Risetime
Building Value with IT Solutions.

SharePoint 2007 Infrastructure and Capacity Planning

White Paper

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Introduction

Over the last couple of years, Microsoft Office SharePoint Server 2007 (MOSS 2007) has become a widely-used enterprise solution for Intranet portals that provide collaboration, content/document management, forms automation, workflow, and search capabilities. In 2008, Microsoft sales of SharePoint eclipsed 100 million licenses and generated over $1 billion dollars in revenue. SharePoint's popularity has provided many lessons-learned about proper infrastructure and capacity planning.

Since some core elements of SharePoint can be difficult to reconfigure once a SharePoint implementation is live, it is really important to plan ahead. Whether a company or organization is looking to implement SharePoint as a departmental solution or as an enterprise solution, planning the SharePoint technical infrastructure is essential to making the project a success.

It may be tempting to just have a member of the IT staff set up a server, install MOSS 2007 and go from there. While this approach may work for a demonstration environment to show others how MOSS 2007 works, it is not advisable to use this method (or the demonstration environment) for a production SharePoint environment.

This paper addresses key elements of infrastructure and capacity planning when setting up a SharePoint environment. Since each SharePoint implementation tends to be unique, this paper will not go into details regarding server-specific specifications, etc. It will, however, describe the following:

- Each server's purpose in the farm
- Farm implementation types
- Farm architecture alternatives
- Capacity planning

What Comprises a SharePoint Farm?

The SharePoint environment, or SharePoint Farm, consists of a series of either physical or virtual servers. Each server can fulfill specific roles by running a set of SharePoint services.

Server Roles

- Web Front End (WFE) Server
- Application Server
- Index Server
- Query Server
- Database Server

The SharePoint Server Roles do not have a 1:1 correlation to the actual servers. Instead, each server can be configured to fulfill one or more roles in a way that best utilizes resources.
For example, many smaller SharePoint implementations (e.g. a basic intranet portal) will use a two-server Farm. In that situation, the WFE, Application, Index and Query roles would be configured on one server, while the Database role would be configured on the second server.

A more complex SharePoint implementation would use a five-server Farm. In this farm setup, two of the servers would have the WFE and Query roles, one server would have the Application and Index roles, and the remaining two servers would have the Database role installed and configured for a clustered setup. This SharePoint Farm is the most common server setup for redundancy needs. (See Appendix A: Sample Redundant SharePoint Farm for an example diagram.)

If there are redundancy needs for a SharePoint implementation, it is important to note that if the Index and Query roles are installed on the same server, additional Query Servers cannot be added for redundancy. The reason for this is, when both roles are installed on the same server, the Index role will not propagate the indexes to other Query Servers.

For more information about redundancy in SharePoint Farms, refer to the *Plan for redundancy (Office SharePoint Server)* link in Appendix B: Additional Resources.

Services on Servers

The common services available on an enterprise MOSS installation are listed below

- Central Administration
- Document Conversions Launcher Service
- Document Conversions Load Balancer Service
- Excel Calculation Services
- Office SharePoint Server Search
- Windows SharePoint Services Help Search
- Windows SharePoint Services Incoming E-Mail
- Windows SharePoint Services Web Application

When determining which services to run on the various servers in the farm, the choices are largely dependent on the Server Roles. If installing the Index or Query role on a server, the Office SharePoint Server Search service would also be required.

Also, not all the SharePoint Services may be available or necessary for your Farm. The Excel Calculation Services is only available when using the Enterprise Edition (with Enterprise CALs) of MOSS 2007. This service is also independent of any of the Server Roles and can be setup on servers according to the requirements of the SharePoint Farm.

SharePoint Implementation Types

The way SharePoint is implemented has a major impact in how the SharePoint Farm is configured and setup. The implementation type, along with redundancy and availability needs often dictates the number of servers in the SharePoint Farm and what Server Roles are needed.

The most common SharePoint implementation types are Internet/Pubic Facing Website and Intranet/Extranet implementations.

Internet/Public Facing Website

Most of the Internet/Public Facing Website implementations take advantage of the Web Content Management (WCM) aspects of MOSS 2007. Internet/Public Facing Websites tend to need a highly available and redundant Farm environment that is capable of serving content to end users quickly.

Intranet/Extranet

Intranet/Extranet implementations often emphasize the WCM and/or the Portal & Collaboration capabilities of MOSS 2007. With Intranet/Extranet implementations, having a highly available or redundant server Farm environment may be less critical, but the indexing (search) and data storage needs are often much greater.

Planning for the Future

If a SharePoint farm configuration is not planned correctly, the entire farm may need rebuilding soon after it is rolled out to production.

Customizations

The rebuilding of a SharePoint Farm can be complicated by the degree of customization included with the implementation. Rebuilding a SharePoint Farm can be a costly endeavor, and may require significant system downtime. Deploying SharePoint customizations to a new SharePoint environment almost always requires some level of manual configuration, unless time was taken to create a reusable deployment module or script as part of the customization effort.

Users

The number of users that will be accessing the SharePoint farm is an essential factor when planning the Farm capacity needs.

In an Internet implementation, this is important in terms of planning for the overall number of servers needed. The number of visitors to an Internet MOSS 2007 site is a key factor in determining how many WFE Servers are needed. In a lower traffic situation it may be sufficient to have one WFE Server be the primary server, while using a second WFE as a cold failover server for redundancy. In other higher traffic situations there might be a need for two or more WFE Servers to handle the larger number of site visits. Another item to consider is how “cache-able” the data is. If the data is highly dynamic and is not easily cached on the WFE Server(s), a more powerful SQL Server or more clustered SQL Servers (also depending on redundancy needs) would be needed.

In an Intranet/Extranet implementation, server needs will also vary greatly depending on the number of users. As more users are added for the purpose of collaboration (read & write activities, instead of read only – See Figure 1 for a comparison of throughput for read only vs. read/write operations as the

number of users increases), the load on the SQL Server grows. This will require more robust server hardware or the need to use clustered SQL Servers.

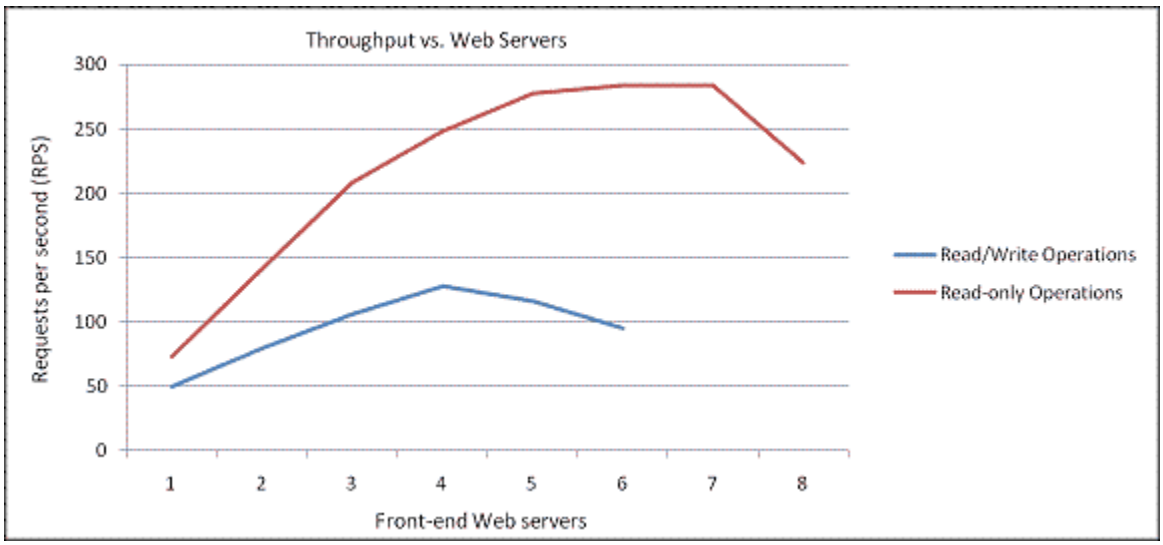


Figure 1: Throughput for Read only vs. Read/Write Operations

Hardware/Servers

Server planning is crucial because under-powered hardware can cause the Farm to hit performance boundaries. Further, performance issues may lead to application errors or even system downtime due to part of or the entire SharePoint farm crashing under higher loads.

When planning for future growth in a SharePoint Farm, there are two strategies to consider: Scale Up or Scale Out. Scaling Up is vertical scaling, which means adding more robust hardware to a server, while Scaling Out is horizontal scaling, which means adding more servers to the SharePoint Farm.

Scaling Up

The concept behind scaling up the hardware is to "supersize" the initial servers that will be running the SharePoint Farm. There are some components, such as server memory (RAM) that can be scaled up at a later point in time. The reason for scaling up the servers when initially setting up the SharePoint Farm is to avoid performance issues and possible downtime in the future if the initial hardware proves inadequate.

One server role that should be scaled up properly from the very start is the Index Server. SharePoint 2007 Index Servers were not designed to be scaled out to improve performance (within the same search context).

Scaling Out

With SharePoint implementations, there are certain elements of the Farm that can be scaled out as needed. Examples of these include WFEs, Query Servers, and Application Servers running the Excel Calculation Services. Refer to the *Plan for redundancy (Office SharePoint Server)* link in Appendix B: Additional Resources for a complete list of what elements of a SharePoint Farm can be scaled out.

It is important to note that SharePoint 2007 Index Servers were not designed to be scaled out within the same search context.

Storage

Environment setup and planning should accommodate the need for data storage growth. It is very easy to perform infrastructure and capacity planning for what you need today, and then quickly out-grow the SharePoint Farm infrastructure.

From the Microsoft TechNet article, ***Estimate performance and capacity requirements for portal collaboration environments***: *"In addition to estimating the initial data volume, an Office SharePoint Server 2007 collaboration environment must also allow for data and site growth over time. A server farm that is sized only for the initial data volume can quickly be outgrown."*

To solve this problem, some simple formulas can be used to calculate the data storage needs for a SharePoint implementation.

Without Versioning (with volume being in GBs)**:**

> (*Initial Data Volume* + (*Initial Data Volume* x *Yearly Rate of Growth* x *Years before Storage Upgrade*)) x 1.3 = *Total Data Storage Volume*

With Versioning (with volume being in GBs)**:**

> (*Initial Data Volume* + (*Initial Data Volume* x *Yearly Rate of Growth* x *Years before Storage Upgrade*)) x 2.6 = *Total Data Storage Volume*

Conclusion

With the immense popularity of Microsoft Office SharePoint Server 2007, it will only be a matter of time before your organization will consider a SharePoint implementation.

It is important to keep in mind that when doing infrastructure and capacity planning for a MOSS 2007 environment it is not as easy as buying the software and installing it. Each implementation tends to be unique and have its own specific needs.

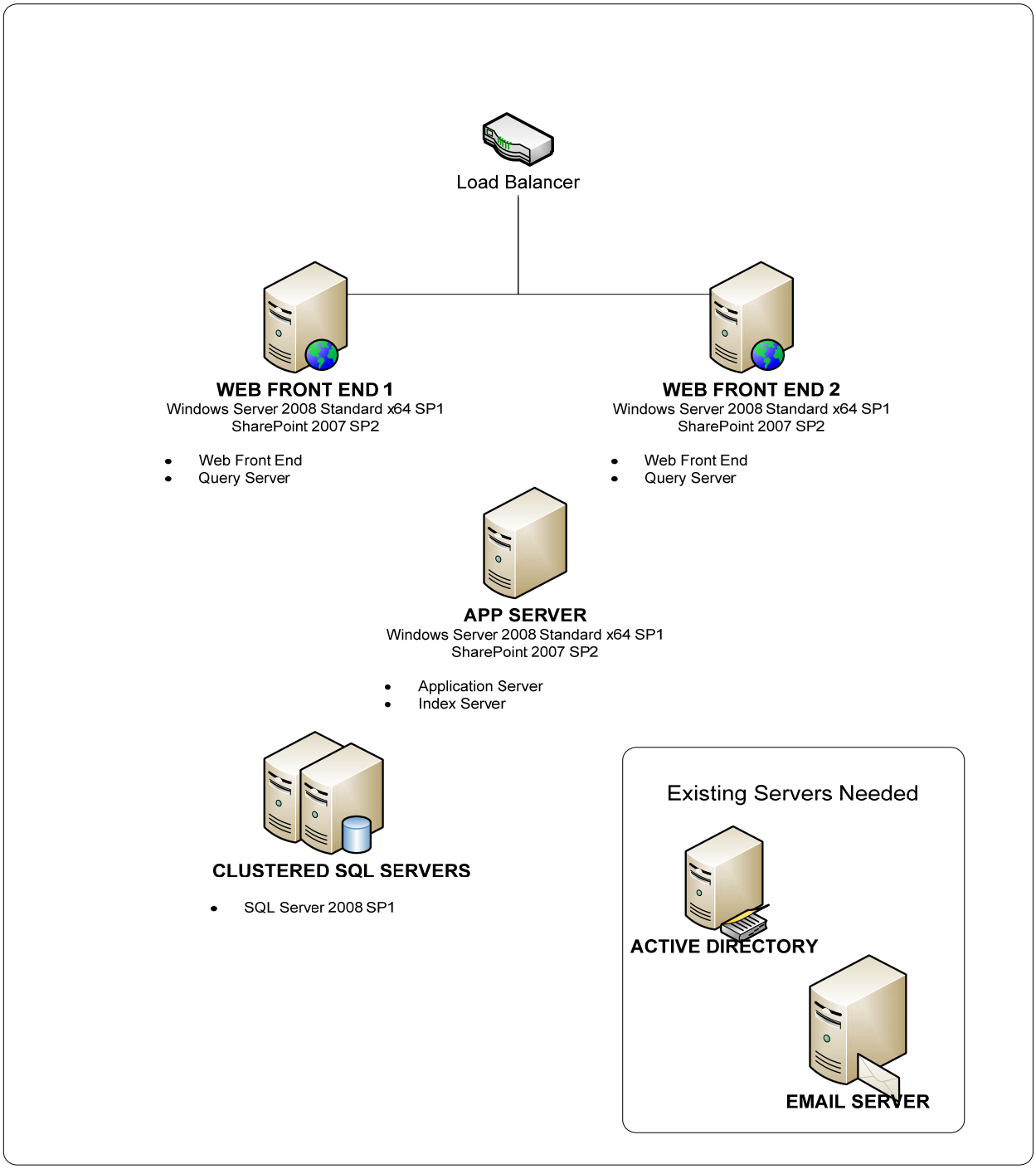
By understanding what comprises a SharePoint Farm, what the common implementations are, how to plan for future use and growth, and applying those concepts to your environment needs, a SharePoint implementation will be setup for success.

Risetime has firsthand experience in SharePoint infrastructure and capacity planning, and assisting organizations in planning for an implementation that's done right – the first time. As a Microsoft Gold Certified Partner, all Risetime SharePoint developers are certified by Microsoft on the SharePoint platform and our SharePoint teams have extensive experience implementing a wide-variety of SharePoint solutions and integrating them with other enterprise systems.

To learn more, take a look at Risetime's Lake County Success Story, detailing how we saved the day on a SharePoint implementation project that went awry due to insufficient planning.

Appendix A: Sample Farm Topologies

Sample Redundant SharePoint Farm



Sample Basic SharePoint Farm

WEB FRONT END 1
Windows Server 2008 Standard x64 SP1
SharePoint 2007 SP2

- Web Front End
- Query Server

APP SERVER
Windows Server 2008 Standard x64 SP1
SharePoint 2007 SP2

- Application Server
- Index Server

SQL SERVER

- SQL Server 2008 SP1

Existing Servers Needed

ACTIVE DIRECTORY

EMAIL SERVER

Appendix B: Additional Resources

Plan for performance and capacity (Office SharePoint Server)
http://technet.microsoft.com/en-us/library/cc262971.aspx

Plan for software boundaries (Office SharePoint Server)
http://technet.microsoft.com/en-us/library/cc262787.aspx

Plan for redundancy (Office SharePoint Server)
http://technet.microsoft.com/en-us/library/cc263044.aspx

Plan for availability (Office SharePoint Server)
http://technet.microsoft.com/en-us/library/cc748824.aspx

Determine hardware and software requirements (Office SharePoint Server)
http://technet.microsoft.com/en-us/library/cc262485.aspx

Estimate performance and capacity requirements for portal collaboration environments
http://technet.microsoft.com/en-us/library/cc263100.aspx

Estimate performance and capacity requirements for Internet environments (Office SharePoint Server)
http://technet.microsoft.com/en-us/library/cc262405.aspx

Estimate performance and capacity requirements (Office SharePoint Server)
http://technet.microsoft.com/en-us/library/cc261716.aspx

About Risetime:

Since 1984, Risetime has been serving the needs of organizations looking for a strong partner to provide business and technology solutions and services. Headquartered in Chicago and a Microsoft Gold Certified Partner, Risetime focuses on providing a wide range of IT consulting services as well as business process management, content management, and web solutions.

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