

# Microsoft Dynamics CRM

Microsoft Dynamics CRM version 3.0

## Suggested Hardware for Deployments up to 250 Concurrent Users

White Paper

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## Introduction

The purpose of this document is to provide Customers and Partners with general hardware sizing information which will support Microsoft Dynamics CRM version 3.0 (Microsoft CRM 3.0) up to 250 concurrent users in a single deployment model\*.

*Review and understand the following before you use this document:*

- This document is specific only to Microsoft CRM 3.0.
- From this document, you are not authorized to make any warranties, guarantees or representations on behalf of Microsoft and Microsoft cannot certify, warrant, guarantee or otherwise validate that your customer deployment will be successful.
- The information provided and the recommendations made are based on existing Customer environments and lab-tested environmental designs. These designs do contain margins of error that can be reduced with additional testing (see later in this document for tools available for such tests) and research of the specific Customer environment.
- Do not use this document when sizing environments that exceed 250 concurrent users in a single module and a single instance of Microsoft CRM.
- All implementations using these guidelines should include a performance testing cycle in addition to a Microsoft SQL Server tuning analysis before the production implementation.
- If the prospect has a high level of transaction volume or other factors exist which could hinder performance or introduce additional complexities, the recommendations in this document may be insufficient and should not be followed.
- This document is not a Microsoft CRM minimum requirements, implementation or installation guide. For any technical deployment issues, use existing product documentation or contact local Microsoft Product Support Services.
- To confirm if the Technical Presales Advisory Group (TPAG) should review the proposed deployment, visit the following link on the Microsoft Partner Program site and then download and complete the Microsoft CRM TPAG data gathering tool:
  - <https://partner.microsoft.com/global/40023009>
- Recommendations provided in this document assume the customer has applied the latest Microsoft software updates, service packs and so on to all Microsoft products supporting the Microsoft CRM product in addition to Microsoft CRM specific updates and enhancement instructions. They also assume that the proposed Customer deployment is using supported configurations.
  - For the most up-to-date information or to receive the latest on what's new, installation instructions, known issues, and so on, visit PartnerSource (<https://mbs.microsoft.com/PartnerSource>), CustomerSource (<https://mbs.microsoft.com/customersource>) or <http://support.microsoft.com> or contact the local Microsoft Product Support Services Team for any questions.
- \*A single deployment model for Microsoft CRM is defined as an installation that has the following components:
  - Active Directory
  - Microsoft Exchange Server (optional)
  - Microsoft CRM Server
  - Microsoft SQL Server

## ***Executive Overview***

The purpose of this document is to provide Partners and Customers with the appropriate information to understand the infrastructure and hardware which supports the Microsoft CRM solution up to 250 concurrent users. This includes several different technologies and they are as follows:

- Microsoft CRM Server 3.0
- Microsoft CRM 3.0 Desktop Client for Microsoft Office Outlook (optional)
- Microsoft CRM 3.0 Laptop Client for Microsoft Office Outlook (optional)
- Active Directory
- Domain Name System (DNS)
- Microsoft Exchange 2000 Server or 2003 (optional)
- Microsoft Windows Server 2003 R2 (32-bit or x64)
- Microsoft SQL Server 2000 or 2005 (32-bit or x64)
- Microsoft Windows Server Terminal Services 2003
- Internet Information Services (IIS)
- .NET Framework

## ***Microsoft CRM Environment Overview***

The Microsoft CRM environment consists of the following components:

- Microsoft CRM Database Server (Microsoft SQL Server)
- Microsoft CRM Application Server (Microsoft CRM Server)
- Microsoft CRM Web Client (uses Internet Explorer)
- Microsoft CRM 3.0 Desktop Client for Microsoft Office Outlook (optional)
- Microsoft CRM 3.0 Laptop Client for Microsoft Office Outlook (optional)
- Microsoft CRM-Exchange E-mail Router (optional)
- Microsoft Windows Server Terminal Services (optional)

### **Microsoft CRM Database Server**

The Microsoft CRM Database Server is primarily used for storing and processing data. This server uses Microsoft SQL Server.

### **Microsoft CRM Application Server**

The Microsoft CRM Application Server (Microsoft CRM Server) is primarily used for serving Microsoft CRM application forms to users and for Microsoft CRM workflow processing. IIS is required on this server.

### **Microsoft CRM Web Client**

The Microsoft CRM Web client enables licensed users to access Microsoft CRM through their Microsoft Internet Explorer Web browser.

## Microsoft CRM 3.0 Client for Microsoft Office Outlook

### Desktop Client

The Microsoft CRM 3.0 Desktop Client for Microsoft Office Outlook (desktop client) is an optional component which lets users access customer data through the Microsoft Outlook e-mail and messaging client (online only).

### Laptop Client

The Microsoft CRM 3.0 Laptop Client for Microsoft Office Outlook (laptop client) is an optional component which lets users access customer data through the Microsoft Outlook e-mail and messaging client (online or offline).

## Microsoft CRM-Exchange E-mail Router

The Microsoft CRM-Exchange E-mail Router (Router) is an optional software component that provides an interface between the Microsoft CRM system and Microsoft Exchange 2000 Server or Microsoft Exchange Server 2003. For more information about Router functionality see the Microsoft CRM Implementation Guide.

## Microsoft Windows Server Terminal Services (optional)

Microsoft Windows Server Terminal Services (Terminal Services) is an optional software component that provides new options for application deployment, more efficient access to data over low bandwidth, reuse of older hardware, remote management, and other tasks. For questions about officially supported Microsoft CRM configurations using Terminal Services, see the Microsoft CRM Implementation Guide or contact Microsoft Support Services.

## *Assumptions and Considerations*

- Each architectural scenario outlined in this document assumes that no single entity in the MSCRM database contains more than 50% of all the data in the system (i.e. the data is “generally” distributed evenly). If a single entity has more than 50% of the total data in the system, or if the overall data size is greater than what is in the outlined scenarios, then the recommendations of this document may not apply.
- Deployments greater than 250 concurrent users require a more detailed analysis of business requirements, existing infrastructure, proposed data size and transactional volume than this document provides. Therefore, this document should not be used to provide guidance for deployments greater than 250 concurrent users. Plan accordingly and see the [Additional Services](#) section of this document.
- Particularly complex solutions such as when there are a large number of integration points, complex scripting or workflow processes or a very low ‘think time’ between transactions may require significantly more hardware and this document may therefore not apply in these instances.

- This document assumes all computers used in the Microsoft CRM deployment have processors purchased within the last two years. Best case scenario is new computers with the latest chip technology.

## ***Microsoft CRM Database Server***

Microsoft CRM supports Microsoft SQL Server database software. The following information is applicable regardless of the deployment scenario selected.

### **Microsoft SQL Server**

Microsoft SQL Server 2005 Standard Edition is the typical version of Microsoft SQL Server recommended for deployments with up to 250 concurrent Microsoft CRM users. Notice that if transactional volume in the Microsoft CRM deployment becomes very high, this could have a large affect on overall application performance. To minimize any adverse performance results, an in-depth testing cycle and Microsoft SQL Server tuning analysis are suggested before the production implementation and after any planned customizations.

#### **Versions**

The Microsoft CRM database can use different versions of the Microsoft SQL Server product suite. Make sure that you have a good understanding of the performance benefits and implications associated with which version of Microsoft SQL Server is deployed. The version of Microsoft SQL Server (2000 vs. 2005, 32-bit vs. 64-bit) deployed will affect how many computer processors and RAM are available to the Microsoft SQL Server. Before purchasing or installing Microsoft CRM, make sure you understand the differences in the Microsoft SQL Server version and the benefits of each. To learn more, visit the following link:

<http://www.microsoft.com/sql/prodinfo/features/compare-features.mspx>

### **Data Size Impact**

The data which is both first migrated into the Microsoft CRM database and also subsequently entered into the system each day, month and year can have a significant affect on the overall Microsoft CRM system performance. The Microsoft SQL Server housing the Microsoft CRM data is a very important piece to providing acceptable performance.

In addition, as the total number of records (both per entity and over the whole system) is important in determining an overall database size, equally important are the users in the system and the information about those users, the data that each user will own, the business use cases that each user will run, and the frequency at which those use cases occur. This is also why each Microsoft CRM deployment truly is unique and it is difficult to do a side-by-side comparison of one Microsoft CRM deployment to another, even though they may have generally the same number of users or data size. Carefully consider all of the business requirements and other unique deployment details which will shape the deployment.

## Data Archiving

When significant data growth is expected, data archiving should be considered to offload non-business critical data and to improve overall system performance.

## General Guidelines to Optimize Performance on the Database Server

Hardware is one way to boost Microsoft CRM application performance, but by itself may not elicit optimal performance if the following points are not considered. It is also important to notice that performance optimization is deployment specific. This means a specific method of optimization for one customer may have no change or even an adverse effect on another customer. That is why it is so important to deeply understand exactly how the customer will be using the system and what the proposed optimization is doing.

### Disk Configuration

In addition to the Microsoft CRM Implementation Guide, Microsoft preferred practices for disk configuration are available online. See the following Microsoft articles when you are considering Microsoft SQL Server configuration and settings:

- Using Files and Filegroups - [http://msdn2.microsoft.com/en-us/library/ms187087\(d=ide\).aspx](http://msdn2.microsoft.com/en-us/library/ms187087(d=ide).aspx). This article discusses best practices for data and log files among other relevant topics. The main point to take from this article is that the Microsoft SQL Server Data Files should not be on the same physical disk set as the Microsoft SQL Server Log Files. This article is also available in Microsoft SQL Server 2005 Books Online.
- SQL Server 2000 Operations Guide: Capacity and Storage Management - <http://www.microsoft.com/technet/prodtechnol/sql/2000/maintain/sqlops6.mspix>

### Memory

Use as much dedicated memory (RAM) per Microsoft SQL Server instance as possible for the computer that is running Microsoft SQL Server and supporting the MSCRM database. As the memory allocated to Microsoft SQL Server is very important, adjust as necessary. It is preferred practice to not run other applications on the Microsoft SQL Server computer which supports the MSCRM database, but it is supported. If it is co-hosted with other applications (example: Microsoft CRM Server), we recommend the memory available to Microsoft SQL Server is constrained to top heavy paging activity.

### More information

For other information about the Microsoft CRM Database Server, view any of the following:

- Microsoft SQL Server - <http://www.microsoft.com/sql>
- To download Microsoft SQL Server 2005 Books Online, visit: <http://www.microsoft.com/technet/prodtechnol/sql/2005/downloads/books.mspix>
- For more information about Microsoft SQL Server on an x64 Platform, visit <http://www.microsoft.com/sql/editions/64bit/default.mspix>.
- For more information about supported processors using Microsoft SQL Server on an x64 Platform, visit <http://www.amd.com> and <http://www.intel.com>.
- For more information about x64 Microsoft Windows Server operating systems, visit <http://www.microsoft.com/windowsserversystem/default.mspix>.

- Microsoft Help and Support - <http://support.microsoft.com/>
- MSDN Library - <http://msdn2.microsoft.com/en-us/library>
- For AMD chip information visit: <http://www.amdcompare.com/us%2Den/opteron/>
- For Intel chip information visit: <http://www.intel.com/products/processor/index.htm>

## Client Specifications

### Microsoft CRM Web Client

See the Microsoft CRM 3.0 Implementation Guide (section 5-3) for Microsoft CRM Web Application Software Requirements.

### Microsoft CRM Client for Microsoft Office Outlook

Microsoft CRM 3.0 Client for Microsoft Office Outlook requirements are provided in the Microsoft CRM 3.0 Implementation Guide (section 5-3), but notice they are minimum requirements (that is what it takes for the application to run). To boost performance, specifications beyond these base requirements will be required.

#### Desktop Client

A general desktop client that supports the transaction volume outlined in this document is as follows:

Microsoft Windows Edition	Single Core Processors	Dual Core Processors	RAM (GB)	Network (GB)
Windows XP or later (See Microsoft CRM Implementation Guide for more details)	1	1	Minimum – 512 MB Recommended – 1+	Minimum – 100 mbps

Notice that any other processes running on the client computer may adversely affect performance. If a Customer has heavy transactional volume this could have a large affect on overall application performance. To minimize any adverse performance results, an in-depth testing cycle and Microsoft SQL Server tuning analysis are suggested before the production implementation.

#### Laptop Client

Because the laptop client has offline functionality, more powerful hardware client requirements for the client are typically required. We recommend for the laptop client to have *at least* the following requirements to adequately meet performance expectations:

Microsoft Windows Edition	Single Core Processors	Dual Core Processors	RAM (GB)	Network (GB)
Windows XP or later (See Microsoft CRM Implementation Guide for more details)	1	1	1+	Minimum – 100 mbps

For software requirements and hardware minimum requirements (what it takes for the laptop client to run), see the Microsoft CRM 3.0 Implementation Guide.

The following list includes some Microsoft preferred practices for optimizing laptop client offline synchronization, which can potentially impact performance on the Microsoft SQL Server computer and overall Microsoft CRM deployment:

- Assign all users roles with the *minimum* access levels and permissions that are required for them to do their jobs – this will help guarantee data synchronization to the laptop clients’ performance is optimized.
- Optimize local data filtering for each laptop client, or in other words, limit the amount of data any user takes offline. Offline data filtering is available via the Microsoft Outlook tool bar after the laptop client is installed (under CRM | Local Data).
- Have an approved security data plan (data access levels and rights within Microsoft CRM) for the organization's implementation.
- High-speed connections at remote branches will improve offline synchronization performance for the laptop client.

\*If you have questions on other ways to increase synchronization performance, contact your regional Microsoft Product Support Services office.

Notice that other processes and applications can also adversely affect Microsoft CRM laptop client performance. Turning any of these other non-business critical processes off may be necessary to achieve desired performance levels. The following items may affect Microsoft CRM laptop client performance (this is not an all-inclusive list):

- Any other third-party Microsoft Office Outlook add-in’s
- Antivirus software
- Third-party software running on the client computer which is not critical to a user’s business needs (i.e. games, music programs, etc.)
- Disk fragmentation

## **Microsoft CRM-Exchange E-mail Router**

For Exchange Server requirements, see Exchange Server product documentation or visit the following link:

- <http://www.microsoft.com/exchange/default.mspx>

Review the Microsoft CRM Implementation Guide for Microsoft CRM Exchange E-mail Router requirements. This document does not cover any Router requirements.

## **Microsoft Windows Server Terminal Services**

Microsoft Windows Server Terminal Services (Terminal Services) may be required if any of the following scenarios are true:

- Users are connecting over a WAN or VPN using the Microsoft CRM web client or desktop client.
  - Notice the laptop client is not supported with Terminal Services in Microsoft CRM 3.0.
- Round-trip client/server latency does not meet Customer expectations.
- Remote users are connecting with a finite (or budgeted) amount of bandwidth. Terminal Services can allow more users to use that connection with better results (faster, lower latency) because more work is done on the Terminal Services computer rather than the remote client(s).

The following is based on 100 clients per Terminal Server. A general Microsoft Windows Terminal Server that supports 100 or less concurrent Microsoft CRM is as follows:

AMD Opteron or Intel Xeon					
Microsoft Windows Server Edition	Concurrent users	Single Core Processors	Dual Core Processors	RAM (GB)	Network (GB)
Microsoft Windows Server 2003 Standard Edition R2 (32-bit)	<100	2	1	4	1
Windows Server 2003 Enterprise Edition R2 (32-bit)	<100	2	1	4	1

If performance is not acceptable for this many users, reduce the number of users per Terminal Server and/or increase the supporting hardware on the Terminal Server (i.e. memory).

For more information about Microsoft Windows Server Terminal Services, visit:

<http://www.microsoft.com/windowsserver2003/technologies/terminalservices/default.mspx>

## Microsoft CRM Architecture and Hardware Recommendations

This section outlines hardware specifications and general architecture considerations for three different deployment scenarios. These scenarios focus on the Microsoft CRM Server and Microsoft SQL Server.

- A Microsoft CRM deployment with the Microsoft CRM Server and Microsoft SQL Server on the same physical computer, either using Small Business Server 2003 R2 (Windows SBS) or installed on a Windows Server 2003 R2 computer
- A Microsoft CRM deployment with a separate, physical Microsoft CRM Server and a separate, physical Microsoft SQL Server (i.e. Microsoft CRM and SQL are NOT on the same computer).
- A Microsoft CRM deployment with a separate, physical Microsoft CRM Server and a separate, physical Microsoft SQL Server (i.e. Microsoft CRM and SQL are NOT on the same computer).
  - This scenario also includes high availability considerations.

### Deployment Scenario #1 – Microsoft CRM Server and Microsoft SQL Server on Same Machine

In this deployment scenario, Microsoft CRM Server is installed either on a Windows SBS computer or on the same computer as Microsoft SQL Server (non Windows SBS computer).

#### Deployment Characteristics:

- Number of concurrent users: <75
- Operating System: Small Business Server 2003 R2 or Windows Server 2003 Standard Edition R2
- Low IT involvement
- Under 100,000 records in any single entity within the MSCRM database (<10 GB of data)

#### Server Specifications:

A general Microsoft CRM deployment that supports up to 75 concurrent users is as follows:

AMD Opteron or Intel Xeon				
Microsoft Windows Server Edition	Number of Microsoft CRM concurrent users	Dual Core Processors	RAM (GB)	Network (GB)
Microsoft Small Business Server R2 (32-bit)	75 or less	2	4	1
Windows Server 2003 Standard Edition R2 (32-bit)	75 or less	2	4	1

#### Other Information:

- Be aware that if using Windows SBS for the Microsoft CRM deployment, other components such as Windows SharePoint Services and Exchange Server 2003 (among other components) could affect

overall system performance, depending on specific business requirements and usage. Plan accordingly when sizing the Windows SBS computer.

- It is recommended to start with the RAM mentioned above and expand as necessary. Additional processors may also be added as necessary. Proper system monitoring will determine when RAM and processors should be added to this server configuration.
- For more information about Windows SBS visit <http://www.microsoft.com/windowsserver2003/sbs/default.msp>

## Deployment Scenario #2 – Microsoft CRM Server and Microsoft SQL Server on Separate Computers

In this deployment scenario, the Active Directory Domain Controller is on a dedicated computer within the Customer’s domain. The Microsoft CRM Server and Microsoft SQL Server are each installed on their own dedicated physical computers.

### Deployment Characteristics:

- Number of concurrent users: up to 250
- Database size as large as 50GB
- Moderate to high IT involvement

### Microsoft CRM Server Specifications:

Generally, a deployment of up to 250 concurrent Microsoft CRM users will need a single Microsoft CRM Server. However, specific [performance variables](#) may require a deployment to have multiple Microsoft CRM Servers. Plan accordingly.

A general Microsoft CRM Server that supports up to 250 concurrent Microsoft CRM users is as follows:

AMD Opteron or Intel Xeon				
Microsoft Windows Server Edition	Number of Microsoft CRM concurrent users	Dual Core Processors	RAM (GB)	Network (GB)
Microsoft Windows Server 2003 Standard Edition R2 (32-bit)	250 or less	2	4	1
Microsoft Windows Server 2003 Standard Edition R2 (32-bit)	250 or less	2	4	1

It is recommended to start with the RAM mentioned above and expand as necessary. Additional processors may also be added as necessary. Proper system monitoring will determine when RAM and processors should be added to this server configuration.

## Microsoft SQL Server Specifications:

A general Microsoft SQL Server that supports up to 250 concurrent Microsoft CRM users is as follows:

AMD Opteron or Intel Xeon EM64T						
Microsoft Windows Server Edition	SQL Server Edition	Number of Microsoft CRM concurrent users	Single Core Processors	Dual Core Processors	RAM (GB)	Network (GB)
Microsoft Windows Server 2003 Enterprise Edition R2 (32-bit)	Microsoft SQL Server 2000 Enterprise Edition (32-bit); Microsoft SQL Server 2005 Standard Edition (32-bit); Microsoft SQL Server 2005 Enterprise Edition (32-bit)	250 or less	4	2	4	1
Windows Server 2003 Standard x64 Edition R2; Windows Server 2003 Enterprise x64 Edition R2	Microsoft SQL Server 2000 Enterprise Edition (x64); Microsoft SQL Server 2005 Standard Edition (x64); Microsoft SQL Server 2005 Enterprise Edition (x64)	250 or less	4	2	4	1

It is recommended to start with the RAM mentioned above and expand as necessary. Additional processors may also be added as necessary. Proper system monitoring will determine when RAM and processors should be added to this server configuration.

### Disk Configuration

A RAID (redundant array of independent disks) configuration that will support up to 250 concurrent Microsoft CRM users is as follows:

- The Microsoft CRM Server computer can be a RAID 1 for just operating system (OS) and installation files.
- The Microsoft SQL Server computer can be a RAID 1 for just OS and installation files.
- Deploy a dedicated RAID 5 or RAID 1+0 array for the MSCRM SQL Data Files (.mdf).
- Deploy a dedicated RAID 1 array for the MSCRM SQL Log Files (.ldf).
- Deploy a dedicated RAID 1 array for the MSCRM SQL TEMPDB database if it's determined the TEMPDB will be heavily utilized.

## Deployment Scenario #3 – Microsoft CRM Server and Microsoft SQL Server on Separate Computers (High Availability Included)

In this deployment scenario, the Active Directory Domain Controller is on a dedicated computer within the Customer's domain. The Microsoft CRM Server and Microsoft SQL Server are each installed on their own dedicated physical computers. This scenario includes a *high availability* component.

### Deployment Characteristics:

- Number of concurrent users: up to 250
- Database size as large as 50GB
- Moderate to high IT involvement
- High availability required

### Microsoft CRM Server Specifications:

Generally, a deployment of up to 250 concurrent Microsoft CRM users will need a single Microsoft CRM Server. However, specific [performance variables](#) may require a deployment to have multiple Microsoft CRM Servers. Plan accordingly.

A general Microsoft CRM Server that supports up to 250 concurrent Microsoft CRM users is as follows:

AMD Opteron or Intel Xeon				
Microsoft Windows Server Edition	Number of Microsoft CRM concurrent users	Dual Core Processors	RAM (GB)	Network (GB)
Microsoft Windows Server 2003 R2 (32-bit)	250 or less	2	4	1
Windows Server 2003 Enterprise Edition R2 (32-bit)	250 or less	2	4	1

It is recommended to start with the RAM mentioned above and expand as necessary. Additional processors may also be added as necessary. Proper system monitoring will determine when RAM and processors should be added to this server configuration.

### Microsoft SQL Server Specifications:

A general Microsoft SQL Server that supports up to 250 concurrent Microsoft CRM users is as follows:

AMD Opteron or Intel Xeon EM64T						
Microsoft Windows Edition	SQL Server Edition	Number of Microsoft CRM concurrent users	Single Core Processors	Dual Core Processors	RAM (GB)	Network (GB)
Microsoft Windows Server 2003 Enterprise Edition R2 (32-bit)	Microsoft SQL Server 2000 Enterprise Edition (32-bit); Microsoft SQL Server 2005 Standard Edition (32-bit); Microsoft SQL Server 2005 Enterprise Edition (32-bit)	250 or less	4	2	4	1
Windows Server 2003 Standard x64 Edition R2; Windows Server 2003 Enterprise x64 Edition R2	Microsoft SQL Server 2000 Enterprise Edition (32-bit); Microsoft SQL Server 2005 Standard Edition (x64); Microsoft SQL Server 2005 Enterprise Edition (x64)	250 or less	4	2	4	1

It is recommended to start with the RAM mentioned above and expand as necessary. Additional processors may also be added as necessary. Proper system monitoring will determine when RAM and processors should be added to this server configuration.

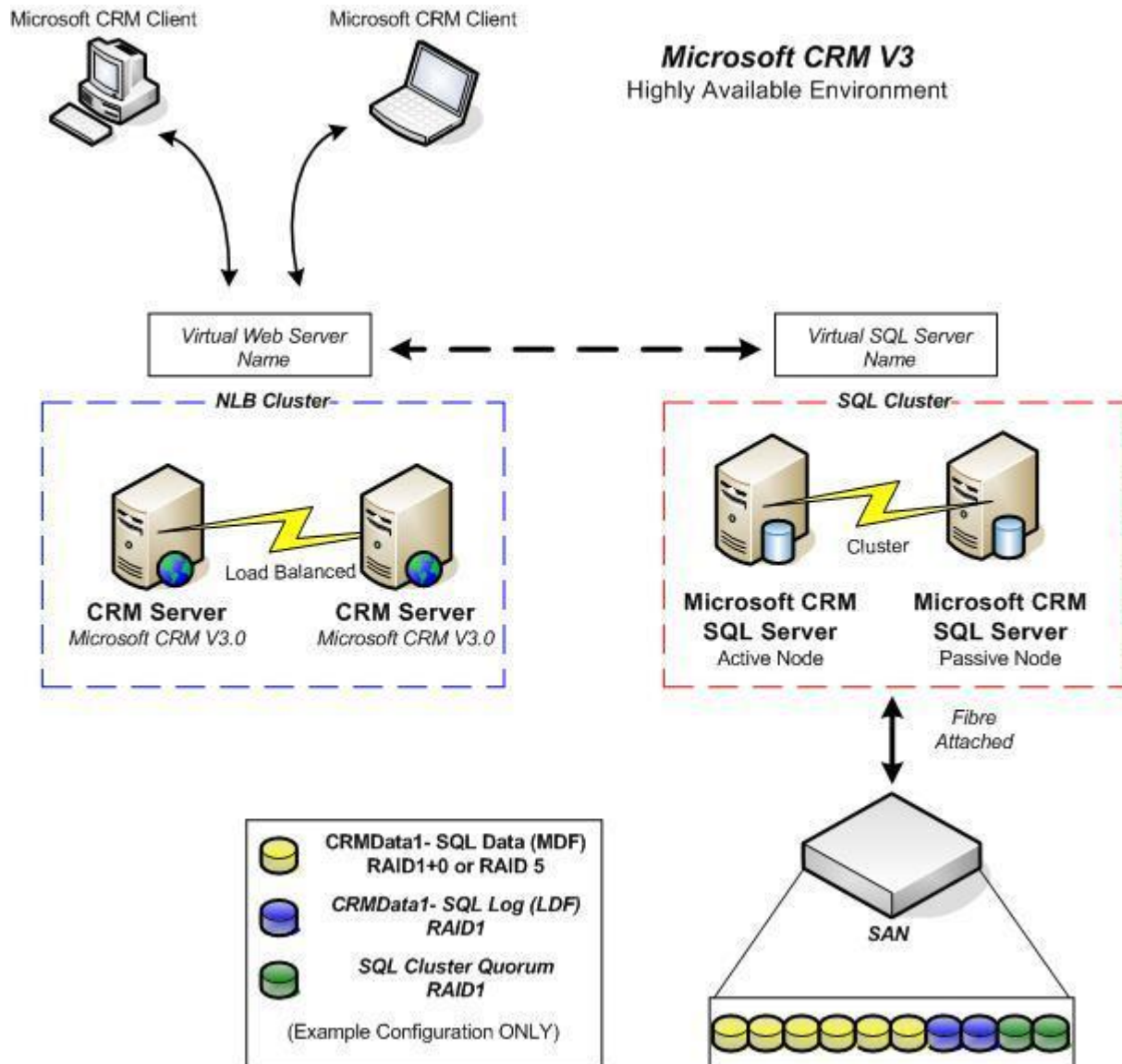
### Disk Configuration

A RAID (redundant array of independent disks) configuration that will support up to 250 concurrent Microsoft CRM users factoring in high availability options is as follows:

- The Microsoft CRM Server computer can be a RAID 1 for just operating system (OS) and installation files.
- The Microsoft SQL Server computer can be a RAID 1 for just OS and installation files.
- Deploy a dedicated RAID 5 or RAID 1+0 arrays for MSCRM SQL Data Files (.mdf).
- Deploy a dedicated RAID 1 array for MSCRM SQL Log Files (.ldf).
- Deploy a dedicated RAID 1 array for MSCRM SQL TEMPDB if it's determined the TEMPDB will be heavily utilized.
- Deploy RAID 1 for a cluster Quorum drive.

## Example Diagram

High availability and load balancing are achieved at the application tier by implementing Windows Network Load Balancing (NLB) or a Hardware Load Balancer. High availability is achieved at the data tier by implementing a SQL Server Active/Passive cluster.



## High Availability and Storage Preferred Practices

The following topics are relevant to Microsoft CRM deployments for many reasons. They are not all inclusive and are not meant to be, but rather are available for consideration for a Customer's Microsoft CRM environment.

## Microsoft SQL Server

Microsoft CRM 3.0 servers can be installed into a clustered Microsoft SQL Server environment. A cluster of computers running Microsoft SQL Server can reduce system down time because if one of the servers in the cluster fails there will be an automatic fail-over to another computer running Microsoft SQL Server.

The Microsoft SQL Server cluster is to be configured so that the Microsoft CRM databases will fail over to the second node in the Microsoft SQL Server cluster – only a Single Instance (Active/Passive) cluster is supported. This includes:

- Microsoft CRM Database
- Microsoft CRM Metadata
- Microsoft CRM SRS (this may reside on a dedicated SRS server outside of the cluster)

Additional information on implementing Microsoft CRM 3.0 in a Microsoft SQL Server clustered environment can be found here:

<http://www.microsoft.com/dynamics/crm/using/deploy/clusteringSQLservers.mspix>

## Storage

A general storage configuration of a Storage Area Network (SAN) for a Microsoft CRM environment is as follows:

Storage Solution	Technology	Concurrent Number of Users	Number of Disks for SQL Server and Tempdb	Number of Disks for SQL Server Log	Total Number of Disks for SQL Server
Storage Area Network (SAN)	Fiber/SCSI	250	12-16 (RAID 10)	2 (RAID 1)	14-18
Storage Area Network (SAN)	Fiber/Fiber	250	12-16 (RAID 10)	2 (RAID 1)	14-18

## Load balancing

You can install multiple Microsoft CRM 3.0 Servers in order to balance the processing load across several servers. With multiple servers, you can also implement departmental Microsoft CRM systems that still have access to the same Microsoft CRM database.

Network Load Balancing (NLB) technology is designed to spread the load between the different nodes of a cluster. With NLB, administrators can simply add another server to the node as traffic increases (i.e. scaling "out").

Additional information on implementing Microsoft CRM 3.0 in an NLB environment can be found here:

<http://www.microsoft.com/dynamics/crm/using/deploy/clusteringmscrmservers.mspix>

## Performance Variables

Overall Microsoft CRM system performance is dependent on several factors in addition to architecture and hardware specifications. These factors can include (but are not limited to) the following:

### Reporting

Ad hoc reports performed during peak hours can cause decreases in performance. The following suggestions can also possibly assist in avoiding performance issues caused by long running reports, custom reports or reporting on large datasets:

- For long running reports use the Report Scheduling Wizard:
  - <http://www.microsoft.com/downloads/details.aspx?FamilyID=a101d4d9-6463-4a45-899b-3c3ee979c4d0&DisplayLang=en>
- When creating custom SRS reports, review the Performance Issues section in the Report Writers Guide section of the Microsoft CRM 3.0 SDK:
  - <http://www.microsoft.com/downloads/details.aspx?FamilyID=9c178b68-3a06-4898-bc83-bd14b74308c5&DisplayLang=en>
- For large datasets, review the Improving Performance of Microsoft CRM 3.0 by Using a Dedicated Report Server document:
  - <http://www.microsoft.com/downloads/details.aspx?FamilyID=c82dfbe2-db8f-4a78-92b2-7c866057cde6&DisplayLang=en>

### Additional Performance Variables

- Laptop client offline synchronization
- Microsoft CRM client connection speeds
- Network bandwidth (home office, remote locations ...)
- Non-OS or Microsoft CRM processes running on either the Microsoft CRM Server or client computers
- Microsoft CRM Workflow processing
- Customizations, ISV products or 3<sup>rd</sup> party integrations
- Custom scripting
- Other applications sharing storage with Microsoft CRM
- Ad hoc queries using Microsoft CRM Advanced Find
- The number and type of Microsoft CRM users
- Amount of data in the Microsoft CRM (MSCRM) database

(This document assumes all technologies have been purchased within the last two years)

## ***Virtual Servers***

Deploying Microsoft CRM in a virtual environment is not supported in production. You can install Microsoft CRM on computers that are running either Microsoft Virtual Server 2005 or Microsoft Virtual PC 2004 (or latest version). However, notice the following support conditions:

- Because of decreased performance *do not use* Microsoft CRM running on a virtual server as your main production business environment.
- Microsoft Product Support Services will consider Collaboration Requests and hotfix investigations for issues that involve Microsoft CRM and Microsoft Virtual Server 2005 or Microsoft Virtual PC 2004 only in test, development, and demonstration systems.

## ***Microsoft CRM 3.0 Performance and Stress Testing Toolkit***

Overview – the Microsoft CRM 3.0 Performance and Stress Testing Toolkit is a tool that was created by the Microsoft CRM product team to formalize performance testing of Microsoft CRM 3.0. This toolkit facilitates load testing for particular customer scenarios. Taking the time to carefully consider and gather dataset and workload requirements, together with accurate modeling of those requirements may prevent added expense if a performance or scalability design is discovered late in the implementation process. This document, together with the code and examples in the toolkit, are designed to provide a solid foundation for running robust and meaningful performance tests.

We strongly recommend that you complete a performance stress test well before go-live (even in pre-sale if necessary) for any Microsoft CRM deployment which contains a large dataset, a significant number of concurrent users or has complex business requirements or multiple items from the [Performance Variables](#) section above.

Visit the following link to download the Microsoft CRM Performance and Stress Testing Toolkit and view its requirements:

- <http://www.microsoft.com/downloads/details.aspx?FamilyID=1a25db7c-5060-417c-86db-6377a84ee650&DisplayLang=en>.

\*It is important to note that the Microsoft CRM Performance and Stress Testing Toolkit will require performance tuning to see optimum results, both within Microsoft CRM and Microsoft SQL Server.

## ***Additional Services***

### **North America**

#### **Business Systems Architecture Services**

The North America Microsoft Dynamics Business Systems Architecture Team provides prescriptive guidance on deployment infrastructure and hardware to Partners and Customers for Microsoft Dynamics deployments. Specific packaged services include Business Systems Architecture Assessments (includes hardware sizing), Health Checks and Onsite System Performance Workshops. Notice that these types of services are outside the scope of the Microsoft CRM Technical Presales Advisory Group (TPAG) resource (<https://partner.microsoft.com/global/40023009>).

For pricing information and availability, contact [MBSPProfessionalServices@microsoft.com](mailto:MBSPProfessionalServices@microsoft.com) today.

Visit PartnerSource to learn more about the services that are provided by the Microsoft Dynamics Business Systems Architecture Team:

[https://mbs.microsoft.com/partnersource/resources/services/services/business\\_systems\\_architecture.htm](https://mbs.microsoft.com/partnersource/resources/services/services/business_systems_architecture.htm)

### **Other regions**

For services in other regions, please contact the local Microsoft Support Services or Microsoft Consulting Services (MCS) office to request hardware sizing or architecture services (availability may vary).

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