

**EPICOR**<sup>®</sup>

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An Epicor<sup>®</sup> White Paper

# ERP 10 Hardware Sizing Guide

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## Introduction

Welcome to the Epicor ERP 10 Hardware Sizing Guide. The goal of this guide is to provide a practical approach to sizing your Epicor ERP 10 application and database server to obtain the best performance possible from your Epicor software. It will also help you plan for the future growth of your system.

The key to success in getting your hardware sized correctly is to define your application load correctly and then to match it with the appropriate hardware resources. Choosing a hardware architecture which can grow as your business and/or application load grows is also important.

It is very difficult to accurately come up with a hardware recommendation that matches your unique application usage. Many of our customers find this guide very useful and accurate after they have followed all the steps described here. There are cases where the provided recommendations may fall short for whatever reason. It is therefore very difficult to guarantee or imply that the hardware purchased using this guide will solve your unique business requirements. To improve the odds of success, we highly recommend that you work with the Epicor Technical Solutions group and implement their hardware sizing recommendations.

This guide is meant for customers buying new hardware and software so we recommend latest software versions supported by Epicor ERP. If you want to determine if other versions of software are supported then please contact Epicor technical support.

Please note that you should consult Epicor Technical Services for High Availability and Business Continuity customer requirements as this sizing guide cannot get into details of that topic.

## Hardware sizing guide for up to 15 user load

Table 1

|  |  |
|--|--|
| <b>Small ERP</b>   | ERP 10 Physical Server. This configuration can support standard load of 15 Office + Data collection users. See table 2 for the definition of standard load.  |
| <b>OS &amp; SQL Server (Recommended)</b>   | OS: Windows Server 2012 R2 Standard Edition<br>SQL Server 2012 / 2014 Standard Edition   |
| <b>Applications</b>  | Epicor ERP 10, Epicor Web Access (EWA), Enterprise Search (ES), Epicor Social Enterprise (ESE)   |
| <b>Processors</b>  | 1 x CPU socket recommendations: <ul style="list-style-type: none"> <li>Intel Xeon E5-2450 v2 2.50GHz, 20M Cache, 8.0GT/s QPI, Turbo, 8C, 95W</li> </ul> It is recommended to leave Hyper-Threading enabled (check BIOS settings).<br>Disable Power Saving options and C-States in BIOS. Enable Turbo Boost.<br><i>Note: The latest generation of Haswell processors are not fully available at the time of publication. For a recommendation on Haswell processors please contact the Hardware Sales Team or Epicor Technical Services.</i>  |
| <b>Memory (RAM)</b>  | 32 GB ECC  |
| <b>Storage – Option #1 - HDD and SSD (Recommended)</b>   | 2 x 146GB 15k RPM HDDs in RAID 1, 3 Gbps, 4 x 200GB SSDs in RAID 1 or 10, 3 Gbps<br>Operating system and page file on HDD SQL Database and reports on SSDs.<br><i>Note: MLCs are cheaper than SLCs. SLCs are more reliable. MLCs are getting better by the day, if you maintain a warranty coverage on Enterprise MLC SSDs then you can purchase MLCs.</i>   |
| <b>Storage Option #2 (you can use this option if your SAN passes the SQLIO test)</b><br><b>Existing Storage Area Network (SAN)</b> | To find out if your SAN delivers sufficient performance for SQL database, see the “Testing the performance of an existing SAN” section in the Appendix for details on how to run a storage benchmarking tool (SQLIO).<br>Required SQLIO results at all times including during peak load from other application usage on the SAN:<br><br><b>Database drive letter (location of SQL mdf file):</b><br>Must be able to deliver at least 100MB/sec at a latency of less than 5ms.<br><br><b>Transaction log drive letter (location of SQL log file):</b><br>Must be able to deliver at least 30MB/sec at a latency of less than 5ms.<br><br><b>Tempdb drive letter (location of SQL temp db file):</b><br>Must be able to deliver at least 50MB/sec at a latency of less than 5ms. |

Table 2

| <b>Load expectation for up to 15 user load (Small ERP)</b>   |   |
|--|---|
| <b>Application Usage</b>   | <b>Load Description</b>   |
| <b>Interactive Application Load</b>  | Typical application usage by end-users using ERP 10 via Smart Client and/or browser and / or mobile devices.  |
| <b>Automation and heavy processing</b><br><b>1. Epicor Service Connect (ESC)</b><br><b>2. Imports (e.g. PO, Sales Order, AR invoice and Shipping)</b><br><b>3. Automatic updating of data not covered by ESC</b><br><b>4. Heavy reporting.</b> | <p>If you are processing more than 25K transactions (insert, update or delete) in any one hour period of the working day then schedule this activity to less busy time of the day. 25K transaction is the sum total of all sources of automatic processing.</p> <p>If this activity cannot be scheduled to less busy time of the day then please discuss the server sizing with Epicor technical services.</p> <p>Heavy and concurrent reporting should be scheduled to less busy time of the day or on a separate reporting appserver.</p> |
| <b>Custom Code (BPM is not counted as Custom code)</b><br><br><b>In-house custom application running on Epicor ERP 10 machine and/or using Epicor ERP 10 database and/or Epicor ERP 10 appserver directly</b>                                  | No (If yes then discuss the increase in usage with Epicor technical services)   |
| <b>MRP (Manufacturing customers)</b>   | <p>MRP regeneration will be scheduled during less busy times. For daily MRP runs use MRP net change.</p> <p>If your business requires you to run more than 2 processes and 2 schedulers for MRP run then discuss the increase usage with Epicor technical services.</p>   |
| <b>Growth and acquisition of new users</b>   | No  |
| <b>Seasonal peaks</b>  | No  |

## ERP 10–Hardware sizing guide (up to 50 user load)

Table 3

|  |  |
|--|--|
| <b>Medium ERP</b>  | ERP 10 Physical Server. This configuration can support standard load of 50 Office + Data collection users. See table 4 for the definition of standard load.  |
| <b>OS &amp; SQL Server (Recommended)</b>   | OS: Windows Server 2012 R2 Standard Edition.<br>SQL Server 2012 / 2014 Standard Edition.   |
| <b>Applications</b>  | Epicor ERP 10, Epicor Web Access (EWA), Enterprise Search (ES), Epicor Social Enterprise (ESE)   |
| <b>Processors</b>  | 1 x CPU socket recommendations: <ul style="list-style-type: none"> <li>Intel Xeon E5-2667 v2 3.3GHz, 25M Cache, 8.0GT/s QPI, Turbo, HT, 8C, 130W</li> </ul> It is recommended to leave Hyper-Threading enabled (check BIOS settings).<br>Disable Power Saving options and C-States in BIOS. Enable Turbo Boost.<br><i>Note: The latest generation of Haswell processors are not fully available at the time of publication. For a recommendation on Haswell processors please contact the Hardware Sales Team or Epicor Technical Services.</i>  |
| <b>Memory (RAM)</b>  | 64 GB ECC  |
| <b>Storage – Option #1 - HDD and SSD (Recommended)</b>   | 2 x 146GB 15k RPM HDDs in RAID 1, 3 Gbps<br>4 x 200GB SSDs in RAID 1 or 10, 3 Gbps<br>Operating system and page file on HDD<br>SQL Database and reports on SSDs.<br><i>Note: MLCs are cheaper than SLCs. SLCs are more reliable. MLCs are getting better by the day, if you maintain a warranty coverage on Enterprise MLC SSDs then you can purchase MLCs.</i>  |
| <b>Storage Option #2 (you can use this option if your SAN passes the SQLIO test)</b><br><b>Existing Storage Area Network (SAN)</b> | To find out if your SAN delivers sufficient performance for SQL database, see the “Testing the performance of an existing SAN” section in the Appendix for details on how to run a storage benchmarking tool (SQLIO).<br>Required SQLIO results at all times including during peak load from other application usage on the SAN:<br><br><b>Database drive letter (location of SQL mdf file):</b><br>Must be able to deliver at least 100MB/sec at a latency of less than 5ms.<br><br><b>Transaction log drive letter (location of SQL log file):</b><br>Must be able to deliver at least 30MB/sec at a latency of less than 5ms.<br><br><b>Tempdb drive letter (location of SQL temp db file):</b><br>Must be able to deliver at least 50MB/sec at a latency of less than 5ms. |

## ERP 10 Application usage Load Expectation (up to 50 user load)

Table 4

| Load expectation for up to 50 user load (Medium ERP)  |  |
|---|--|
| Application Usage   | Load Description   |
| <b>Interactive Application Load</b>   | Typical application usage by end-users using ERP 10 via Smart Client and/or browser and/or mobile devices.   |
| <b>Automation and heavy processing<br/>Epicor Service Connect (ESC)<br/>Imports (e.g. PO, Sales Order, AR<br/>invoice and Shipping)<br/>3Automatic updating of data not<br/>covered by ESC<br/>Heavy reporting.</b>         | <p>If you are processing more than 50K transactions (insert, update, or delete) in any one hour period of the working day then schedule this activity to less busy time of the day. 50K transaction is the sum total of all sources of automatic processing.</p> <p>If this activity cannot be scheduled to less busy time of the day then please discuss the server sizing with Epicor technical services.</p> <p>Heavy and concurrent reporting should be scheduled to less busy time of the day or on a separate reporting appserver.</p> |
| <b>Custom Code (BPM is not counted<br/>as Custom code)<br/>In-house custom application<br/>running on Epicor ERP 10 machine<br/>and / or using Epicor ERP 10<br/>database and / or Epicor ERP 10<br/>appserver directly</b> | No (If yes then discuss the increase in usage with Epicor technical services)  |
| <b>MRP (Manufacturing customers)</b>  | <p>MRP regeneration will be scheduled during less busy times. For daily MRP runs use MRP net change.</p> <p>If your business requires you to run more than 3 processes and 3 schedulers for MRP run then discuss the increase usage with Epicor technical services.</p>  |
| <b>Growth and acquisition of<br/>new users</b>  | No   |
| <b>Seasonal peaks</b>   | No   |

## ERP 10–Hardware for up to 200 user load

Table 5

|   |   |
|---|---|
| <b>ERP Server</b>   | ERP 10 Physical Server Machine. This configuration can support standard load of 200 Office + Data collection users. See table 6 for the definition of standard load.  |
| <b>OS &amp; SQL Server (Recommended)</b>  | OS: Windows Server 2012 R2<br>SQL Server 2012 / 2014 Standard Edition   |
| <b>Applications</b>   | Epicor ERP 10, Epicor Web Access (EWA), Enterprise Search (ES), Epicor Social Enterprise (ESE)  |
| <b>Processors</b>   | 2 x CPU sockets with following configuration <ul style="list-style-type: none"> <li>Intel Xeon E5-2667v2 3.3GHz, 25M Cache, 8.0GT/s QPI, Turbo, HT, 8C, 130W (or better)</li> </ul> <p>It is recommended to leave Hyper-Threading enabled (check BIOS settings).<br/>Disable Power Saving options and C-States in BIOS. Enable Turbo Boost.</p> <p><i>Note: The latest generation of Haswell processors are not fully available at the time of publication. For a recommendation on Haswell processors please contact the Hardware Sales Team or Epicor Technical Services.</i></p>   |
| <b>Memory (RAM)</b>   | 96 GB ECC   |
| <b>Storage – Option #1 – Fusion-IO PCI-Express based card i.e. Fusion IO (SAS / SATA based) storage</b> | Operating system and page file: 2 x 15K HDD in RAID 1.<br>Fusion-IO should hold SQL database (MDF file), SQL transaction log (LDF file) and SQL tempdb files.<br>Epicor Reports – 2 x 15K HDD in RAID 1<br>Total <ul style="list-style-type: none"> <li>4 15K RPM HDD (3 Giga bits /seconds SATA or SAS)</li> <li>Quantity 1, at least 785 GB , Fusion-IO card</li> </ul>   |
| <b>Storage – Option #2 - SSD (Recommended) Solid State Drive (SAS / SATA based) storage</b>             | Operating system and page file: 2 x Solid State Drive in RAID 1.<br>SQL database (MDF file): 4 x Solid State Drive in RAID 10.<br>SQL transaction log (LDF file): 2 x Solid State in RAID 1. (Only Epicor SQL Log file on this drive)<br>SQL tempdb: 2 x Solid State Drive in RAID 1. (This will house at least 8 tempdb files)<br>Epicor Reports – 2 x Solid State Drive in RAID 1<br>Total drives - 12 Solid State Drives (3 Giga bits /seconds SATA or SAS)<br><i>Note: MLCs are cheaper than SLCs. SLCs are more reliable. MLCs are getting better by the day, if you maintain a warranty coverage on Enterprise MLC SSDs then you can purchase MLCs.</i> |



|   |  |
|---|--|
| <p><b>Storage Option #3 (you can use this option if your SAN passes the SQLIO test)</b></p> <p><b>Existing Storage Area Network (SAN)</b></p> | <p>To find out if your SAN delivers sufficient performance for SQL database, see the “Testing the performance of an existing SAN” section in the Appendix for details on how to run a storage benchmarking tool (SQLIO).</p> <p>Required SQLIO results at all times including during peak load from other application usage on the SAN:</p> <p><b>Database drive letter (location of SQL mdf file):</b><br/>Must be able to deliver at least 100MB/sec at a latency of less than 5ms.</p> <p><b>Transaction log drive letter (location of SQL log file):</b><br/>Must be able to deliver at least 30MB/sec at a latency of less than 5ms.</p> <p><b>Tempdb drive letter (location of SQL temp db file):</b><br/>Must be able to deliver at least 50MB/sec at a latency of less than 5ms.</p> |
|---|--|

## ERP 10 Application usage Load Expectation (up to 200 user load)

Table 6

| Load expectation for up to 200 user load (ERP Server)  |   |
|--|---|
| Application Usage  | Load Description  |
| <b>Interactive Application Load</b>  | Typical application usage by end-users using ERP 10 via Smart Client and / or browser and / or mobile devices.  |
| <b>Automation and heavy processing</b><br>1. Epicor Service Connect (ESC)<br>2. Imports (e.g. PO, Sales Order, AR invoice and Shipping)<br>3. Automatic updating of data not covered by ESC<br>4. Heavy reporting. | <p>If you are processing more than 100K transactions (insert, update or delete) in any one hour period of the working day then schedule this activity to less busy time of the day. 100K transaction is the sum total of all sources of automatic processing.</p> <p>If this activity cannot be scheduled to less busy time of the day then please discuss the server sizing with Epicor technical services.</p> <p>Heavy and concurrent reporting should be scheduled to less busy time of the day or on a separate reporting appserver.</p> |
| <b>Custom Code (BPM is not counted as Custom code)</b><br><b>In-house custom application running on Epicor ERP 10 machine and / or using Epicor ERP 10 database and / or Epicor ERP 10 appserver directly</b>      | No (If yes then discuss the increase in usage with Epicor technical services)   |
| <b>MRP (Manufacturing customers)</b>   | <p>MRP regeneration will be scheduled during less busy times. For daily MRP runs use MRP net change.</p> <p>If your business requires you to run more than 6 processes and 6 schedulers for MRP run then discuss the increase usage with Epicor technical services.</p>   |
| <b>Growth and acquisition of new users</b>   | No  |
| <b>Seasonal peaks</b>  | No  |

## ERP 10–APP01–Application Server/Physical Host/ Reporting Server

Table 7

|   |  |
|---|--|
| <b>Table Name</b>   | Application Server APP01   |
| <b>Operating System (Recommended)</b>                             | Windows Server 2012 R2 Standard Edition  |
| <b>Applications</b>   | Epicor ERP 10, Epicor Web Access (EWA), Enterprise Search (ES), Epicor Social Enterprise (ESE)   |
| <b>Processors</b>   | <p>2 x CPU sockets with following configuration:</p> <ul style="list-style-type: none"> <li>Intel Xeon E5-2690 v2 3 GHz (or better)</li> </ul> <p>It is recommended to leave Hyper-Threading enabled (check BIOS settings).<br/>Disable Power Saving options and C-States in BIOS. Enable Turbo Boost.</p> <p><i>Note: The latest generation of Haswell processors are not fully available at the time of publication. For a recommendation on Haswell processors please contact the Hardware Sales Team or Epicor Technical Services.</i></p>             |
| <b>Memory (RAM)</b>   | 64 GB ECC  |
| <b>Solid State Drive (SAS / SATA based) storage (recommended)</b> | <p>Operating system: 2 x 15k RPM HDDs in RAID 1.</p> <p>The following files are stored in 2 x SSDs in RAID 1:</p> <ul style="list-style-type: none"> <li>Epicor ERP 10 files.</li> <li>Reports and temporary data (EpicorData).</li> </ul> <p>Two SSDs are required.<br/>Two SCSI / SAS HDDs are required.</p> <p>When using this configuration as virtual host buy enough disk space for all VMs.</p>   |
| <b>Network</b>  | <p>For good network performance, use 1 Giga bit (or faster) network cards.</p> <p>To ensure that network latency is as low as possible between the Epicor application server and the SQL database server, add at least two network cards:</p> <ul style="list-style-type: none"> <li>One dedicated network card that is directly connected to the SQL database (Cable from network card to network card).</li> <li>One dedicated network card that is connected to the LAN (and is processing all network traffic except SQL database traffic).</li> </ul> |

## ERP 10–SQL Server (SQL01)

Table 8

|   |   |
|---|---|
| <b>Table Name</b>   | SQL Server – SQL01  |
| <b>OS &amp; SQL Server (Recommended)</b>  | OS: Windows Server 2012 R2 Standard Edition.<br>SQL Server 2012 / 2014 Standard Edition (you may want to consider enterprise edition for high availability and on line indexing features)   |
| <b>Applications</b>   | Epicor ERP 10, Epicor Web Access (EWA), Enterprise Search (ES), Epicor Social Enterprise (ESE)  |
| <b>Processors</b>   | 2 x CPU sockets with following configuration: <ul style="list-style-type: none"> <li>Intel Xeon E5-2667 v2 3.3GHz, 25M Cache, 8.0GT/s QPI, Turbo, HT, 8C, 130W</li> </ul> It is recommended to leave Hyper-Threading enabled (check BIOS settings).<br>Disable Power Saving options and C-States in BIOS. Enable Turbo Boost.<br><i>Note: The latest generation of Haswell processors are not fully available at the time of publication. For a recommendation on Haswell processors please contact the Hardware Sales Team or Epicor Technical Services.</i>   |
| <b>Memory (RAM)</b>   | 128 GB ECC  |
| <b>Storage – Option #1 – Fusion-IO (Recommended) PCI-Express based card i.e. Fusion IO (SAS / SATA based) storage</b> | Operating system and page file: 2 x 15K HDD in RAID 1.<br>Fusion-IO should hold SQL database (MDF file), SQL transaction log (LDF file) and SQL tempdb files.<br>Epicor Reports – 2 x 15K HDD in RAID 1<br>Total <ul style="list-style-type: none"> <li>4 15K RPM HDD (3 Giga bits /seconds SATA or SAS)</li> <li>1 Fusion-IO card</li> </ul>   |
| <b>Storage – Option #2 – SSD Solid State Drive (SAS / SATA based) storage</b>   | Operating system and page file: 2 x Solid State Drive in RAID 1.<br>SQL database (MDF file): 4 x Solid State Drive in RAID 10.<br>SQL transaction log (LDF file): 2 x Solid State in RAID 1. (Only Epicor SQL Log file on this drive)<br>SQL tempdb: 2 x Solid State Drive in RAID 1. (This will house at least 8 tempdb files)<br>Epicor Reports – 2 x Solid State Drive in RAID 1<br>Total drives - 12 Solid State Drives (3 Giga bits /seconds SATA or SAS)<br><i>Note: MLCs are cheaper than SLCs. SLCs are more reliable. MLCs are getting better by the day, if you maintain a warranty coverage on Enterprise MLC SSDs then you can purchase MLCs.</i> |

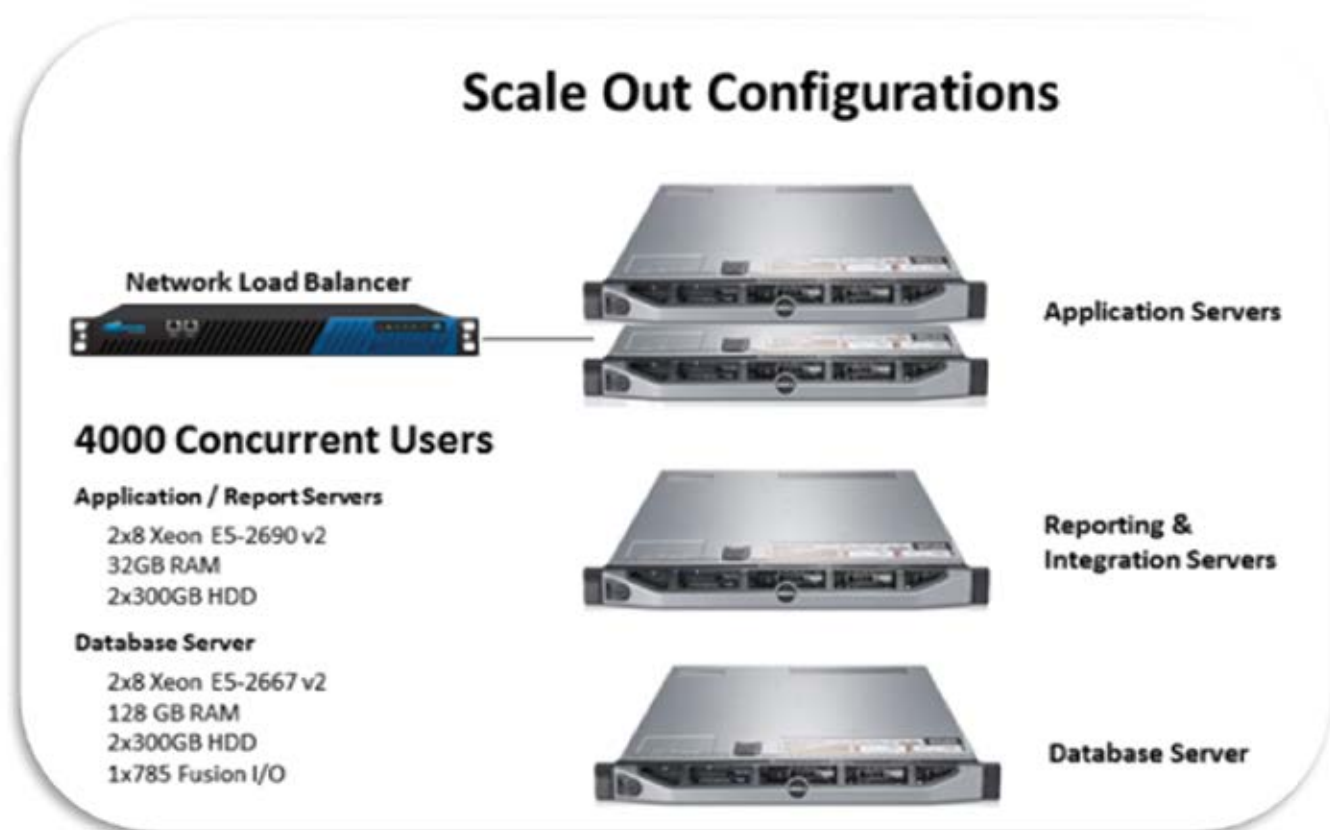
|   |   |
|---|---|
| <p><b>Storage Option #3 (you can use this option if your SAN passes the SQLIO test) Existing Storage Area Network (SAN)</b></p> | <p>To find out if your SAN delivers sufficient performance for SQL database, see the “Testing the performance of an existing SAN” section in the Appendix for details on how to run a storage benchmarking tool (SQLIO).</p> <p>Required SQLIO results at all times including during peak load from other application usage on the SAN:</p> <p><b>Database drive letter (location of SQL mdf file):</b><br/>Must be able to deliver at least 100MB/sec at a latency of less than 5ms at all times.</p> <p><b>Transaction log drive letter (location of SQL log file):</b><br/>Must be able to deliver at least 30MB/sec at a latency of less than 5ms at all times.</p> <p><b>Tempdb drive letter (location of SQL temp db file):</b><br/>Must be able to deliver at least 50MB/sec at a latency of less than 5ms at all times.</p> |
| <p><b>Network (between SQL Server and appserver(s))</b></p>   | <p>For good network performance, use 1 Giga bit (10G card for user load of 500 user or higher) network cards.</p> <p>To ensure that network latency is as low as possible between the Epicor application server and the SQL database server, add at least two network cards:</p> <ul style="list-style-type: none"> <li>• One dedicated network card that is directly connected to the SQL database (Cable from network card to network card).</li> <li>• One dedicated network card that is connected to the LAN (and is processing all network traffic except SQL database traffic).</li> </ul>   |

## ERP 10–Hardware sizing 1,000 to 4,000 Users

Table 9

| Physical Servers                                 | Up to 2,000 Users | Up to 4,000 Users            |
|--|-------------------|------------------------------|
| Interactive Appserver                            | 1 x APP01         | 2 x APP01                    |
| SQL Server                                       | 1 x SQL01         | 1 x SQL01                    |
| Appserver for Reporting and Integration Services | 1 X APP01         | 1 X APP01                    |
| Load Balancer                                    | NA                | F5 switch or KEMP LoadMaster |

## Scale Out Configurations



## ERP 10–Virtual Appserver on VMware

Table 10

|  |  |
|--|--|
| <b>Table Name</b>                                    | VMWAREAPP01  |
| <b>Host software</b>                                 | VMware vSphere 5.5   |
| <b>Guest OS (Recommended)</b>                        | Windows Server 2012 R2 Standard Edition  |
| <b>Virtual CPU count</b>                             | 4 virtual CPUs<br>Create a full CPU reservation to ensure that the virtual machine has dedicated access to physical CPU cores.<br>It is not recommended to overcommit CPU resources.   |
| <b>Memory (RAM)</b>                                  | 12 GB (reserved RAM)<br>It is not recommended to overcommit memory resources.<br>If needed, disable Memory Ballooning so that the virtual application server has a dedicated amount of RAM.<br>Ensure that the RAM on the host supports ECC. |
| <b>Physical CPU requirements (host requirements)</b> | See APP01  |
| <b>Virtual hard disk</b>                             | Use Thick Provisioning and ensure that Eager Zeroing is in use.<br>[Optional] Enable Storage I/O Control (SIOC) and set the threshold to 25ms.   |
| <b>Virtual hard disk controller</b>                  | Use the Paravirtual SCSI adapter.  |
| <b>Guest OS virtualization software</b>              | Install and use the latest VMware Tools.   |
| <b>Network</b>                                       | Ensure that the physical host has multiple physical network cards which are all utilized by the hosted virtual machines.<br>Use the VMXNET3 virtual network card.  |
| <b>Load balancing</b>                                | Physical load balancing appliance recommended like F5 switch or Kemp LoadMaster.   |
| <b>VM Backup software</b>                            | VM level snapshot backup works for Epicor ERP 10.<br>File-level backups are supported.   |

## ERP 10–Virtual Appserver on Hyper-V

Table 11

|   |   |
|---|---|
| <b>Table Name</b>                       | HYPERVAPP01   |
| <b>Host software</b>                    | Windows Server 2012 R2 Standard Edition with Hyper-V role   |
| <b>Guest OS (Recommended)</b>           | Windows Server 2012 R2 Standard Edition   |
| <b>Virtual CPU count</b>                | 4 virtual CPUs<br>Create a full (100%) virtual machine reserve to ensure that the virtual machine has dedicated access to physical CPU cores.<br>It is not recommended to overcommit CPU resources.           |
| <b>Memory (RAM)</b>                     | 12 GB (reserved RAM)<br>Select Static memory when you allocate memory to the virtual machine.<br>It is not recommended to overcommit memory resources.<br>Ensure that the RAM on the host supports ECC.       |
| <b>Physical CPU (host) requirements</b> | See APP01   |
| <b>Virtual hard disk</b>                | Use Fixed Size virtual hard disks.  |
| <b>Virtual hard disk controller</b>     | <ul style="list-style-type: none"> <li>• Use the IDE Controller option for the virtual hard disk that contains the OS.</li> <li>• Use the SCSI Controller option for all other virtual hard disks.</li> </ul> |
| <b>Guest OS virtualization software</b> | Install and use the latest Integration Services.  |
| <b>Network</b>                          | Use the Network Adapter virtual network card (and not the Legacy Network Adapter).  |
| <b>Load balancing</b>                   | Physical load balancing appliance recommended. Software based works too. Use Multicast Mode if you are using Microsoft Network Load Balancing (NLB). This is recommended for stability reasons.               |
| <b>Backup software</b>                  | VM level snapshot backup works for Epicor ERP 10.<br>File-level backups are supported.  |



## ERP 10 – Virtual SQL Server on VMware

Virtualization of SQL Server takes careful planning and appropriate resources to optimize performance. You should work with the Epicor Technical Services Group or Hardware Sales Team to develop and approve a SQL virtualization plan.

Table 12

|  |   |
|--|---|
| <b>Table Name</b>                                    | VMWARESQL01   |
| <b>Host software</b>                                 | VMware vSphere 5.5  |
| <b>Guest OS (Recommended)</b>                        | Windows Server 2012 R2 Standard Edition   |
| <b>Virtual CPU count</b>                             | <p>Minimum 4 virtual CPUs, increase vCPU count as dictated by the load</p> <p>Create a full CPU reservation to ensure that the virtual machine has dedicated access to physical CPU cores.</p> <p>It is not recommended to overcommit CPU resources.</p>        |
| <b>Memory (RAM)</b>                                  | <p>24 GB (reserved RAM)</p> <p>It is not recommended to overcommit memory resources.</p> <p>If needed, disable Memory Ballooning so that the virtual application server has a dedicated amount of RAM.</p> <p>Ensure that the RAM on the host supports ECC.</p> |
| <b>Physical CPU requirements (host requirements)</b> | See SQL01   |
| <b>Virtual hard disk</b>                             | <p>Use Thick Provisioning and ensure that Eager Zeroing is in use.</p> <p>[Optional] Enable Storage I/O Control (SIOC) and set the threshold to 25ms.</p>   |
| <b>Virtual hard disk controller</b>                  | Use the Paravirtual SCSI adapter.   |
| <b>Guest OS virtualization software</b>              | Install and use the latest VMware Tools.  |
| <b>Network</b>                                       | <p>Ensure that the physical host has multiple physical network cards which are all utilized by the hosted virtual machines.</p> <p>Use the VMXNET3 virtual network card.</p>  |
| <b>VM Backup software</b>                            | <p>VM level snapshot backup works for Epicor ERP 10. When you virtualize SQL Server be sure to test and make sure differential backup works correctly in your case.</p> <p>File-level backups are supported.</p>  |

## ERP 10 – Virtual SQL Server on Hyper-V

Virtualization of SQL Server takes careful planning and appropriate resources to optimize performance. You should work with the Epicor Technical Services Group or Hardware Sales Team to develop and approve a SQL virtualization plan.

Table 13

|   |   |
|---|---|
| <b>Table Name</b>                       | HYPERVSQL01   |
| <b>Host software</b>                    | Windows Server 2012 R2 Standard Edition with Hyper-V role   |
| <b>Guest OS (Recommended)</b>           | Windows Server 2012 R2 Standard Edition   |
| <b>Virtual CPU count</b>                | <p>Minimum 4 virtual CPUs, increase vCPU count as dictated by the load</p> <p>Create a full (100%) virtual machine reserve to ensure that the virtual machine has dedicated access to physical CPU cores.</p> <p>It is not recommended to overcommit CPU resources.</p> |
| <b>Memory (RAM)</b>                     | <p>24 GB (reserved RAM)</p> <p>Select Static memory when you allocate memory to the virtual machine.</p> <p>It is not recommended to overcommit memory resources.</p> <p>Ensure that the RAM on the host supports ECC.</p>  |
| <b>Physical CPU (host) requirements</b> | See SQL01   |
| <b>Virtual hard disk</b>                | Use Fixed Size virtual hard disks.  |
| <b>Virtual hard disk controller</b>     | <ul style="list-style-type: none"> <li>• Use the IDE Controller option for the virtual hard disk that contains the OS.</li> <li>• Use the SCSI Controller option for all other virtual hard disks.</li> </ul>   |
| <b>Guest OS virtualization software</b> | Install and use the latest Integration Services.  |
| <b>Network</b>                          | Use the Network Adapter virtual network card (and not the Legacy Network Adapter).  |
| <b>Backup software</b>                  | <p>VM level snapshot backup works for Epicor ERP 10. When you virtualize SQL Server be sure to test and make sure differential backup works correctly in your case.</p> <p>File-level backups are supported.</p>  |

## ERP 10—Hardware Sizing on Virtual Servers

Table 14 - Epicor ERP 10 Appserver

| # Users | Interactive | Reporting | EDI (or heavy Imports) | Total VM | # vCPU per VM | Total vCPU | RAM (GB) per VM | Disk OS (GB) per VM | ERP 10 App Data Disk (GB) per VM |
|---------|-------------|-----------|------------------------|----------|---------------|------------|-----------------|---------------------|----------------------------------|
| 15      | 1           | 0         | 0                      | 1        | 4             | 4          | 24              | 60                  | 40                               |
| 50      | 1           | 1         | 0                      | 2        | 4             | 8          | 24              | 60                  | 40                               |
| 100     | 1           | 1         | 0                      | 2        | 8             | 16         | 24              | 60                  | 40                               |
| 200     | 1           | 1         | 0                      | 2        | 8             | 16         | 24              | 60                  | 40                               |
| 400     | 2           | 1         | 0                      | 3        | 8             | 24         | 24              | 60                  | 40                               |
| 500     | 2           | 1         | 1                      | 4        | 8             | 32         | 24              | 60                  | 40                               |

Table 15 - Epicor ERP 10 SQL Server

| # Users | # of VM | # vCPU per VM | RAM (GB) | Disk OS (GB) | SQL Database Size (GB)<br>(You will need 40% for data, 20% for log file and 40% for temp db) |
|---------|---------|---------------|----------|--------------|--|
| 15      | 1       | 4             | 24       | 60           | 150  |
| 50      | 1       | 4             | 48       | 60           | 175  |
| 100     | 1       | 8             | 64       | 60           | 200  |
| 200     | 1       | 12            | 80       | 60           | 300  |
| 400     | 1       | 16            | 100      | 60           | 400  |
| 500     | 1       | 16            | 120      | 60           | 600  |

### Footnotes for Tables 14 and 15

- (1) 200+ users—Add a 2nd SQL server for SSRS. Sizing of the SSRS SQL Server will be similar to the E10. Consult with Epicor Technical Services if separate SSRS is a right choice for your business.
- (2) 100+ users installation, highly recommended that you involve Epicor Technical Services. It is recommended that Epicor Technical Services perform an infrastructure analysis.
- (3) If you process a lot of EDI transactions and/or do heavy imports into the ERP 10, add an EDI appserver of similar sizing as ERP 10 appserver, even though the table doesn't recommend one for your case.
- (4) SQL Database Disk Size—If you already have a SQL database and know the size and/or know the size and growth factors then use estimates based on your experience. Discuss the actual disk size with Epicor Technical Services in case you need further help.
- (5) Above 500 users use table 14 and 15 and extrapolate the sizing. It is also recommended that you work with Epicor Technical Services on the deployment architecture.
- (6) All SQL Server database drives should pass the SQLIO test described in the appendix.

## Hardware Requirements for Other Epicor Systems

### Epicor Client Machine/Epicor Workstation

For desktop/network clients, keep in mind that other installed applications, specifically Microsoft products, have requirements of their own over and above the requirements for Epicor ERP 10. The Epicor client will perform better on workstations that have sufficient memory and processor power to run all your applications.

Table 16

|  | Recommended Configuration  |
|--|--|
| <b>Operating System</b>                            | Windows Vista / 7 or 8 Professional<br>(32-bit or 64-bit*)   |
| <b>Processor</b>                                   | 2.8 GHz or higher. Recommended dual core 32-bit or 64-bit processor and SATA hard drives. SSD is especially beneficial if the workstation runs multiple applications at the same time. |
| <b>RAM</b>   | 4 GB (add more RAM if the workstation is shared by multiple applications)  |
| <b>Disk Space for Epicor Smart Client Software</b> | 2 GB   |
| <b>Monitor</b>                                     | SVGA or higher adapter Color SVGA monitor with 1024 X 768 resolution   |
| <b>DVD-R</b>                                       | DVD-R drive (if not on server)   |
| <b>Other</b>                                       | Internet connection recommended for online support and downloading latest updates  |

## Other Epicor Systems

Table 17

| System Type                           | Hardware Description   |
|---------------------------------------|--|
| <b>Remote Desktop Services</b>        | For every 100 users use server configuration described by APP01  |
| <b>Epicor Service Connect</b>         | 1 X VMWAREAPP01 OR 1 X HYPERVAPP01   |
| <b>EPM</b>                            | Depending on load either use<br>1 X SQL01 or 1 x Medium ERP configuration  |
| <b>AFR</b>                            | 1 X VMWAREAPP01 OR 1 X HYPERVAPP01   |
| <b>Handheld Equipment</b>             | Device Requirements <ul style="list-style-type: none"> <li>• Screen size minimum of 240 x 320</li> <li>• Device must support MS Terminal Services client</li> <li>• IEEE 802.11 Radio Frequency standards support</li> </ul> Access Points <ul style="list-style-type: none"> <li>• IEEE 802.11 Radio Frequency standards support</li> <li>• Software: Requires Windows 2012 RDS CALs license</li> </ul> |
| <b>Barcode Equipment</b>              | Support for Bar 39 Barcode   |
| <b>MES Workstation</b>                | PioneerPOS Stealth M5<br>Same configuration as Epicor workstation (Table 11)   |
| <b>Printer</b>                        | At least one laser printer required for standard reports and forms<br>Must have current Windows drivers  |
| <b>Hardware for any other system?</b> | If you have purchased any other software license from Epicor please work with the Epicor Technical Solutions or Epicor Hardware Sales group to see if you need extra servers to run them. Some applications can be installed on one shared server.   |
| <b>Communications</b>                 | An Internet connection is required to access the Epicor Online Support Center for interim and commercial releases and remote support. DSL or higher quality connection recommended.  |

# Network

## Hardware Recommendations

A 1 Gbit (or faster) network is recommended. In some cases a 10 Gbit network connection will provide additional benefit.

Fiber optic cable recommended in environment with electrical noise.

When designing network, try to minimize the latency (one way to measure latency is ping time) between the Epicor ERP 10 Smart Client and Epicor ERP 10 EWA Client workstations and the Epicor ERP 10 application server box. For example users having a 125ms ping time will see slower response than the users having a ping time of 25ms between the workstation and the application server box. There should be almost no latency between SQL Server and the appserver(s).

If you have users in remote sites, consider placing a Remote Desktop Services (RDS) server on the same location (same LAN) as the Epicor ERP 10 server. Instead of running the Epicor ERP 10 client locally and connecting to the Epicor ERP 10 server over a WAN, users can access the client on a Remote Desktop session. This improves performance as the Epicor ERP 10 server and Epicor ERP 10 client are both on the same LAN.

WAN accelerator - Consider implementing WAN accelerators on both sides of a WAN if you got environments with high latency and/or low bandwidth.

## Network Bandwidth

The bandwidth of a network defines the amount of data that can be transferred across the network at once. If the bandwidth of the network is insufficient for the amount of information being transmitted (usually because too many users are on a single network segment), performance drops noticeably. In these cases, the network will need re-configuring to lower the amount of traffic or increase the bandwidth of the network. Traditional hubs are being replaced by high-speed data switches, which further help alleviate network bottlenecks. Multiple server network cards and automated load balancing may be considered too.

## Network Latency

Network bandwidth is not the only factor that determines the “speed” of a network as perceived by the end user. The other key element of network performance is latency. While it would often appear that data is transmitted instantly between one point and another (that is, with no delay at all), this is typically not the case. Network latency may be caused by:

- The time it takes for a packet to travel from point to point
- The transmission medium (optical fiber, wireless, etc.) may introduce some delay because larger packets typically take longer to move from place to place
- Routers and other processing points each take time to examine and possibly make changes to packet header
- Intermediate devices such as switches and bridges may cause delays

It is often difficult to diagnose a network bandwidth or latency issue and this is best left to professional network analysts.

As a general rule, the Epicor ERP 10 Smart Client and Epicor ERP 10 EWA Client has a bandwidth requirement of 10 Kbps (kilobits per second) to 500Kbps. For a typical use that does not require large dataset (above 100 rows or five pages of report) the Epicor ERP 10 Smart Client uses 12 Kbps bandwidth. This will vary depending on the volume of data transferred between the client and the server. Additionally, file attachments require increased bandwidth.

A simplified rule of thumb for the number of clients to connect per network segment is to determine the worst-case acceptable throughput for each network client, then divide that amount into the selected network throughput. For example, if each client should have no less than 1.5 Mbps of available bandwidth, and the network supports 100 Mbps, the segment could possibly support 66 clients. Unfortunately this simple calculation does not take into account the network latency, network media characteristics, or network traffic in addition to Epicor, but it does provide for a good starting point for the maximum amount of clients per network segment.

# Backup and Fault Tolerance UPS

## Hardware

- Tape backup devices
- Uninterruptible power supply and redundant components

## Tape Backup Devices

It is extremely important that your business information is backed up on a regular basis. The frequency and type of backup should be discussed with your implementation team, but one or more tape drives on the server can ensure a timely backup is made. It is also possible to backup to the local disk, and then copy the file elsewhere for storage.

## Uninterruptible Power Supply (UPS) and Redundant Components

The production server is the key to the business, and should be protected. Power outages can damage the server hardware and can occasionally corrupt the software; therefore, the server should be protected with a UPS, specifically one with server software that is capable of initiating a clean shut-down of the server. Recovery from a power outage is usually not a problem, but why take the risk.

The mission critical nature of an ERP system necessitates consideration of redundant processors, network controllers, storage controllers, hot-swappable hard drives, and power supplies. You should also consider network hub/switch redundancy.

Such components contribute to a “highly-available” solution which is tolerant of most hardware failures and allow for service to be postponed to off-hours. Businesses requiring continuous availability (24 x 7) may also want to consider hot plug support for controllers, on-line spare hard drives, redundant processor power modules, and redundant hot-swappable fans to provide the highest-availability solution that can be serviced during business hours without an interruption in productivity. Network hubs, routers, and server monitors should also be considered when assessing UPS requirements.

## Test the validity of Backup files, systems and processes

It is important that you put processes in place where you are checking the backup and restore files. Do mock runs and restore backup files, validate that the backup is meeting your needs.

# Appendix

## Testing Performance of an Existing SAN

If you have an existing SAN and want to ensure that it can deliver good performance, then you can run a Microsoft storage benchmark utility named SQLIO.

The following tests are designed to test various aspects of an I/O disk subsystem i.e. bandwidth (Mega Bytes/second i.e. MB/Sec), Latency (milliseconds), performance of your I/O system with desired block size (64KB) and file size and type of I/O – read or write and sequential v/s random writes. The parameters described in previous statement have a great impact on IOPS and hence they are specified exactly as needed here for testing using SQLIO. On the same machine you will get different IOPS number if you change any one parameter. So testing with Epicor recommended parameters is highly recommended.

Download SQLIO from:

<http://www.microsoft.com/download/en/details.aspx?id=20163>

### Instructions:

The default install path on a 64-bit OS for SQLIO is C:\Program Files (x86)\SQLIO\

In the SQLIO install path, the configuration file called param.txt determines which drive letter SQLIO will test.

If you want to test the D-drive letter, then change the param.txt content to the following (80 Gigabyte size is important):

```
D:\testfile.dat 2 0x0 80000
```

To run each test:

1. Open up a Windows Command Prompt on the server that you installed the SQLIO utility. For example START—RUN—CMD, this opens up the command window.
2. Change the directory to the SQLIO folder, for example c:\>cd c:\Program Files (x86)\SQLIO
3. Run the three tests below using specified parameters.

### Database (.mdf) drive letter test:

This test will test 64k random writes.

Modify the param.txt file so that it points to the database drive letter and then run the following command:

```
sqlio -kW -t8 -s900 -o8 -frandom -b64 -BH -LS -Fparam.txt
```

### Transaction log (.ldf) drive letter test:

This test will test 64k sequential writes.

Modify the param.txt file so that it points to the transaction log drive letter and then run the following command:

```
sqlio -kW -t2 -s900 -o8 -fsequential -b64 -BH -LS -Fparam.txt
```

### Tempdb drive letter test:

This test will test 64k random writes.

Modify the param.txt file so that it points to the tempdb drive letter and then run the following command:

```
sqlio -kW -t8 -s900 -o8 -frandom -b64 -BH -LS -Fparam.txt
```



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These HW sizing guidelines are designed to assist you in determining your hardware requirements for a specific solution and to help you zero in on a solution between upper and lower estimates for your hardware requirements. These guidelines represent the culmination of our combined experiences in the field and in testing of our software in various environments and offer our reasonable estimates and approximations of the hardware resources necessary for different ERP software implementation scenarios. However, each Customer project, situation and system is unique and these general Hardware sizing guidelines and recommendations are not absolute nor are they intended to be your sole source of information pertaining to the process of sizing the Hardware for your system. Hardware Sizing estimates also very much depend on such variables as the architecture of the project, the complexity of the installation and implementation, expected usage and traffic and the project requirements. It is difficult to accurately arrive at a hardware recommendation that matches your unique application usage. There are instances where the suggested guidelines and recommendations fall short for whatever reason and it is very difficult to guarantee or imply that the hardware purchased using this guide will solve or meet your unique business requirements. Thus we do not guarantee that the Hardware you acquire based on these guidelines will solve or meet your requirements, nor do we guarantee or warrant the software utilization or performance that you will ultimately experience based upon such Hardware. To improve the odds of success, we highly recommend that you work with the Epicor Technical Solutions group and allow them to work with you directly in determining your hardware sizing recommendations.



Contact us for more information on Epicor Products and Services

+1.800.999.6995 [info@epicor.com](mailto:info@epicor.com) [www.epicor.com](http://www.epicor.com)

Corporate Office  
804 Las Cimas Parkway  
Austin, TX 78746  
USA  
Toll Free: +1.888.448.2636  
Direct: +1.512.328.2300  
Fax: +1.512.278.5590

Latin America and Caribbean  
Blvd. Antonio L. Rodriguez #1882 Int. 104  
Plaza Central, Col. Santa Maria  
Monterrey, Nuevo Leon, CP 64650  
Mexico  
Phone: +52.81.1551.7100  
Fax: +52.81.1551.7117

Europe, Middle East and Africa  
No. 1 The Arena  
Downshire Way  
Bracknell, Berkshire RG12 1PU  
United Kingdom  
Phone: +44.1344.468468  
Fax: +44.1344.468010

Asia  
238A Thomson Road #23-06  
Novena Square Tower A  
Singapore 307684  
Singapore  
Phone: +65.6333.8121  
Fax: +65.6333.8131

Australia and New Zealand  
Suite 2 Level 8,  
100 Pacific Highway  
North Sydney, NSW 2060  
Australia  
Phone: +61.2.9927.6200  
Fax: +61.2.9927.6298

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