

Deltek Maconomy®

Hardware Requirements and Sizing Tool

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Overview

This document provides information for setting up your Maconomy system and using the Maconomy Hardware Requirements Scaling Tool, which is a dynamic tool that allows you to input specific parameters based on your exact setup, and then generate custom recommendations.



- You must engage with a Technical Consultant from Services to use this document and related Hardware Requirements Scaling Tool. *Without this engagement, Deltek takes no responsibility for the resulting output.*
- This document does not include specific reference to hardware offered by vendors or Cloud services (such as Amazon), and it is the responsibility of Services (a Technical Consultant) to advise on this.

Workspace Client Hardware Requirement

Deltek Maconomy offers guidelines for hardware requirements for the client computer running the Workspace Client as minimum requirements and recommended requirements.

The hardware requirements below are valid for the Workspace Client delivered with Maconomy 2.0 and onward. The recommendations may update for later versions of Maconomy.

The hardware specification is detailed by running the NovaBench – System Benchmarking Software version 3.0.4. See www.novabench.com for details.

Minimum Hardware Requirements

The minimum hardware requirements specify a client computer capable of running the Workspace Client without monitoring the response times. This is typically sufficient for those using less complicated functionality, such as time sheets, expense sheets, and mileage reporting.

Following are the minimum hardware requirements for the Maconomy Workspace Client:

- **RAM:** At least 500 MB of free memory (RAM).
- **Configuration:** Depending on the load from other programs running on the machine, a machine configured with 2 GB RAM and 1.6 GHz processor should be the minimal configuration in practice.
- **Hard Disk:** The client program itself plus the files the client program generates usually occupy less than 500MB of disk space. As hard disks typically are much larger, client machine disk space is not expected to become an issue in practice.
- **Screen Size:** The absolute minimum resolution is 1024x768 pixels.
- **NovaBench:** The NovaBench scores follow.
 - NovaBench Overall score: 175
 - NovaBench CPU score: 73

Recommended Hardware Requirements

Using standard Maconomy functionality more complicated than time sheet functionality requires more robust hardware capabilities, and Deltek recommends the following hardware requirements or better.

The following are the recommended hardware requirements for the Maconomy Workspace Client:

- **RAM:** At least 1 GB of free memory (RAM).

- **Configuration:** Depending on the load from other programs running on the machine, a machine configured with 4 GB RAM and 2.5 GHz Intel i5 processor is recommended.
- **Hard Disk:** The client program itself plus the files the client program generates will in most cases occupy less than 500MB of disk space. As hard disks typically are much larger, client machine disk space is not expected to become an issue in practice.
- **Screen Size:** The recommended resolution is 1440x900 pixels or better.
- **NovaBench:** The NovaBench scores follow.
 - NovaBench Overall score: 647
 - NovaBench CPU score: 405

Configuration Introduction

This document covers both vertical and horizontal scalability architecture configurations:

- **Vertical scaling** — Adds more resources (memory, more CPUs, and so on) to a single machine.
- **Horizontal scaling** — Adds more machines.

Choosing between the scaling options is based on individual customer requirements and input from a technical consultant considering many factors, including cost. A single high power server used for vertical scaling may cost 10 times more than 2 servers each with 50% the power, but software licensing could possibly negate this. Also consider that horizontal scaling of the application server using the scalable server of 2.3 GA enables you to have multiple relatively inexpensive servers as opposed to one large one. This configuration also allows for inbuilt redundancy, as well as an inbuilt overhead for failure.

The sample configurations in this document show three single server and three multi-server configurations, and are designed to help in your consideration of future growth.

From 2.3 GA and onwards, you can move from a single server to a multi-server setup at any time, as business requirements grow. However, as you transition from a two-tier to a three-tier installation (which is required for running a scalable server) note that a three-tier installation has an overhead of approximately 20% of the total system usage, which is due to the network connection between the server and database tier compared to utilization of the internal machines' communication when the application server and database are on a single tier. This finding was the result of the performance tests performed on existing Maconomy users using Mercury's LoadRunner® tool. The tests showed that three-tier solutions use TCP/IP-based interfaces (ODBC), which adds an extra communication layer between Maconomy and the underlying database.



Special Actions Required

- **Discuss with Customer** — Services (a Technical Consultant) should discuss considerations with the customer regarding a horizontal or vertical solution, as there are many parameters to consider which are not covered in this document, such as license and hardware costs, and possible performance issues in specific customer environment, and so on.
- **Approved by PDM** — All use of the scalable server must be approved by PDM prior to implementation, as it is in its early stages of adoption.

Depending on the budget, specific infrastructure bottlenecks and other factors, one solution may be more appealing over another. The response time requirements will decide which solution should be implemented. In general, as hardware becomes cheaper, there may be some financial advantages in choosing a mid-size server for the initial phase and then expanding it once or

several times in the first year, instead of paying a higher price outright to make sure that response times are satisfactory for the first one or two years.

One parameter that is necessary for good performance is the disk subsystem. All configurations discussed in this document are configured with high-end internal disk systems, which ensure the fastest data access and optimum stability. For high-end systems with more than 2,000 users, Deltek recommends an external disk system for the database files.



Performance Notes

- Tiered SANs are often difficult performance-wise for ERP systems because data is moved to slower disks. Maconomy must reside on the fastest tier at all time.
- The number and speed of the disk drives have an impact on the performance of the database.

All sample configurations that are described in this document are designed to handle a standard Maconomy solution installation. These configurations assume that 5% of the total number of users are heavy users, such as back office Finance users, 15% are moderate users, such as Project and Resource Managers, and 80% are light users, such as Time and Expense users, who may access Maconomy using a browser or mobile device. Variance from this split of Users should accordingly be taken into account when sizing.

In addition, the configurations assume a shared-server program pool of not more than four programs per kernel.

Maconomy works with most Intel-based servers.



This document does not discuss backup media, though it is an important part of the technical implementation. In general, the backup system for a Maconomy installation must be an integral part of the company's backup strategy.

Maconomy Infrastructure

The two Maconomy sample configurations below show typical configurations for both a single server and multi-server environment. These configurations can either be installed in a customer's own on-premise setup with physical or virtualized servers, or via hosted virtual environments, such as in Amazon Web Services (AWS) infrastructure.



If you have a configuration utilizing virtual environments, please ensure that all resources like CPU and Memory are dedicated and not shared between instances.

From Maconomy 2.3 and later releases, in order to increase network security, we recommend running the Web server/reverse proxy on the Maconomy Application Server or Servers. This allows running HTTPS across the entire Maconomy stack, covering communication from all Maconomy clients (including the RESTapi) to the Maconomy Server itself. We recommend running the Reverse Proxy in all single or multi-server configurations.

Single Server Environment

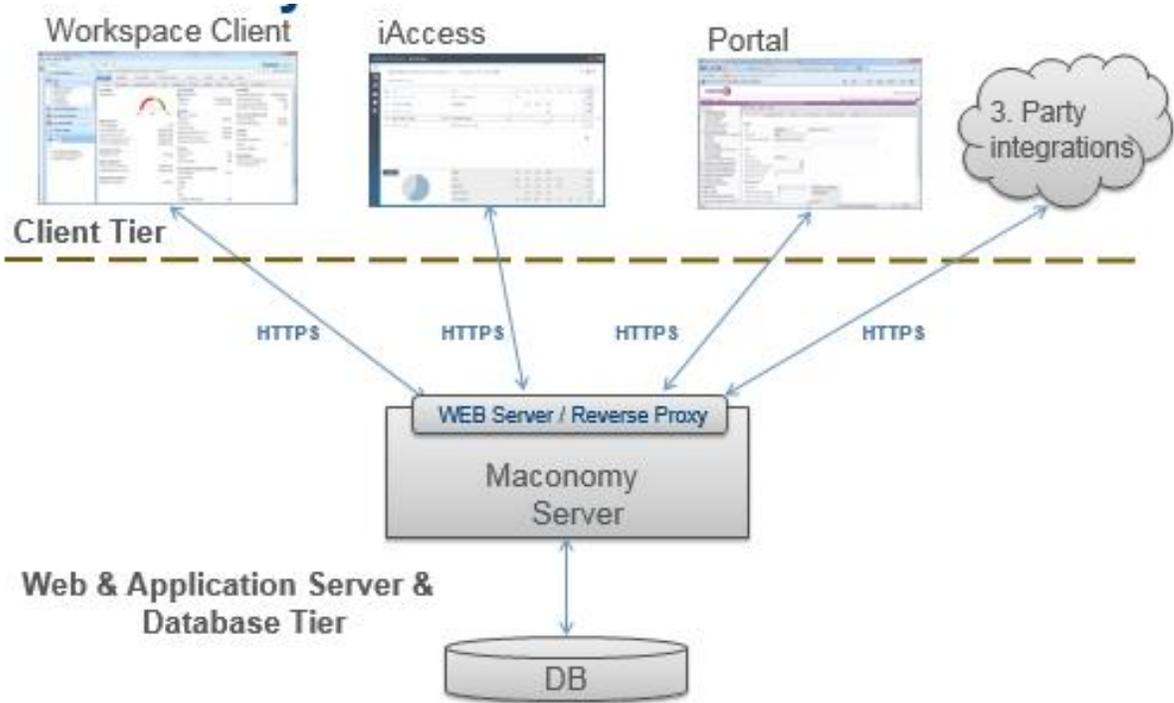
The following example shows a single server Maconomy configuration based on the following parameters:

OS: Linux

Database: Oracle

Clients: WSC, iAccess, Portal and RESTful API

Users	Memory (GB)	CPU (Kernels)	CPU (Clock)	IOPS	Disk	Configuration Server_Max
500	57	27	2.8	375	350	18
2000	61	34	2.8	1500	350	36
5000	70	49	2.8	3750	350	72



Multi-Server Environment

The following example assumes equal configuration and utilization across all servers. Note that it may also be possible and desirable to set up servers without equal load or operations. For example, you may choose to set up one server that is used only for running scheduled tasks. Depending on your needs, you may require a different split of the configuration of resources, with different sizing calculations.

The following example shows a multi-server Maconomy configuration based on the following parameters:

OS: Linux

Application Servers: 3

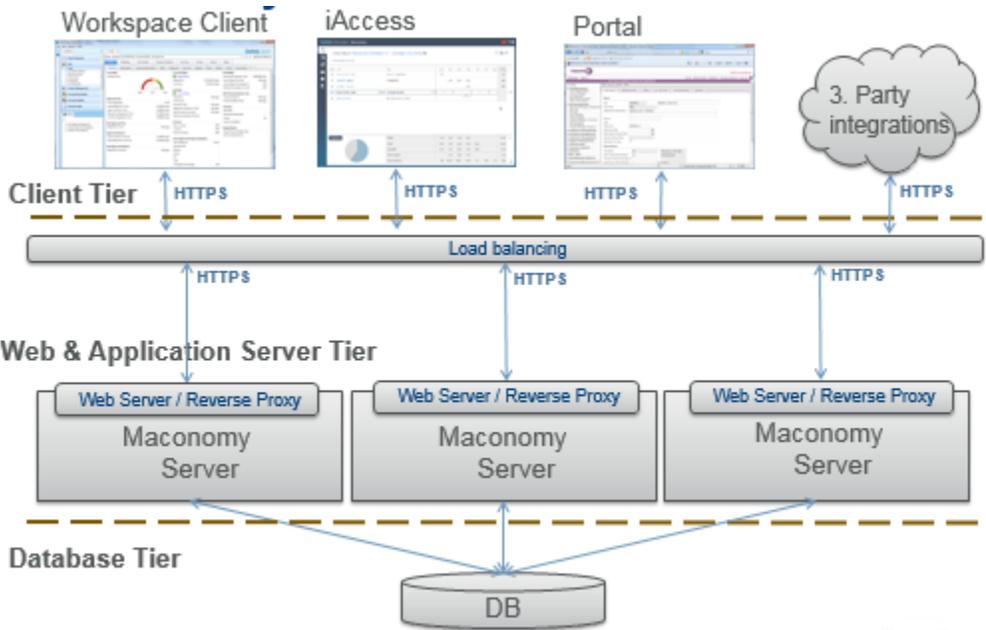
Peak load per server: 50%

Database: Oracle

Load Balancer: Yes

Clients: WSC, iAccess, Portal and RESTful API

Users	Servers	Memory (GB)	CPU (Kernels)	CPU (Clock)	IOPS	Disk	Configuration Server_Max
2000	Load Balancer	4	2	2.6			
	Application	25	19	2.8		100	
	Database	34	12	2.8	1500	250	24
5000	Load Balancer	4	2	2.6			
	Application	28	24	2.8		100	
	Database	37	18	2.8	3750	250	
10000	Load Balancer	4	2	2.6			
	Application	33	31	2.8		100	72
	Database	42	28	2.8	7500	250	



Other Scalability Considerations

Databases

Both Oracle and SQL Server have built in capabilities aimed towards horizontal database scalability although both vendors recommend vertically scaling loads of up to 10,000 transactions per second.

As you make server choices, consider that Deltek recommends Oracle (Active) Data Guard and SQL Pier to Pier replication for the Maconomy solution, as they provide only read scalability, and this is relevant for removing the load related to reporting from the transactional database.



Deltek has not certified running specific options, but assumes these options will work with Maconomy through Oracle or SQL Server.

BPM & People Planner Scaling

BPM & People Planner scaling should be considered separately or in conjunction with the recommendation given regarding this document and the Maconomy scaling tool. This could have an impact on Maconomy hardware.



Extra Step with Oracle

Maconomy is a 32-bit application on the Intel platform. To install Maconomy with an Oracle 64-bit database, you need OracleNet as the interface layer between Maconomy and the database. This adds a data communication overhead of up to 20% to the database. On the other hand, large SQL statements may run faster due to the larger cache size on the database.

This setup is required only for Oracle. SQL Server does not have any special setup requirements.

Virtualization

In general, Maconomy supports systems that run on virtual environments if the OS is certified to run Maconomy. Maconomy does not support the virtual environment itself.

In terms of performance, virtualization translates to additional work for the CPU. The instructions that perform the extra work are normally part of the operating system calls. To support virtualization, an extra layer of OS calls is introduced, and this layer makes up the biggest share of the virtualization overhead.

When running Maconomy on a virtual environment, you must allow room for the expansion of both the CPU and memory. You may also experience a performance degradation (up to 20% in overhead), compared to running Maconomy on a physical machine, due to VM administration, shared I/O, and CPU. The best mitigation is the make sure to run on dedicated resources.

A key challenge for virtualization is the interception and simulation of privileged operations, such as I/O instructions and CPU capacity.

Maconomy Hardware Requirements Scaling Tool



Hardware Requirements Scaling Tool in Testing

Engineering is testing the new Hardware Requirements Scaling Tool. If you need specific requirements, refer to the Kona conversation at this link:

https://www.kona.com/#!/projects/65917/current/forum_topics/3096800/comments



Sizing Tool Password

The Delttek Maconomy Requirements Sizing Tool is for internal use only, and is password-protected. To open it, use the following password:

MaconomyRocket!23

The Maconomy Hardware Requirements Scaling Tool **in testing** is a dynamic tool that allows you to input specific parameters based on your exact setup, and then generate custom recommendations.

In order to get the maximum benefit from this tool you must first understand the fundamental differences in configuration (described below). Additionally, resize on a regular basis or as your setup evolves.

Technical Consultants input criteria such as:

- Number of users
- Make up of user profiles
- Number of languages

The tool then output the recommended hardware required in as much detail as possible, including the all key server parameters such as:

- Memory
- CPU (Kernels)
- CPU (clock speed)
- I/Ops

The information the tool provides is completely dynamic, matching the customer's specific requirements.

Before You Begin

Before you begin you need to complete the following tasks:

- Gather system information
- Consider warnings

Warnings

Virtualization

There is limited guidance around virtualized environments. Plan to take 20% degradation into account.

Network Bandwidth

If you run a three-tier configuration you must have a high-bandwidth, low-latency connection between server and database.

Coupling Service

The Coupling Service is now a permanent part of the Application Server and must run on the same instance as the Application Server, not on separate hardware.

Multi-Thread CPUs

Maconomy does not benefit from multi-thread CPUs. Servers with this feature will not benefit from any gains as a result.

Tiered SANS

Tiered SANs are supported by Maconomy architecture, but may be problematic in terms of performance related to the incorrect priority of Maconomy within the SAN and in difficulty troubleshooting.

Unicode Impact

Expect a 15-20% degradation in system performance for all customers moving through the 2.1 release due to Unicode impact. This impacts ALL customers not only those making use of language support for characters now included after conversion.

Sizing Tool Procedures



Hardware Requirements Scaling Tool in Testing

Engineering is testing the new Hardware Requirements Scaling Tool. This section offers details on input information, but for now, you must provide Engineering with this information via Kona and receive specific recommendations.

To receive specific hardware requirements recommendations:

1. Refer to the Kona conversation at this link:
https://www.kona.com/#!/projects/65917/current/forum_topics/3096800/comments
2. Click the Notes (middle) tab for a list of parameters.
3. Enter your parameter information in the conversation. See descriptions in this section as needed.
4. Ping @HardwareRequirementsTool.

Engineering will review your parameters and respond with specific recommendations.

Server Sizing Guide

Use the steps in this section to use the Hardware Requirements Scaling Tool to calculate specific output for your needs.

Input

To use the Hardware Requirements Sizing Tool, open it with the password *MaconomyRocket!23*. In the spreadsheet, complete the following fields in the top Input area.

1. **Users** — Enter the total number of users, such as 20,000.
 - a. **Time and Expense Users** — Enter the percentage of the above total users that use time and expense, such as 80%.
 - b. **Project and Resource Managers** — Enter the percentage of the above total users that are project and resource managers, such as 15%.
 - c. **Finance Users** — Enter the percentage of the above total users that are finance users, such as 5%.



Note on Users

We split up users in this manner because various users have different load requirements on the system. For example, Time and Expense users exert little load on the system, whereas PMs nominally use more resources working on more complex tasks, and Finance users utilize the system much more aggressively often working with large sums of data (entries) and complex procedures.

The number of relevant users displays in gray shading in Column C for each user group.

2. **Languages** — Enter the number of languages used by your Maconomy system. The number of languages affect the amount of memory and CPU usage, as more memory and CPU is required to handle and process each language.

3. **Concurrent users (Max)** — Enter the maximum number of users that normally use the Maconomy system at any one time. Take care to include time zone considerations as well. For example, if half of your organization is working in Asia and the other half is in the U.S., the number of concurrent users at any time may only be 50% of your total number of users.
4. **Environment** — Select whether the environment is physical or virtual.
5. **Server OS (MS / Linux)** — Select whether the server operating systems is Windows or Linux. Note that Microsoft (MS) requires more memory and CPU resources compared to Linux.
6. **Servers (load balanced)** — Enter the number of load-balanced servers on the system.
7. **Peak load per server** — Enter the percentage of the load each server is intended to handle.
8. **DB (Oracle / SQL)** — Select whether you use Oracle or SQL for the database. Both consume similar resources.
9. **Load Balancer** — Select yes or no to indicate whether or not you use a load balancer to dynamically balance the server loads.
10. **iAccess** — Select yes or no to indicate whether or not you use iAccess.
11. **Portal** — Select yes or no to indicate whether or not you use the Portal.
12. **RESTapi** — Select yes or no to indicate whether or not you use RESTapi for integrations.

As you input information into these columns, the system recommendations automatically update in the bottom half of the spreadsheet. Ensure that all relevant information is entered.

Recommendations

Maconomy 2.3.x

As you update information in the Input area, the Recommendations automatically display best practice guidelines for these areas:

- Load Balance / Reverse Proxy (WSC)
- Web servers / Reverse Proxy
- Maconomy Server
- Server Configuration
- DB Server (one only)

The recommendations include specifics for the following:

- # (Number)
- Memory GB (each)
- CPU Kernels (each)
- CPU (Clock)
- IOPS
- Disk (GB)
- Configuration (Server Max)



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