Initial Hardware Estimation Guidelines

AgilePoint BPMS v5.0 SP1

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Contents

Preface

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- AgilePoint is built on top of Microsoft .NET framework. The pre-compiled executable is a.NET Common Language Runtime (CLR) application, not a native machine binary. As far as is known at this time, there are no viruses that infect .NET CLR executables.
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- The deliverable package is scanned by anti-virus software before upload to our customer download site.

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- **r** - Indicates "revision." This helps to differentiate the document *version* numbers, which start with **v**.
- ***X*** - The major version number for AgilePoint BPMS to which this document refers. For example, AgilePoint releases 5.0, 5.0 SP1, and 5.5 would all have an ***X*** value of **5**.
- ***Y*** - The major document revision number. This number typically changes only when either there is a new AgilePoint release, or there are major changes to the document.
- ***Z*** - The minor document revision number. This number is incremented each time the document is republished.

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- **All hyperlinks supported**. Links in PDFs are only supported in certain contexts.
- "One-stop shopping" for all information related to AgilePoint BPMS.
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Initial Hardware Estimation Guidelines

This document provides guidelines for hardware sizing and configuration for AgilePoint BPMS.

Note that these are general guidelines based on past experience with representative AgilePoint customers. AgilePoint can provide sizing guidelines for specific customers based on the information in this document. However, the customer must fill out the Hardware Sizing Worksheet in order to complete the estimates.

Considerations

This document provides a baseline recommendation using a minimum recommended hardware configuration. The specific number of machines you require may vary based on a number of factors, which are discussed in this section.

System Usage

Three main factors go into determining system usage for AgilePoint:

- The number of concurrent users
- The number of process steps to be completed per day
- External system load

Note that again, the guidelines provided here apply in most cases. If you have questions regarding your specific configuration needs, contact an AgilePoint representative.

Concurrent Users

The number of concurrent users refers to both process participants and users who are not part of the process but access the system to gather information, such as process status. This number affects the number of front-end application machines you will need.

Process Steps Per Day

To determine your system capacity, you must determine your process steps per day.

Maximum Process Steps per Day for AgilePoint

Use the following formula to estimate how many steps can be completed per day:

Total steps that can be completed in 24 hours = [Thread pool size]*24 (hrs)*60 (m)*60(s)*1,000(ms) / [Average event processing time]*3

Assume a typical server with 2 CPUs (Xeon 3.6 GHz), dual-core and 4GB memory and connects similar configuration of database server. The average AgilePoint event processing speed is 321(ms)/ per event (3 events for one step). Assume a thread pool capacity of 30.

Total steps that can be completed in 24 hours = 30 *24 *60 *60 *1,000/321*3 = 89,719 steps/day

Estimating Your Process Steps Per Day

The number of process steps you require per day can be determined using a worksheet and calculations provided by AgilePoint. In order to set up your worksheet, we require the following information:

- The number of years you would like to project
- The number of processes you foresee creating during that time span

Once we have calculated your estimated process load per day, we can compare it to the following calculations.

Once your process steps per day are calculated, we compare it to the maximum of 89,719. If your requirements are less than this number, the minimum hardware configuration is sufficient.

External System Load

External system load refers to any external systems that will access the AgilePoint system. External system load is a variable that can impact your performance, but it is difficult to calculate precisely what the impact will be.

AgilePoint recommends using either an educated guess based on your knowledge of the external systems to determine the impact, or to run test metrics to more precisely determine the load. If you have questions regarding your specific configuration needs, contact an AgilePoint representative.

Capacity of the Machines in your Environment

AgilePoint offers a baseline recommendation based on minimum recommended hardware. You may need fewer machines if each machine in your environment has a higher capacity. The main hardware considerations for an AgilePoint are covered in this section.

CPU Speed

Increasing the server's CPU speed will increase the amount of work that can be performed by the server within a given time frame. Therefore, faster CPUs will almost always improve performance. However, one notable exception is that a faster CPU will not (necessarily) resolve performance issues that stem from performance bottlenecks.

Number of CPUs

Since AgilePoint Server is multi-threaded and is designed to support asynchronous processing, AgilePoint Server can take full advantage of the benefits of multiple server CPUs. Multiple CPUs will generally improve performance for any real-world AgilePoint system because it offers the greatest improvement for systems that will have concurrent usage by multiple users. However, it may not have as great an affect on the performance of an AgilePoint system that is only used by one or a few users at a time (such as a development or QA system). As with CPU speed, multiple CPUs may not (necessarily) resolve performance issues that stem from performance bottlenecks, although it may prevent a bottleneck from affecting some of the system's users.

CPU Sizing

CPU Sizing is based on the number of transactions per CPU per second under optimal and regular conditions.

The typical formula for computing CPU sizes is as follows:

Number of transactions = number of concurrent requests * (optimal/regular response times) 0.80 * (Speed of CPU in Mega Cycles) * No. of CPUs

= Mega Cycles per Transaction * No. of Transactions

The reason we use the 0.80 factor is because the threshold for CPU utilization before it is considered a bottleneck is 80%. If you want to take into account future growth you should use a smaller factor.

System Memory (RAM)

Unlike CPU speed, where slower CPUs will just require more time for the server to finish performing its work, the server's physical and available memory impose an upper limit to the size and quantity of the data and work that the server can be working on simultaneously. Therefore, for mission critical systems, maximizing the physical memory is always best.

Memory Utilization

Memory requirements for AgilePoint Server depends on several factors such as:

- Number of active process instances
- Typical amount of process instance size varies by amount of custom data carried along process
- Custom application data at each step
- Number of concurrent requests

Hard Disk Performance

Since data will be read from and saved to the server's hard disk, the hard disk's seek time, read response, RPMs, etc. will affect the performance of AgilePoint systems. Therefore, the faster your server's hard disk performs, the better your system's performance will be. However, hard disk performance generally has the greatest affect on database servers. For other servers (or for hard disks that don't contain a database), hard disk performance is much less critical and unlikely to affect performance significantly, unless the server starts using virtual memory (see above), in which case it may become very critical.

Network Bandwidth

Network Bandwidth is determined by amount of data pulled/pushed per request. This is usually determined by the number of active requests at any particular instance. Please note, you need to consider bandwidth between client applications and the AgilePoint Engine as well as bandwidth available between the database and AgilePoint Server.

Rule of thumb for network bandwidth:

There should be at least 1 GB bandwidth between AgilePoint and Database Server and 10 – 100 MB is sufficient between client applications and AgilePoint Server.

Network Adapters

Usually network bandwidth is more of an issue than network adapters. However, the server's network adapters should be sufficiently fast and reliable to allow the server to make maximum use of the full bandwidth provided by the networks the server is connected to. Anything slower (or an unreliable adapter) could represent a potential performance bottleneck.

Availability Requirements

High Availability (HA)

AgilePoint recommends a High Availability (HA) configuration for maximum uptime. However, you will need to consider whether HA is required for your organization.

Network Load Balancing (NLB)

AgilePoint recommends Network Load Balancing (NLB) to ensure maximum resource availability. However, you will need to consider whether NLB is required for your organization.

Disaster Recovery (DR)

If your organization requires a disaster recovery (DR) strategy, additional hardware is required. For more information, see Disaster Recovery on the AgilePoint Support Portal.

The Number of Environments You Want to Create

AgilePoint recommends having a Development, Test, Staging, and Production environment. However, some customers opt to forgo one or more of these based on their organizations' requirements.

Virtual Environments

In order to save money, it is possible to run one or more of your non-production environments as virtual environments. This is much cheaper, but it tends to run slower than a physical environment. It is possible to run functional tests in a virtual environment, but not load tests.

If load testing is not required in a particular environment, AgilePoint recommends using a virtual environment. This is an especially effective strategy for development environments.

Note that even if you use a virtual environment, physical database servers are recommended.

Support for Virtual Environments

AgilePoint is committed to fully supporting AgilePoint BPMS running on virtualization technologies. AgilePoint recommends installing AgilePoint on a physical server machine, but AgilePoint can be supported in a virtual machine (including NLB) given the virtual machine can support Windows Server 2003 or 2008, and the .NET Framework 3.5. AgilePoint recommends Windows Server® 2008 Hyper-V™, but other Microsoft and non-Microsoft virtualization products are also supported as discussed here. In addition to Windows Server® 2008 Hyper-V™, AgilePoint can also be deployed using Microsoft Virtual Server and Microsoft Virtual PC virtualization technologies. Only virtualization products that have specifically passed Microsoft's requirements for virtualization support are also officially supported for running AgilePoint. See the following Microsoft Web site that provides a list of non-Microsoft virtualization products that have passed the requirements for Windows Server 2003 and 2008:

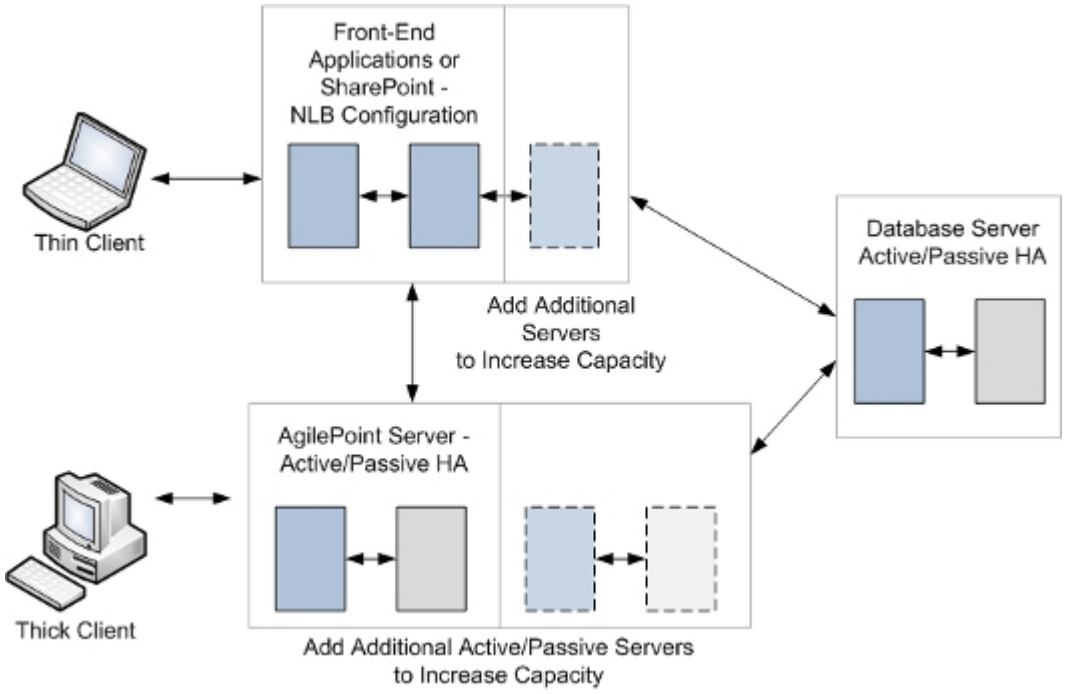
http://www.windowsservercatalog.com/results.aspx?&bCatID=1521&cpID=0&avc=0&ava=0&avq=0&OR=1&PGS=25&ready=0

AgilePoint recommends the following configurations to ensure optimal performance of the AgilePoint BPMS in a virtual environment:

Host OS Architecture	X64
Host Machine Processors	4
Memory	4 GB allocated to each virtual machine
Bandwidth	1 Gb Network connection to the host machine
Virtual Memory	Memory allocation cannot always be guaranteed (i.e. if 4 GB is set for the virtual machine, it does not mean that the virtual machine will be using the entire 4 GB of memory at all times). The memory is shared amongst all the virtual machines.
AgilePoint Database	The AgilePoint Database should be on a physical machine.

Hardware Configuration

The following diagram shows the basic AgilePoint hardware architecture approach. The precise number of machines you may need for your environment may vary based on your requirements. Also, NLB and HA are recommended, but optional.



Hardware Sizing

The recommendations in this section represent the current, baseline recommended hardware requirements. You may need additional machines or higher performance based on your system requirements.

AgilePoint Server

Processor (CPU)	64bits Dual Physical Processor, dual-core and clock speeds of 3.2 GHz or higher.
Memory (RAM)	6 GB RAM or higher
Available Hard Disk Space	150 MB for AgilePoint installation and plus an additional 1GB for log files and cache
Other Hardware or Devices	1 Gigabit Network Interface Card (NIC) Share Device required by cluster service

Front-Tier Application

Processor (CPU)	32bits or 64bits Dual Physical Processor, dual-core and clock speeds of 3.2 GHz or higher.
Memory (RAM)	4 GB RAM or higher
Available Hard Disk Space	150 MB for AgilePoint Installation or SharePoint
Other Hardware or Devices	1 Gigabit Network Interface Card (NIC) Network load-balance device.

If SharePoint 2007 installed, see the Microsoft SharePoint documentation.

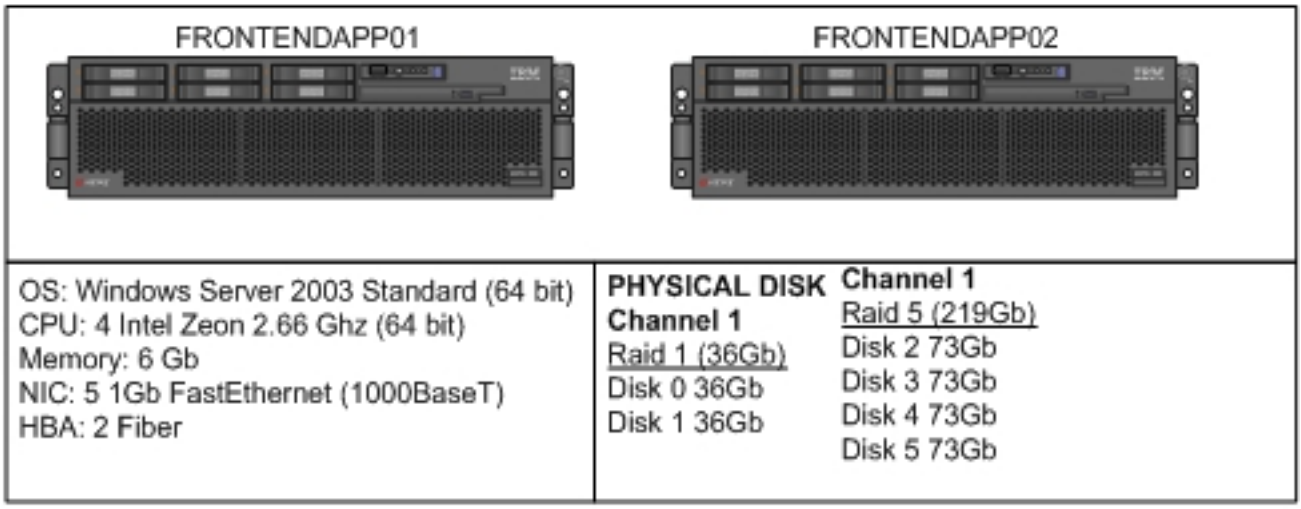
Database

In most organizations, the AgilePoint database is installed on a machine that includes databases for other applications. AgilePoint only provides sizing recommendations for the database upon request. Please discuss your organization's requirements with your database administrator.

Hardware Configuration Example

The following diagram provides the hardware configuration for an actual AgilePoint BPMS client. The client was a large-scale implementation of AgilePoint BPMS, so the configuration specifications are higher than the baseline.

Front-End Application
(ASP.Net or SharePoint)



AgilePoint Server Cluster