

# Automated Performance Management for Servers and Workstations

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*Using standardized configuration settings ensures the system will work but it doesn't make it work well.*

*AmbiCom's Veloxum identifies and fixes problems continuously - including virtualized systems - and does so without voiding support contracts.*

*Too many configuration permutations exist to manually optimize system performance.*

Every component that is assembled to create a server or workstation, from device drivers to applications, are built to be optimized for their specific environment and operating criteria. The manufacturers build in a range of supported settings so that tuning can occur once the systems are in place. However, the level of interdependency and number of variables that can take place makes the task of doing so too onerous to be done manually.

So, each device or component is shipped by the manufacturer with default settings designed to ensure the systems run, regardless of versions or drivers from other components. This means they are tuned to the lowest common denominator. To ensure compliant support criteria, many large IT organizations create "gold" configurations that are designed to ensure the servers perform in a wide variety of instances, but not necessarily to perform well.

The result: in a study commissioned by the Department of Energy it was found that servers and workstations in a commercial environment delivered less than 20% of their potential in relation to workload and throughput. They were 80% inefficient.

Veloxum reclaims this lost performance using a mathematic optimization formula to find a balance point, where all related variables are able to achieve their maximum efficiency based on the resources at hand and the workload being addressed.

The thousands of variables that the formula uses are derived from multiple sources within the target device, or generated by specific tests used to pinpoint bottlenecks affecting performance.

Once a bottleneck has been isolated, the configuration settings relevant to that specific bottleneck are calculated to find the balance point, creating a change set. This change set is a group of settings that, when implemented in their entirety, will remove the bottleneck resulting in improved overall efficiency.



*Veloxum addresses all aspects of a server's performance not just CPU and Memory.*

#### **Supported Operating Systems**

- Microsoft Windows Server 2003,2008
- Microsoft Windows XP, Vista, 7, 8, 8.1 and 10
- Linux
- Sun Solaris
- Apple OSX
- IBM AIX
- VMware
- Hyper-V

#### **Supported Applications & Databases**

- Microsoft Exchange / Outlook
- Microsoft SharePoint
- Lotus Notes
- Citrix
- SQLserver
- Oracle

*Active Continuous Optimization (ACO) automates optimizing OS settings to unlock systems' potential and increase their efficiency and capacity.*

*ACO Unleashes the real power of servers and applications.*

Veloxum's optimization application targets the heart of the server, the operating system, working to maximize the efficient use of all server and client components that depend upon OS interaction including:

- Applications and Databases
- CPU
- Memory
- Network
- Storage

Veloxum's features make it an exceptional tool by:

- Identifying and fixing performance problems via active remediation through a patented process.
- Rapidly optimizing both server and client, often within minutes.
- Adjusting existing hardware and OS settings "out-of-band" while staying within the manufacturer's supported ranges.
- Periodically optimizing with changes deployed either automatically or through existing change-control procedures.
- Supporting Linux, AIX, SUN and Windows OS with supplied OS modules.
- Optimizing popular apps such as Exchange, SharePoint, SQLserver, Lotus Notes and Oracle with optional Application Optimization Modules (AOM).
- And deploying quickly and easily.

The formula used to find the balance point of variables is derived from the Lagrange Multiplier, a partial differential equation used to find the optimization point for a group of constrained variable.

$$\Lambda(x, y, \lambda) = f(x, y) + \lambda \cdot (g(x, y) - c)$$

AmbiCom designed its Veloxum software's Active Continuous Optimization (ACO) process to maximize the efficiency of your existing infrastructure and to combat performance degradation whether caused by poor OS settings or the side effect of IT priorities. It delivers immediate Return on Investment (ROI) and lets you do more with your existing systems.



## Appendix A: ACO under the Covers – Multi-variable Optimization

Do you remember the first time you ever used an automatic camcorder? When you pushed the 'on' button, it seemingly came to life, with the lens twisting-and-turning out of the front. When aimed at your subjects, it knew to focus itself on them. If you happened to move into another room or outside, it automatically adjusted the light level to compensate for its new surroundings. Regardless of what you did, it would correct for it and optimize the image. Do you remember your thoughts at the time? Most likely it was, "Cool! This is like magic!" Well, welcome to the world of Active Continuous Optimization (ACO), where machines anticipate your needs and adapt to environmental changes.

To understand ACO operation theory, think about the automatic camcorder's operation. While modern camcorders operate, using highly-advanced algorithms beyond the scope of this paper, for the sake of explanation, this paper presents a greatly simplified operational scenario, focusing on only two functions and their associated camcorder settings – focal-length and light level.

When a videographer points a camcorder at a subject, the camcorder moves the lens back and forth in order to maximize the camcorder's relative focus in regard to the subject. The graph of the relative focus vs. the focal-length setting might look like the graph shown in Figure 1 below. The optimal focal-length range is around the peak of the relative focus value. If the focal-length is to the left of the optimum range, the subject is too blurry because the camcorder focuses too close for the subject. If to the right of the optimal range, the subject again becomes too blurred as the focus is too far away.

Perhaps it is obvious that the simple focus example above assumes a particular light level. If you constrain focal-length over all light levels settings - as camera manufacturers must - the graph becomes a three-dimensional contour as shown in Figure 2. In this diagram, the purple contour shows all possible focal-length settings for all possible light level settings. The red line represents a particular range of light levels overlaid onto this contour.

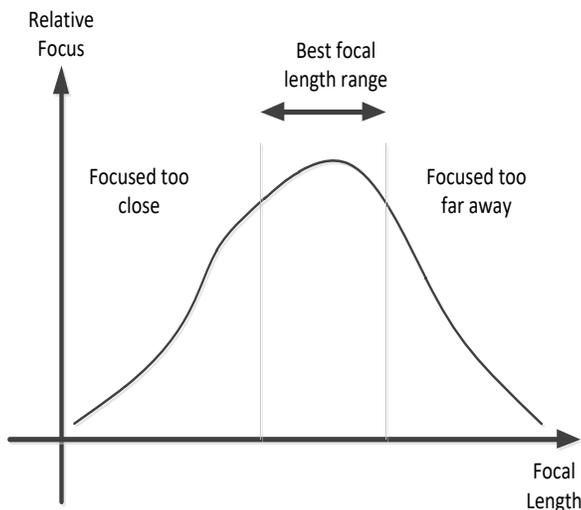


Figure 1: Camcorder Focus vs. Focal Length

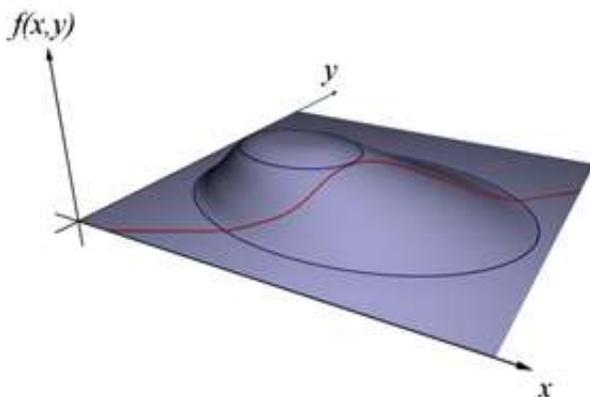


Figure 2: Focal-length optimized for light level

Solving for the optimum, focal-length setting for a particular light level then becomes a mathematical exercise in determining where the set of focal lengths (the upper contour ring) is tangential to the maximum (optimum) brightness for a given light level. In Figure 2 this occurs near the center of the diagram. When the camera figures out this value, it can zoom the lens in or out to the optimum setting for both variables.

Once you understand the general concept of optimizing one variable constrained by another, it may not come as a surprise that the technique also works just as well for multiple variables. However, for the purposes of this paper, it is important to know only that optimizing variables constrained by others follows generally accepted mathematical principles, and is used throughout everyday activities.



## Appendix B: AmbiCom's Veloxum Architecture, Installation, and Operation

### Veloxum's Architecture

Three key components make up the Veloxum solution---Connectors, Virtual Appliances, and the Management Console.

#### Connector

The Connector is a lightweight, cross-platform process that identifies the components – applications, databases, hardware, software, and operating systems –installed on the target server or client. The Connector tests and reports the baseline configuration results to the Virtual Appliance. The Connector also implements required configuration changes when it receives instructions from the Appliance. To save resources, Connectors remain dormant until they initiate active tests.

#### Virtual Appliance

The Virtual Appliance (VA) is a 64bit VMware image that controls Connectors. When first deployed, the VA collects data from the Connectors and automatically creates a baseline. It then compares the baseline against its business rules, identifies optimization opportunities, and creates settings change recommendations. The VA then transmits the configuration change instructions to the Connector. Deployment occurs immediately in automatic mode, or once authorized by IT in manual mode.

#### Management Console

The Management Console (MC) is a browser-based, control center that gives IT complete control over VA instances and provides continuous performance information back from them. Through the MC, IT personnel can set remediation to occur either immediately, on a deployment schedule or when manually set.

The MC provides a rich set of settings-related data not found in other tools. For instance, the MC provides a heat map to instantly inform users which servers are most heavily used and endangering timely performance. In addition, the MC can provide instant graphical readouts on VMware's most critical metrics; % CPU RDY, CPU Usage, Shared Memory Utilization, Network Throughput, and Guest Throughput, to name just a few.

The MC maintains a history of all changes and can roll back any set of changes at any time. Existing enterprise monitoring tools, such as Microsoft's SCOM, IBM's Tivoli and Kaseya's RMM are fully integrated with Veloxum and can present the Veloxum data as if it were collected natively.

### Installation and Operation

Installing Veloxum within the Enterprise is fast and easy. Installation follows generally accepted procedures and operation requires setting only a few options.

#### Installation

The Virtual Appliance (VA) Installs as a 1GB 64-bit image that downloads onto an existing VMware server. The Connector installs on all supported devices including local and remote servers, notebooks, and home office systems. It installs via standard software distribution methods and completes within in minutes. Once started, the Connector begins reporting metrics to the VA immediately.

#### Operation

Veloxum's system and method for optimizing operating systems, and application is a patent-pending process. (An overview of the technology can be found in Appendix A.) In addition to the previously mentioned baselining, testing, reporting and implementing of fixes, Veloxum also validates implemented improvements, continuously monitors performance, and rolls back changes if desired. This feature combination – active remediation, validation, continuous monitoring, and rollback – set Veloxum clearly apart from other server and application monitoring-only tools.

