

NOTE: Make sure that you are using the version of this specification that matches your version of Cisco Video Surveillance Manager (VSM). This specification used VSM 6.3.1 to validate acceptable loads.

Video Surveillance Monitoring Workstation Performance Baseline Specification

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This document provides the performance baseline for a video surveillance monitoring workstation. The performance of a workstation on which you display multiple windows of surveillance video depends on many variables, including, CPU, memory, bus speeds, graphics card capabilities, and other applications that are installed on the workstation. Overall quality of experience also can vary depending on the type of system used, the number of video streams being rendered, and the characteristics of those streams.

This document describes the performance baseline for a dedicated surveillance monitoring workstation to ensure the overall quality of the monitoring experience. This document also describes the maximum number of video streams that can run with acceptable quality on a monitoring workstation when using different codecs (Motion JPEG, MPEG-4 and H.264) The values listed in the standard-definition acceptable load table were verified using NTSC video settings.

A properly configured surveillance monitoring workstation ensures the overall quality of the monitoring experience. Cisco offers the Physical Security Client Workstation, a validated, easy-to-order version of the Dell Precision T5500 Tower Workstation (a Cisco SolutionsPlus offering). It is available on the Cisco price list under the Product ID, CPS-WORKSTATION. To order one, contact your local representative.

Table 1 describes configurations for a monitoring workstation that displays video from **Cisco Video Surveillance Manager (VSM) 6.3.1**. Workstations with these configurations were used to determine the recommended maximum video loads. This assumes that the workstation is *dedicated* to video. Running other software, such as firewalls, antivirus applications, CD/DVD burning utilities, and general-purpose applications will reduce the quality of the user experience.

Table 1. Video Surveillance Monitoring Workstation Recommended Specifications

Workstation Attribute	Legacy Specification	Physical Security Client Workstation
Operating System (OS)	Windows XP Professional 32-bit, SP3	Windows 7 Professional, 64-bit
CPU	Intel 950 i7 Core - 3.07 GHz	Intel Xeon quad-core – 2.53 GHz
Memory	6 GB DDR3	6 GB DDR3
Graphics	NVIDIA GeForce GTX260 896MB PCIe	NVIDIA Quadro FX 3800 1 GB PCIe
Browser	Microsoft Internet Explorer 7	Microsoft Internet Explorer 8, 32-bit
Cisco VSOM configuration		VMR mode enabled

Network connection	Gigabit Ethernet (GigE) network connection required			
Display configuration	Single monitor			

Table 2 shows the maximum number of standard-definition video streams that can run with acceptable quality on the recommended monitoring workstation.

Table 2. Acceptable Load per Client by Codec for Standard Definition (SD)

	Motion JPEG	MPEG-4	H.264 SD	Mixed
Video streams	16	16	16	16
Resolution	VGA	4CIF	4CIF	VGA/4CIF
Frame rate	30 fps	30 fps	30 fps	30 fps
Bit Rate per stream (CBR)	6 Mbps	3 Mbps	3 Mbps	2-3 Mbps

Table 3 shows the maximum number of high-definition video streams that can run with acceptable quality on the recommended monitoring workstation when using the H.264 codec.

Table 3. Acceptable Load per Client for High Definition (HD) H.264

	H.264 HD	H.264 HD	H.264 HD
Video streams	6	4	2
Resolution	720p	1080p	1080p
Frame rate	30 fps	30 fps	30 fps
Bit Rate per stream (CBR)	4 Mbps	4 Mbps	12 Mbps

Mixing Resolutions and Codecs

You can use several codecs on a monitoring workstation simultaneously. However, the number of streams does not necessarily combine linearly. In addition, a 1080p 12 Mbps streams should be mixed only with a single smaller resolution stream.

Best Practice: Use the Workstation Profiling Tool

It is best practice to validate the performance of any existing system by using the Workstation Profiling Tool. This tool enables the user of a workstation to determine the expected performance of the workstation. See the Workstation Profiling Tool User Guide for information about installing and operating this tool.

Questions & Answers

- Q. Can two video monitors be used, either with two graphics cards or one card with dual connectors?
- A. The acceptable load tables in this document are based on a system with one monitor. Adding monitors will degrade the monitoring experience.
- Q. Is Microsoft Windows XP 64-bit required to support the recommended 6 GB of memory?
- A. No, Windows XP 64-bit is not supported. The 32-bit version cannot address more than 4 GB per executable, but today's multi-core processors can take advantage of more than 4 GB when running in 32-bit mode. Therefore, the minimum workstation requirement is 6 GB of RAM. (For additional information, see the MSDN article, "Memory Limits for Windows Releases.")

- Q. Is one Virtual Matrix client license required per CPU or is one Virtual Matrix client license required for each Virtual Matrix client instance on a workstation?
- A. You need one Virtual Matrix client license for each instance of the Virtual Matrix client that runs on a workstation.
- Q. Do mixing VGA and 4CIF resolutions reduce the stream bit rate?
- A. In the acceptable load table, the "Mixed VGA/4CIF" bit rate specifies a range of bit rates per stream due to the various streams involved. Mixing does not cause bit rates to drop.
- Q. Is the VSM AXClient supported on Windows XP 64-bit?
- A. The VSM AXClient is not currently supported on Windows XP 64-bit. Starting with VSM 6.3.1 it is supported on Windows 7, 64-bit using Internet Explorer 8, 32-bit. If you have a question about whether your workstation supports the VSM AXClient, follow the best practice of using the Workstation Profiling Tool.
- Q. How does using D1 resolution affect expected behavior?
- A. Failure to stay within the recommended specification may degrade quality of the monitoring experience. Using D1 resolution has not been validated with the recommended system. Actual resolution (rather than a nominal one), frame rate, bit rate and codec most affect the quality of experience. Check your device to see what its nominal resolution maps to. For more information, see the white paper, "Understanding High Definition in a Video Surveillance Network."
- Q. How do PAL video settings affect expected behavior?
- A. While the standard-definition acceptable load tables were verified using NTSC video settings, using PAL settings (such as 25 fps) should not degrade the quality of the monitoring experience.
- Q. Can I use a workstation that does not meet the recommended baseline specifications?
- A. When considering the number of codecs, resolutions, and frame rates supported by VSM, and the number of workstations, graphics cards and processors that are available, it is difficult to determine the optimal workstation for a given user experience, so this document provides recommended maximum loads. Workstations that do not meet the baseline specifications may be able to render some video, but they cannot provide the same quality of monitoring experience. If you have a question about whether your workstation can perform the tasks that you need, follow the best practice of using the Workstation Profiling Tool.
- Q. What is the difference between "minimum requirements" and this "baseline specification"?
- A. Minimum requirements define what is required to install and run the VSM AXClient to display a single video stream. They do not define acceptable loads for multi-paned use cases or the necessary configuration to ensure a quality monitoring experience.

For More Information

For more information about Cisco Video Surveillance Products visit
<http://www.cisco.com/go/videosurveillance> or contact your local account representative.

