

Performance Considerations in Video Surveillance



Compute Analytics Price Index

Date: Feb-14th, 2020

Table of Contents

About Arxys	3
About Milestone Systems	3
Executive Summary	4
Tested Products	5
Test Servers	5
Test Results	7
Conclusion	9
Resources	9

About Arxys

Arxys has been crafting data protection and data analytics solutions for the most demanding organizations for more than 25 years. Our unique Activated Hardware Acceleration technologies deliver enterprise class performance and protection at working class prices.

Arxys SHIELD | ENT NVR's brings the power of hardware accelerated video analytics and enterprise class protection together with Milestone Certified performance to bring new levels of security. With open standards ONVIF and H.265 support and GPU powered AI, SHIELD | ENT delivers. More information at www.arxys.com

About Milestone Systems

Milestone Systems is a global leader in providing open platform IP video surveillance software. Milestone has provided easy-to-use, powerful video management software in more than 200,000 installations, worldwide.

Milestone XProtect® provides open architecture products that are compatible with more IP cameras, encoders, and digital video recorders than any other manufacturer. Because Milestone provides an open platform, you can integrate today's best business solutions and expand what's possible with future innovations. Visit www.Milestone.com for more.

GENERAL DISCLAIMER:

All information, to include but not limited to, documentation, configuration calculations, installation and trouble-shooting advice, consultancy and support services which may be provided within this document is delivered 'as is' without warranty of any kind. Unless otherwise agreed in writing between you and Arxys, you, as the recipient, agree to assume the entire risk as to the results and performance achieved or not achieved by reliance on such information. Arxys and its Affiliates shall, to the extent allowed by law, assume no liability for the Recipient's reliance on such information and disclaims all warranties, whether express or implied, including but not limited to, the implied warranties of merchantability, fitness for a particular purpose, title and non-infringement, or any warranty arising out of any proposal, specification or sample with respect to the document. Furthermore, Arxys and its Affiliates shall not be liable for loss of data, loss of production, loss of profit, loss of use, loss of contracts or for any other consequential, economic or indirect loss whatsoever in respect of delivery, use or disposition from the content of this document.

Executive Summary

The SHIELD | ENT NVR's deliver enterprise class performance and protection and advanced video motion detection and analytics at breakthrough prices. All of the tests were performed with server-side video motion detection (VMD) with metadata collection enabled and were ran using Milestone XProtect Corporate 2019 R3 to ensure latest performance numbers.

Arxys Hardware Accelerated Video Decoding delivers breakthrough performance at a much lower price. Arxys' Hardware Acceleration technology supports more full HD cameras with server-side Video Motion Detection for 24/7 Video recording with forensic-grade zero frame loss and video analytics built-in at no extra cost.

Tests compared two HPE DL360 G10 Xeon servers (1x Gold 5222 & 1x Silver 4208 CPU) against the SHIELD | ENT R12E Server (Xeon-E 2176 CPU). Memory, SSD's, NIC, OS, Settings, software and storage equal in all systems. The performance differences are isolated to the performance characteristics of the CPU's themselves and highlight how much better the Xeon-E CPU's process video and video analytics.

Bottomline:

The SHIELD | ENT Enterprise NVRs with Xeon-E CPU delivered 325% more total cameras at 440% lower cost per camera. Three times as many cameras with full video motion analytics on a system that cost 40% less.

Using the h.264 codec the SHIELD | ENT server delivered impressive performance gains over the higher cost HPE system with Scalable CPU servers. When using the h.265 codec the SHIELD | ENT server achieved 15% better performance. Where the HPE Servers using Scalable CPUs struggled to keep up with the enhanced video decoding demands of the h.265 CODEC and lost 25% of the camera performance.

Using a Compute Analytics Price (CAP) to demonstrate the system cost per camera analytics compute. In essence the cost per camera. Lower is better.

$$(\text{System Cost} / \text{Cameras}) = \text{CAP}$$

- 1. SHIELD | ENT R8M (Xeon-E) MSRP \$6,595 / 325 cameras = 20 CAP**
- 2. HPE DL360R10 (Silver 4208 CPU) MSRP \$8,942 / 100 cameras = 89 CAP**
- 3. HPE DL360R10 (Gold 5222 CPU) MSRP \$9957 / 75 cameras = 133 CAP**

Tested Products

- [SHIELD | ENT NVR](#) Enterprise (Network Video Recorders) all-in-one appliances
- [SHIELD | PRIME](#) iSCSI Video SAN X584E
- Milestone XProtect Corporate 2019 R3 (build 13.3a)

Performance of the solution may vary if different products and/or system components not listed in the tests details are included.

Test Servers

All servers stored all recorded video onto the same iSCSI SAN storage system

- SHIELD | PRIME iSCSI SAN X584E 1 Petabyte SAN
- Dual active/active controllers
- 84x 12TB Enterprise HDDs
- 8x 10Gb iSCSI connections - direct attach iSCSI

A single Arxys SHIELD | ENT Enterprise R12E:

- Intel Xeon-E 2176 CPU 3.7-4.5 Ghz - 6Core/12Thread
 - (CPU Passmark: 16,023)
- 32GB ECC DDR4 DRAM
- 2x 10Gb ethernet ports
- Mirrored SSD's for OS
- Microsoft Windows Server 2019 Standard
- Milestone XProtect Version 2019 R3 (with all hot fixes applied)

A single HPE DL360 R10:

- Intel® Xeon® Gold 5222 Processor 3.8Ghz 4Core/8Thread
 - (CPU Passmark: 10,896)
- 32GB ECC DDR4 DRAM
- 2x 10Gb ethernet ports
- Mirrored SSD's for OS
- Microsoft Windows Server 2019 Standard

- Milestone XProtect Version 2019 R3 (with all hot fixes applied)

A single HPE DL360 R10:

- Intel® Xeon® Silver 4208 2.1Ghz Processor 8Core/16Thread
 - (CPU Passmark: 10,838)
- 32GB ECC DDR4 DRAM
- 2x 10Gb ethernet ports
- Mirrored SSD's for OS
- Microsoft Windows Server 2019 Standard
- Milestone XProtect Version 2019 R3 (with all hot fixes applied)

Video streams used in this test were configured at 30 frames per second (FPS). Video streams were configured to use both the H.264 and H.265 video codecs. All tests were performed with 24/7 continuous recording with full Video Motion Detection and Metadata collection enabled for all videos to stress the overall system and the find the peak processing point of each system. Recorded video was purged after one hour of retention. Performance numbers were recorded after the system started to delete old video to further simulate a real-world scenario.

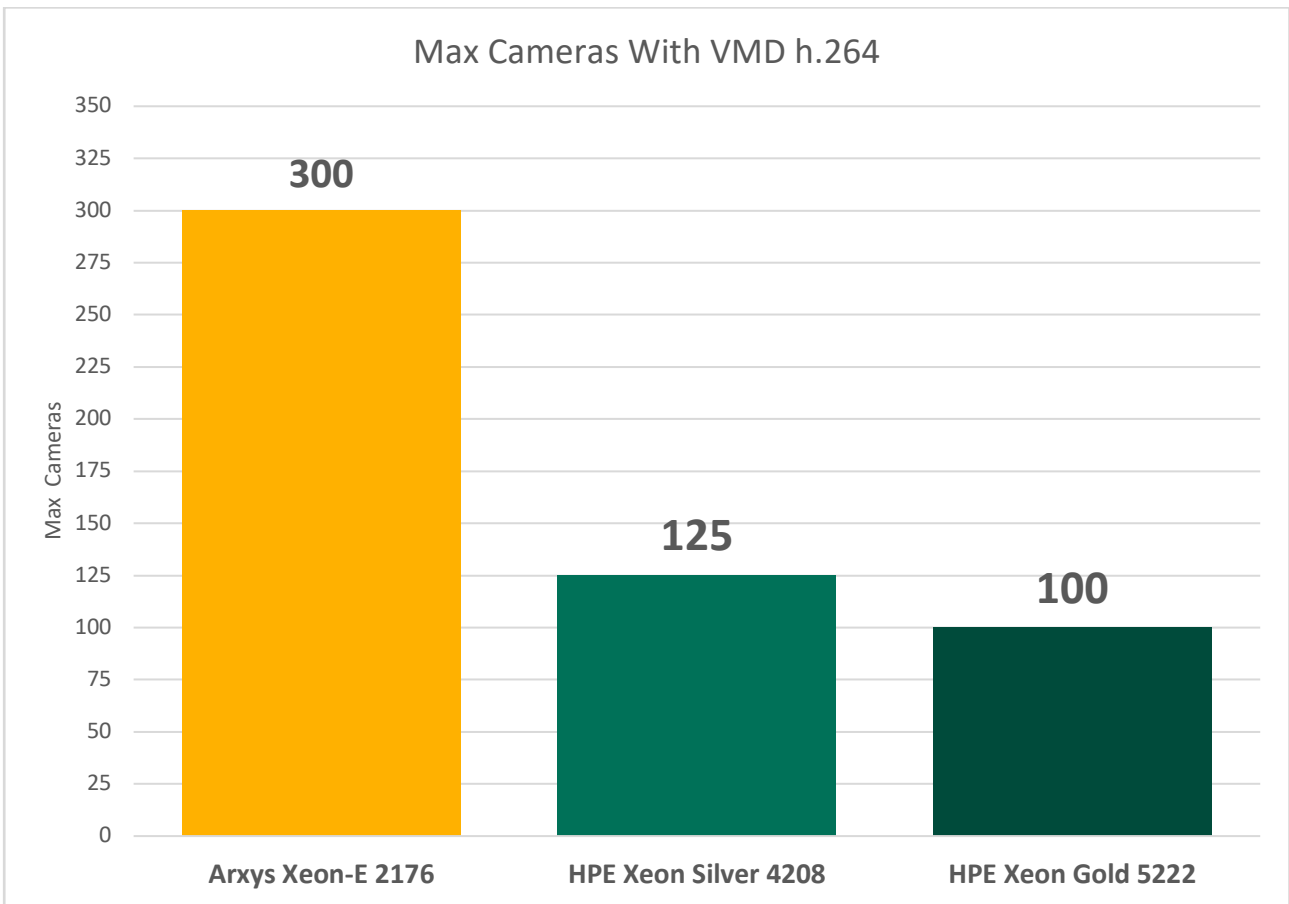
Video Surveillance specifications:

- 1080P resolution
- 30 FPS
- Video Motion Detection
- H.264 and h.265 codecs
- Average of 5.3 Mb/s for H.264 and 3.2 Mb/s for H.265 video streams

Test Results

Scenario 1: h.264

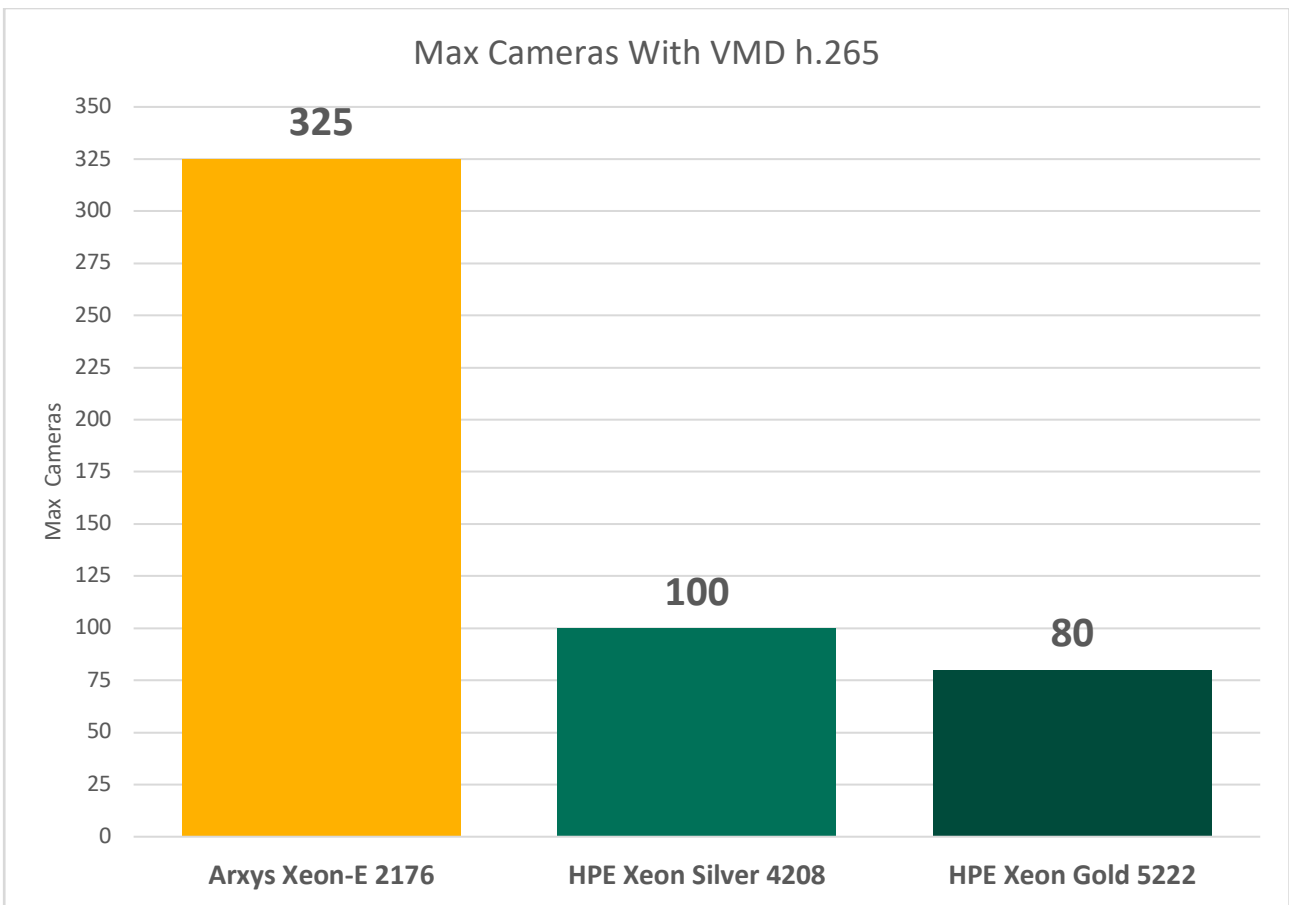
- Server-side motion detection with metadata collection
- Continuous recording or Record on Motion
- h.264 High Quality; 1080p 30FPS



CPU	Max Cameras	CPU Use Avg
Xeon-E 2176	300	47%
Xeon Silver 4208	125	62%
Xeon Gold 5222	100	65%

Scenario 2: h.265

- Server-side motion detection with metadata collection
- Continuous recording or Record on Motion
- h.264 High Quality; 1080p 30FPS



CPU	Max Cameras	CPU Use Avg
Xeon-E 2176	325	47%
Xeon Silver 4208	100	60%
Xeon Gold 5222	80	58%

Conclusion

The SHIELD | ENT Server delivered 325% more cameras in total at more than 440% lower cost per camera.

The SHIELD | ENT Enterprise NVR server delivered unprecedented performance with video motion detection and metadata enabled. Certified to support 300 cameras at 1080P and 30fps with server-side video motion detection with metadata collection while ensuring CPU, RAM and network utilization are always below 65% in accordance with Milestone best practices.

The Arxys SHIELD | ENT is a top performing hardware accelerated Milestone Certified NVR that delivers video motion detection and video analytics at a breakthrough price. The Intel Xeon-E CPU is a powerful video processing CPU with built-in Quicksync GPU for hardware accelerated video motion detection and analytics.

For highly hardware dependant operations such as video surveillance and video decoding for analytics general purpose file server architecture does not deliver the price/performance required in security solutions. A purpose-built architecture that takes into account the unique requirements of video processing and analytics delivers exponentially higher performance at much lower costs.

Resources

[SHIELD | ENT NVRs](#)

[Video Bandwidth & Storage Calculator](#)