Milestone Solution Partner IT Infrastructure Components Certification Report

Capsule DR-Series Hyper Converged Appliance with Milestone XProtect VMS

8-15-2016

Table of Contents

About Capsule Technologies:

Capsule Technologies is bringing next generation storage and server visualization concepts to an industry which is challenged by exploding requirements and saddled with antique IT options.

Capsule Technologies develops 100% of its technology in South Africa and is becoming a major player in the Data Storage industry in Africa for Video Surveillance. Capsule's flagship technology CAPS-OS™, Computer Aided Protection & Surveillance, is composed of a software layer and firmware running on Capsule Technologies Hardware.

CAPS-OS™ provides new capabilities and performance improvements ideal for enabling modern hardware to deliver high performance solution and integrated visualization services. CAPS-OS™ is based on minimalist version of Linux largely modified by Capsule and bundled with proprietary software developed by Capsule Technologies.

About Milestone Systems:

Milestone Systems is the world's leading provider of open platform IP video surveillance software. Milestone has provided easy-to-use, powerful video management software in more than 100,000 installations worldwide.

Milestone XProtect® products are designed with open architecture and 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 for more.

Introduction:

This report documents the technical results of certification tests performed on the Capsule DR Series Hyper Converged Appliances for IP video surveillance. Three versions of the Capsule Appliances were tested, and all three far exceeded the performance benchmarks required for certification. Performance tests focused on finding the maximum number of cameras each Capsule Appliance could support. The Milestone Technology Partner (MTP) Certification program seeks to confirm that server, storage and network solutions provided by qualified MTP vendors meet the performance benchmarks required to support the Milestone XProtect VMS applications, and to measure the maximum performance available to Milestone customers if they choose to build a solution using certified MTP products. Certification of the Capsule Appliance will ensure that any surveillance system built using the DR Series Hyper Converged Appliances in combination with the Milestone XProtect components will be able to record and archive an amount of video consistent with the recommendations of the Milestone Server and Storage Calculator.

Certified Products

- Capsule DR-Series Hyper Converged Appliances
  - DR1630
  - DR2460
  - DR4860

DR1630

DR2460

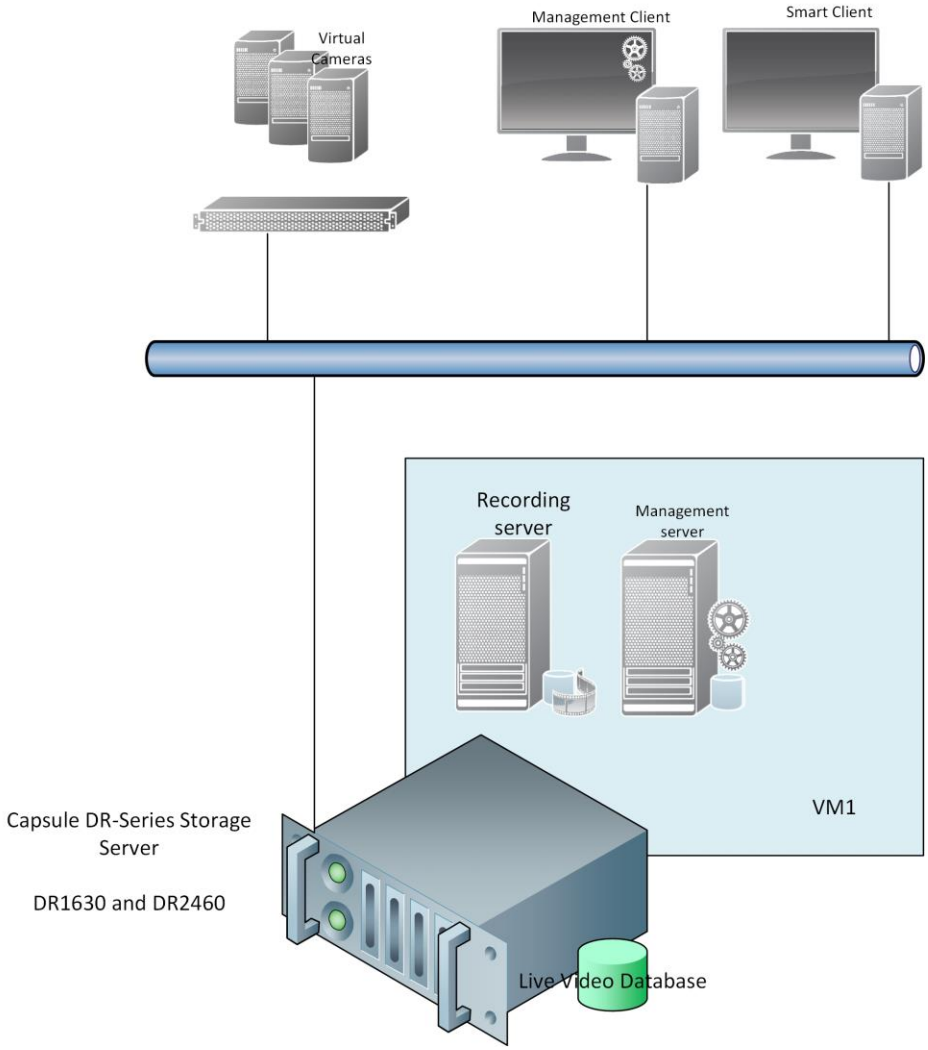
DR4860

- Milestone XProtect Corporate 2016 R2 10.1a
  - Listed products are certified for use with the entire XProtect product line.

Performance of the solution may vary if different XProtect products and/or system components not listed in the tests details are included. For a complete list of all equipment used in the certification check Appendix B.

Test Scenario Configurations:

Capsule DR Series Hyper Converged Appliances are built specifically for the IP video surveillance industry. These appliances combine a server and storage platform which can support VMS software, including XProtect, and provide 128 TB of storage on the 16-bay DR1630, 192 TB on the 24-Bay DR2460 with up to 384 TB on the 48-bay DR4860. These appliances can be configured with multiple Virtual Machines (VM) running inside them to allow the VMS to scale by addition additional Recording Servers. This test scenario used Milestone XProtect Corporate 2016 R2 10.1a, as the version of software. The first test scenario, which was used for both the DR1630 and the DR2460 included a single VM and one XProtect Recording Server.

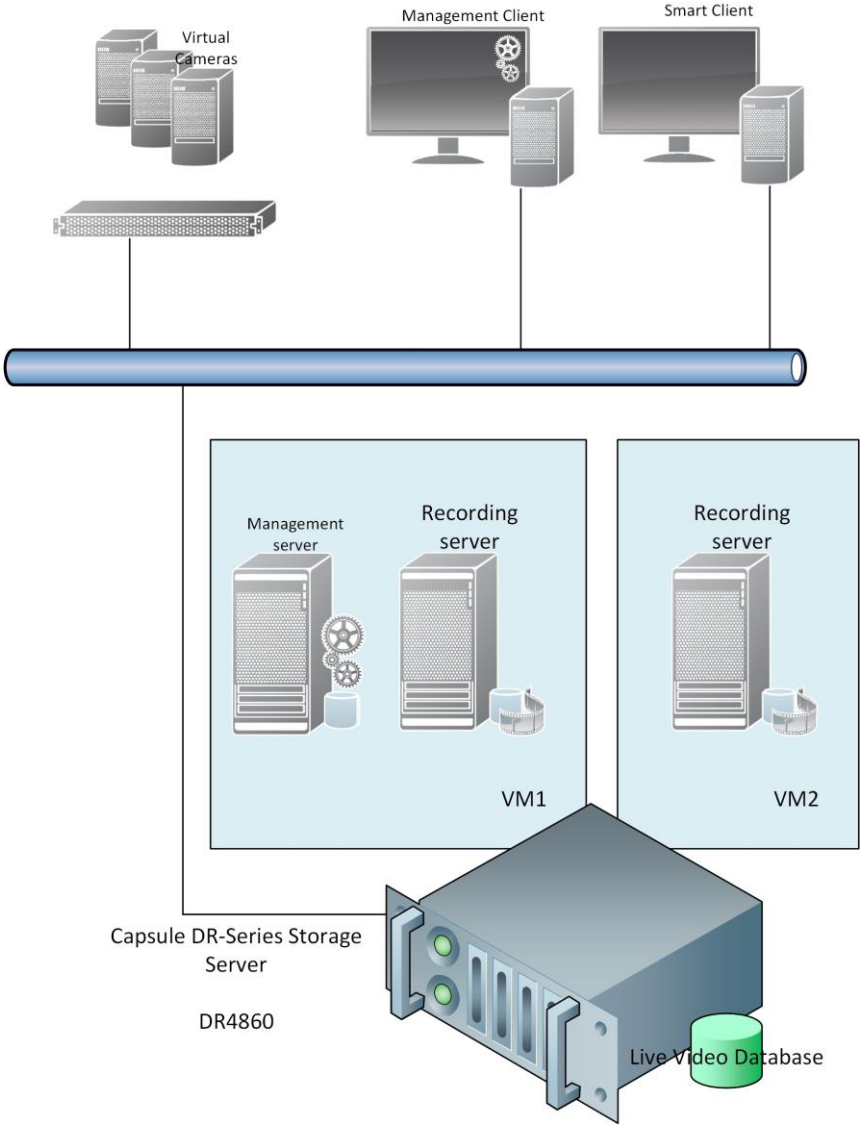


In both of the tests with the DR 1630 and the DR2460 the system was configured similarly. The storage system was configured as a RAID5 array with ZFS, for the DR1630 a 64GB SSD was used for ZFS Cache Tiering, and a 128GB SSD was used for the DR2460, with all available disks in one pool. The XProtect Smart Client was installed in the network, not on the DR Series Appliances, displaying live video. The Recording Servers were configured to record based on video motion detection, and store all video in a single tier on the Live Database only.

DR1630	Cameras	Stream Size (Mbps)	Disk I/O (MBps)	Read Latency	CPU%	Lost Frames
Benchmark	35	9.24	40.38	0.67 ms	13.33	0.229%
Maximum	90	9.06	94.83	128.64 ms	46.59	0%

DR2460	Cameras	Stream Size (Mbps)	Disk I/O (MBps)	Read Latency	CPU%	Lost Frames
Benchmark	50	9.22	57.68	15.15 ms	22.43	0.0005%
Maximum	200	6.65	165.57	1.67 ms	75.06	0.52%

In the second test scenario there were two VMs included in the DR4860 and each VM supported an XProtect Recording Server. This configuration ultimately proved to provide the highest performance supporting 300 total cameras at the maximum level, with each VM supporting 150 cameras. Besides having two recording servers across two VMs, this configuration was similar in terms of recording based on motion, and storing all of the video in a single live video database, one for each Recording Server.



DR4860	Cameras	Stream Size (Mbps)	Disk I/O (MBps)	Read Latency	CPU%	Lost Frames
Benchmark VM1	105	9.02	118.33	11.85 ms	56.02	0.25%
Benchmark VM2	105	9.02	118.77	11.52 ms	41.82	0.33%
Max VM1	150	6.45	121.12	1.14 ms	73.55	0.021%
Max VM2	150	5.99	112.55	0.96 ms	78.28	0.021%

In systems where this extreme level of performance may not be needed, the flexibility to have multiple VMs within the DR-Series Appliances could provide other benefits. Failover Recording Servers, Management Servers, Event Servers, and even third-party applications such as video analytics or access control systems could be hosted on the additional VMs. In separate VMs these applications are isolated from each other creating a safer environment for long term system reliability.

Key Findings

The Capsule DR Series Hyper Converged Appliance performed at a level that far exceeded the benchmark levels indicated by the Milestone Server and Storage Calculator. Each product performed at a different maximum level, and the DR4860 was exceptional in providing multiple VMs for more than one XProtect Recording Server. In surveillance systems, the cost effectiveness of VMS systems and server and storage solutions are often judged by the capacity of the storage available, and the number of cameras per server. We determine certification based upon the number of cameras per server.

DR Series Model	Benchmark #of Cams	Maximum	Stream Size	Total Retention at Max Level
DR1630	35	90	9.02 Mbps	13 days
DR2460	50	200	6.65 Mbps	14 days
DR4860	105	300	6.22 Mbps	19 days

Conclusion:

The Capsule DR Series Appliance product line is certified with Milestone XProtect. Integrators and end users should have confidence when building video security and surveillance systems which include the XProtect VMS and the Capsule Hyper Converged Appliances. Solutions such as the Capsule DR Series Appliances bring several benefits to video surveillance applications such as the XProtect VMS.

- Designed specifically for the I/O profile of video surveillance and utilizing SSD Cache Tiering, converged solutions will provide better disk throughput with fewer lost frames.
- Server and storage resources all within the same chassis provides a smaller footprint and lower TCO.
- Ability to provide multiple VMs internally enhances system scalability and redundancy while keeping storage and server resources centralized.

- RAID configurations and systems that scale upwards from 112 Terabytes can store video securely and for the customer's entire retention period.

End-users and integrators can get performance that meets and exceeds the Milestone performance benchmarks by specifying, installing, and maintaining a solution built with Milestone Certified Capsule DR Series Hyper Converged Appliances.