Milestone Certified Solution

BCDVIDEO™

PURPOSE-BUILT, PERFORMANCE DRIVEN

Certified Solution for
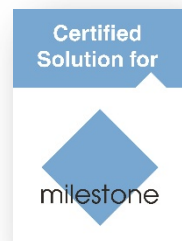
milestone

BCD218-MVRE

Date certified : 2018-10-10

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About BCDVideo

BCDVideo's focus on proactive response and personal service has allowed us to become the most trusted source for security integrators to find innovative, purpose-built IP video storage solutions. Our award-winning products cover video surveillance storage servers, access control servers, environmentally hardened servers and switches, client viewing stations, networking, and professional on-site services.

For over a decade, BCDVideo has proudly built Milestone-ready video recording appliances and have been a Milestone Technology Partner of the Year. BCDVideo is also a charter member of Milestone's System Builder program and are the only video appliance manufacture in the world that guarantees their products on each and every project. Our global footprint includes 70,000+ installed systems, spanning 58 countries and countless verticals. For more information, please visit https://www.bcdvideo.com/video-appliances/milestone-systems/

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.milestonesys.com for more.

Executive Summary

The BCDVideo solution validates the utilization of a single appliance (BCD218-MVRE) platform to exhibit the performance and overall throughput via the Milestone certification procedure. The single BCD218-MVRE video recording appliance was utilized for both the Milestone management, and Milestone recording services, and the below documentation focuses on stand-alone system architecture with the utilization of BCDVideo products (video recording servers, client viewing stations, network switches). The Milestone certification process encompassed system design, detailed data gathering during various stages of real time data ingestion, and overall bandwidth analysis during multiple test scenarios to demonstrate system sustained performance and capability. The intent of this documentation is designed to provide configuration assistance, during project sizing with the Milestone VMS line of products. The referenced configuration verifies the solution and ensures that the BCD218-ARA product will sustain its guaranteed storage performance with the Milestone XProtect Corporate VMS product.

Certified Products

- BCD218-MVRE
- Milestone XProtect Corporate 2018 R2
- Milestone XProtect Smart Client 2018 R2

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

Test Setup

The Milestone Corporate 2018 R2 test system components and topology:

- (1) BCD218-MVRE server running a Microsoft Windows x64 based Server 2016 operating system and hosting Milestone XProtect® Corporate Management Client and Milestone Recording services.
- (1) BCD104SD Server running Microsoft Windows x64 base Server 2016 Operating system and hosting the Milestone XProtect® Camera feed server.
- (1) BCDT04 XProtect Smart Client Viewing station utilized for video play-back.
- The BCD218-MVRE utilized 10 Gigabit per second network interface for test scenario 1 and 1 Gigabit per second interface for test scenario 2. The Milestone XProtect® Camera feed server was connected via a 1 Gigabit per second interfaces. A 1 Gigabit per second interface was utilized for cameras and viewing client network traffic.
- The utilization of a core 10Gb/s and 1Gb/s network switch was needed to interconnect all the working components of the test environment.
- This test topology does not include any virtual machine systems or any virtual LAN networks.

Core Server	System Breakdown
BCD218-MVRE	BCDVideo Enterprise 2U Video Server
Processor	Dual Intel® Xeon® Silver 4116
Live DB Storage	(6) 600GB 15k RPM SAS Enterprise Storage Drives RAID-10
Archive DB Storage	(12) 8TB 7.2k RPM SATA Enterprise level Storage drives RAID-5
RAID Controller	PERC H740P/8G
Network	(2) 1GbE Network Ports, (2) 10GbE SFP+ ports
RAM	32GB ECC DDR4 Overall System Memory
Operating System	Microsoft Windows Server 2016 x64

Feed Server	System Breakdown
BCD104SD	BCDVideo Enterprise 1U SD Server
Processor	Intel® Xeon® E3-1270 v6
Boot Drives	(2) 200GB SATA SSD RAID-1
RAID Controller	PERC S-130 Embedded Controller
Network	(2) 1GbE Network Ports, (2) 10GbE SFP+ ports
RAM	16GB ECC DDR4 Overall System Memory
Operating System	Microsoft Windows Server 2016 x64

Xprotect SmartClient Viewing Station	System Breakdown
BCDT04	BCDVideo Enterprise Workstation
Processor	7th Gen Intel® Core™ i7-7700K
Boot Drives	Crucial M4 275GB 2.5" SSD
Graphics Card	Gigabyte GeForce GTX 1060 6G Rev 2.0
Network	(2) 1GbE Network Ports, (2) 10GbE SFP+ ports
RAM	16GB nECC DDR4 Overall System Memory
Operating System	Microsoft Windows 10 Pro x64 (1709 Release)

Network Switch	System Breakdown
Dell X Series	48x 10GbE SFP+ auto-sensing (10Gb/1Gb) fixed ports, 2x 40GbE QSFP+ fixed ports
Cable	(2) 3-m 10G SFP Twinex Cables (2) RJ-45 Cat6e

Topology Design:
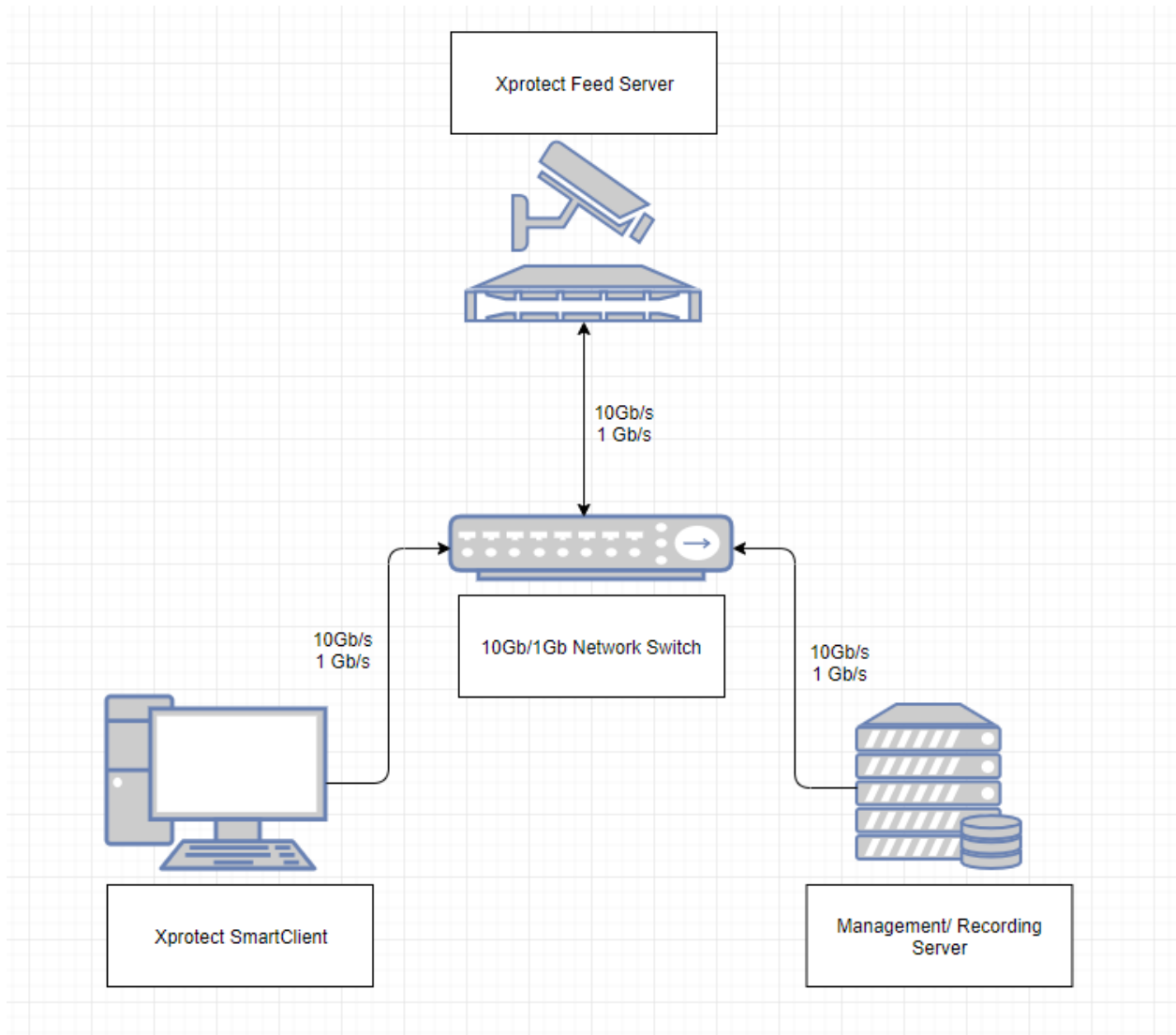
Performance Results / Features Tested Described

Test Procedure:

The first initial step was to install, license and configure the Milestone VMS platform components on the main recorder and configure them according to the verification parameters provided by the Milestone setup guide. This included the setup of (1) main core system with (1) feed server and (1) viewing client running Milestone SmartClient, with multiple monitors. The network component of the test environment was configured in a unicast configuration with 10Gb/s and 1Gb/s interlinks for data path connectivity.

An initial benchmark was established for system stability and retention periods were set for performance monitoring data collections. The BCD104SD unit acted as the simulator, and camera feeds were adjusted accordingly until performance degradation was observed on the BCD218-

MVRE core server. The common camera stream for simulation was setup as 1920x1080 resolution (H.264 codec) and 9 FPS and approximately 2 Mbps stream size. The camera stream was multiplied hundreds of times to achieve peak benchmark statistics on the recording server.

Data was gathered via Microsoft perfmon data collector set which measured performance counters for initial system benchmarking and performance endurance testing. Data acquisition was setup for every 6 and 12-hour increments and included overall CPU utilization, network latency, drive performance, video jitter and frame loss, database overflow errors and overall system utilization. Recording server criteria had to meet certain test guidelines for system testing to continue. If the set thresholds were to exceed provided parameters, the test scenario would have to be adjusted and a data collection would have to be re-set.

In order to continue on with benchmark testing; and successful performance monitor data capturing, the recording server would have to achieve the below criteria in both test scenarios:

* CPU utilization average measured over 70% on any of the Milestone Recording servers or storage systems.

* Read latency from the live video database which is higher than 200 milliseconds.

* Frame loss of over 1%, which will be indicated by "Medias lost/sec" logged by Performance Monitor tool.

If analyzed perfmon data collection met the provided criteria a 6 hour and 12-hour data collection was setup and the simulator would be adjusted accordingly for increased of data ingestion. All the cameras were configured with continues motion recording and identical settings to achieve constant data. In test scenario one, a total of 300 simulated cameras were utilized on the recording server with a 1Gb/s network connection. In test scenario two, a total of 900 simulated cameras were utilized 10Gb/s network connection.

Testing Scenarios:

In the first benchmark test scenario a test was performed to set the overall benchmark for the system. Per the Milestone test guideless, the camera profiles were set to 1920x1080 resolution with H.264 codec, 9 FPs and a constant bit rate of about 2 Mbps was also achieved. This test was performed with no motion detection and all recording was stored locally on the BCD218-ARA core recording server. A 1 Gb/s network connection was setup to conduct this testing. A 6-hour data collection segment was taken and analyzed for verification.

Test Scenario 1 Camera Profile:

Cameras	Resolution	Codec	Frames
300	1920x1080	H.264	12

In the second performance test scenario a test was performed to test out the maximum output performance of the recording server. After a few camera profile configurations and a few system adjustments, a constant camera profile was agreed on. The camera profile was set to 1920x1080 resolution with H.264 codec, 9 FPs and a constant bit rate of about 2 Mbps was achieved. The test was performed with no motion detection and all recording was stored locally on the BCD218-MVRE core recording server. A 10 Gb/s network connection was utilized for testing and a 12- hour data collection segment was taken and analyzed for verification.

Test Scenario 2 Camera Profile:

Cameras	Resolution	Codec	Frames
900	1920x1080	H.264	9

On both test scenarios performance monitoring was setup to capture data for 6-hour and 12-hour segments of time. The thresholds were set identical for both scenarios and they were both analyzed for maximum performance. The most common factors that were observed included overall CPU utilization average, read latency from the live video database (disk I/O) and video frame loss of over 1%

Test Scenario Results:

Benchmark Continues Recording:
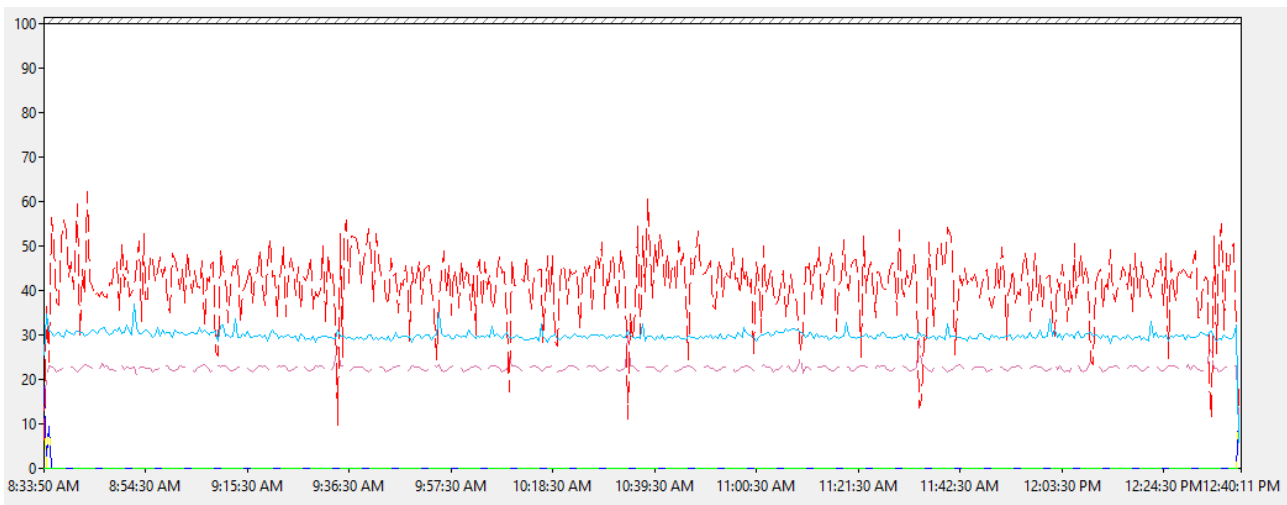
Total cameras	300
Average recorder throughput	532.1 Mbit/s
Average CPU load	29%
Frame loss %	0
Sustained FPS	12

The test completed successfully, and a 6-hour data segment was collected for verification. There was no frame loss or hardware restrictions noticed. All 300 cameras recorded continuously on local storage of BCD218-MVRE recording server

Maximum Performance Testing:
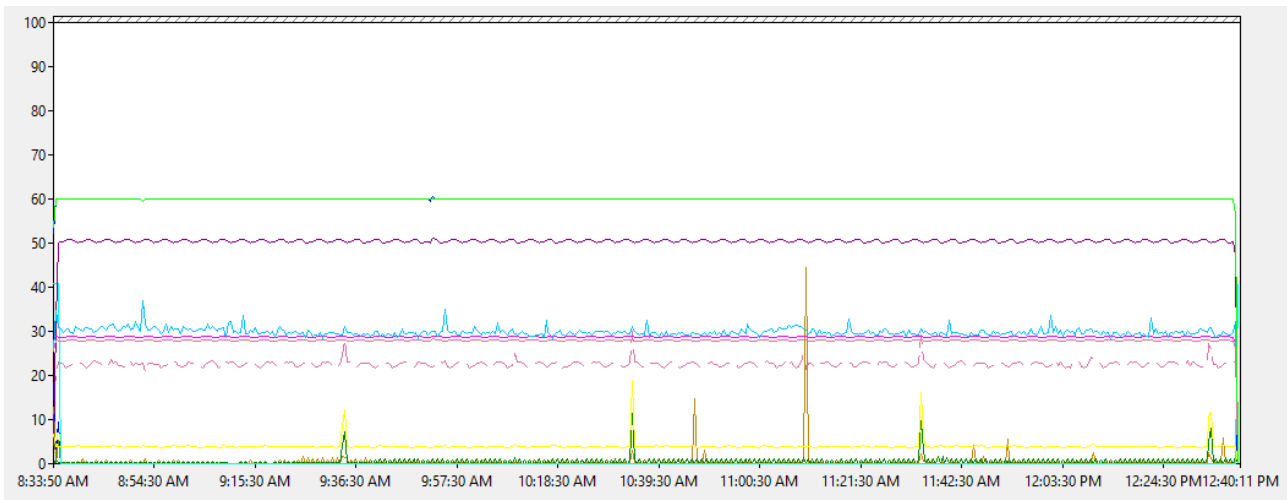
Total cameras	900
Average recorder throughput	1660 Mbit/s
Average CPU load	39%
Frame loss %	0
Sustained FPS	9

The test completed successfully, and a 12-hour data segment was collected for verification. There was no frame loss or hardware restrictions noticed. All 900 cameras recorded continuously on local storage of BCD218-MVRE recording server

Conclusion

The BCDVideo MVRE video appliance is the most powerful and scalable 2U appliance available on the market today. The BCD218-MVRE platform brings you optimized performance and scalability in a small, robust hardware package. As verified by Milestone, the appliance offers the integrator plenty of expansion and sustainability in an ever-growing environment.