Milestone Solution Partner IT Infrastructure Components Certification Report

Infortrend Technologies EonServ 5000 Series NVR

12-15-2015

The Open Platform Company

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About Infortrend Technology Inc.:

Founded in 1993, Infortrend Corporation (Public TPE: 2495) is a leading provider of high-performance networked storage solutions focusing on quality, reliability, choice and value.

Fully dedicated to storage solutions, Infortrend has a strong technological foundation that includes one of the best R&D teams in the industry. Our expertise covers all aspects of storage systems, including hardware, firmware, software and system integration. To ensure product excellence, Infortrend systems are designed and manufactured in-house.

Infortrend storage solutions have been widely deployed on a variety of demanding applications by multiple users across commercial and industrial markets. Our core brands include the EonStor DS, EonNAS and EonServ product families.

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 www.milestonesys.com for more.

Executive Summary:

Introduction

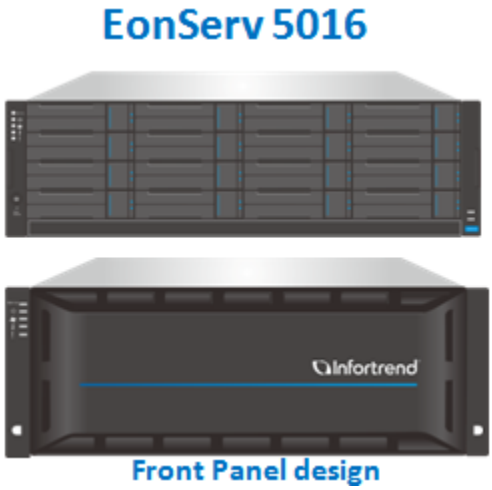
This report highlights the performance results of certification tests performed on the Infortrend EonServ5000 series NVR solutions. Specifically the EonServ5012 and EonServ5016 NVR platforms with major three different Intel new generation processors which hosted XProtect Recording Servers and provided hard disk space for both the long term archive and live video database storage within a Milestone XProtect® video management software (VMS) surveillance system. The certification process seeks to confirm that server, storage and network solutions provided by qualified Solution Partners 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 Solution Partners IT Infrastructure components.

Milestone Technology Partner (MTP) certification efforts include building a test surveillance system using the subject MTP product and gathering performance data while the system is in operation at the benchmark levels, and capacity testing to determine the upper limits of performance for the certified MTP solution. Certification of the EonServ5000 series will ensure that any surveillance system built using this product 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

- EonServ5000 series
  - EonServ5012(2U12)
  - EonServ5016(3U16)
- Milestone XProtect Corporate 2014 7.0d

(Front-View)



(Back-View)

Solution Architecture:

Topology

The test surveillance system topology included one Infortrend EonServ5000 series (EonServ5012 or EonServ5016) storage server running a Microsoft Windows x64 based Server 2012 R2 operating system hosting the Milestone XProtect Corporate Management Server, Management Client and Recording Server to administrate the system. One workstation was running a Microsoft Windows 7 professional hosting the Milestone XProtect Smart Client 2014 to display 5x5 video. The network and all of the NICs on the NVR servers and workstation systems supported Gigabit Ethernet. The test topology is shown in Figure 1 below:

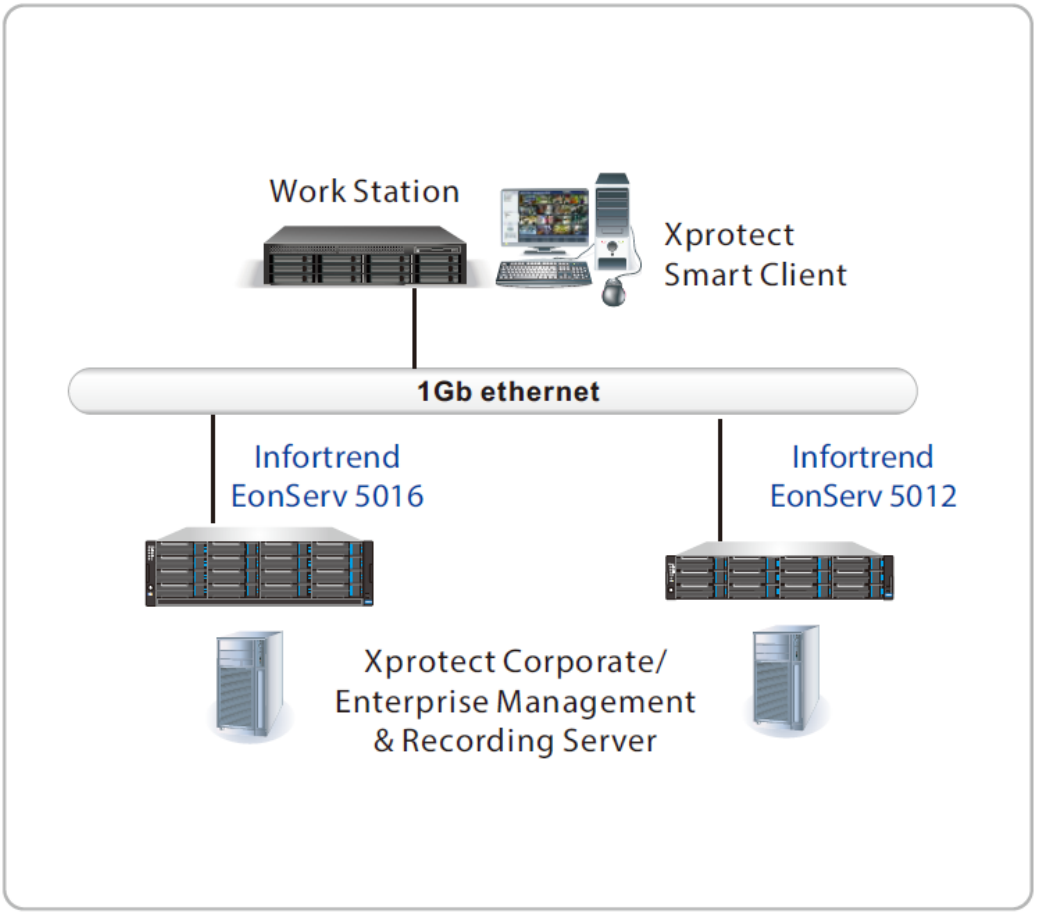


Figure 1

One instance of the video feed simulator and video content files were placed on the EonServ5000 series NVR Server. In this configuration video streams are sent across the IP network to be recorded on the Product storage. Placing the video stream sources within each recording server removes any potential network bottlenecks between cameras, encoders, or other video sources and the recording servers themselves. The specific configurations detailed above were chosen in order to conform to the recommended Milestone storage configuration; providing a live database and an archive database for each recording server.

RAID Configuration on the EonServ 5000 series

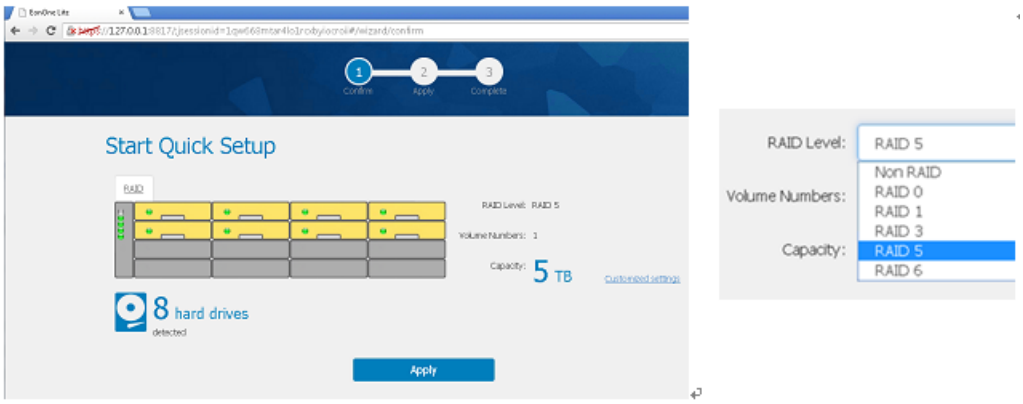
Using the built in RAID configuration tool available through the browser based Product interface as EonOne Lite, a single RAID 10 disk array for test scenario 1st was configured which utilized 6 of the available 12 hard disks to maintain duplicate sets of all data on two separate drives while showing just one set of data as a logical disk on the EonServ5012 NVR storage server with 2U 12-bay form factor and the JB212 JBOD was used a single RAID 5 disk array which utilized 11 of the available 12 hard disks, with one drive held in reserve as a parity to test scenario 2nd.

In the meantime the EonServ5016 NVR storage server with 3U 16-bay form factor was also used a single RAID 10 disk array which utilized 8 of the available 16 hard disks to test scenario 1st and the JB216 JBOD was used a single RAID 5 disk array which utilized 11 of the available 12 hard disks, with one drive held in reserve as a parity to test scenario 2nd.

RAID Configuration Tool on the EonServ 5000 series

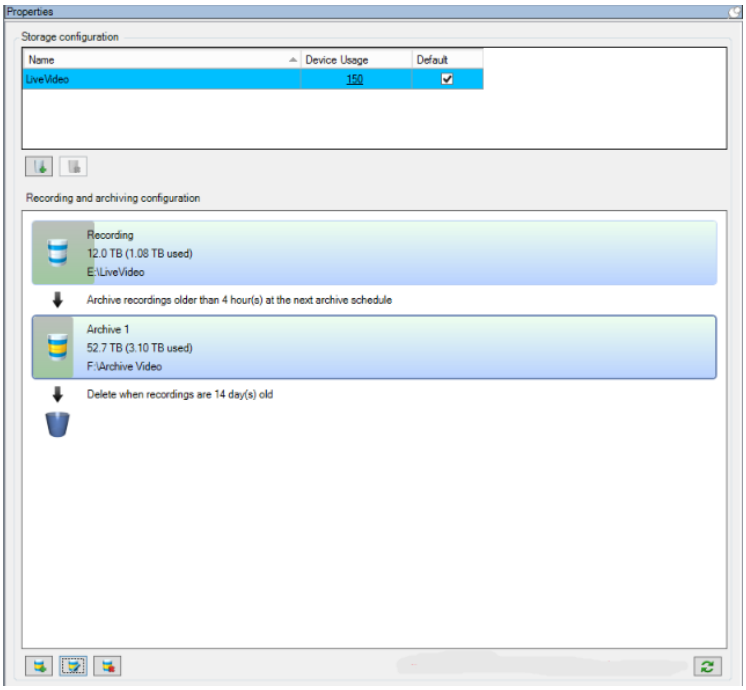
EonOne Lite is an intuitive RAID graphic user interface designed for novice users that may have non to minimum RAID related knowledge. It has a 3-step setup wizard for fast and easy RAID storage setup and can begin monitoring system statuses. Please refer to the EonOne Lite user manual on the CD-ROM for more information.

(In the login page, type user name “admin” and password “admin”)



(3-step setup wizard for fast and easy RAID storage setup and can begin monitoring system statuses)

Milestone recommends always configuring a live and an archive database. According to the test scenario 2nd, the XProtect Recording Server was configured to use 12 Terabyte as a live volume on the EonServ5000 series, and 52.7 Terabyte as the archive database on the Infortrend JB216 JBOD. Video is initially written to the live database, and later moved to the archive database. Once the archive is full, the oldest data will be deleted and incoming data will be stored. This process causes overhead, and is required to simulate a system in long term operations.



Live and archive video database sizes of 12 terabyte and 52.7 terabyte, respectively, were used to support an efficient testing process. Increasing these sizes in operational video surveillance deployments will not negatively affect performance results.

The optimal configuration for performance with the Product storage solution is to place the live database on the NVR and archive database on the expandable JBOD due to large-scale IP cameras deployment. The Product was also placed into surveillance mode throughout the duration of the test process. These configurations provide the highest rate of IOPS, or read/write performance. The certification has verified that this is the optimal configuration for video recording and storage performance.

Test Plan Summary:

Test Process:

The load tests which are included in the basic scope of the certification test include one benchmark test, and one or more maximum performance load tests. Each certification test includes two test scenarios, each scenario contains both of these test types.

- Benchmark test
    - The disk array specifications of partner solutions which are servers, NVRs, or storage solutions will be entered into the Milestone server and storage calculator and a benchmark number of cameras will be output. This tool will be used to determine the benchmark level of performance.
    - Network and display solutions which have video streaming and video display limitations suggested by their manufacturer will be tested using those limitations as the benchmark levels of performance.
    - If a solution does not pass the benchmark test it will not be certified.

- Maximum performance load test(s)
    - Load testing will seek to determine the maximum amount of video streams that a partner solution can support as a component in an operational XProtect VMS system.
    - The number of video streams, video recording servers, and the video stream profile used in the certification test may all be increased to add stress to the Infortrend EonServ 5000 series solution.
    - Once the system meets a stop criteria, the video stream load will be scaled back to the last known safe level of performance and this level will be judged to be the maximum performance.
    - Servers and NVRs may include additional maximum performance load tests which include a comparison between continuous recording and video motion detection based recording.
    - There is no maximum level of performance required to pass the certification.

Stop Criteria:

There are 4 primary stop criteria used to determine if the maximum load test has reached a limit, or if the system has not passed the benchmark test.

- CPU utilization average measured over 80% on any of the Milestone Recording servers or storage systems.
- Read latency from the live video database which is higher than 200 milliseconds.
- Archiving event duration measured to be longer than the retention period of the live database.
- Frame loss of over 1%, which will be indicated by “media overflow” events received by the XProtect VMS system log.

Performance Results:

Key Findings

The Infortrend Technology EonServ 5000 series NVR solution performs as a video recording and archiving platform with the Milestone XProtect VMS system at a level that is two times higher than the benchmark levels determined by the Milestone Server and Storage Calculator. The calculator indicates that the EonServ5012/5016 should support 60 cameras at the benchmark level based on scenario 1, and it was able to support a maximum of 110,145 and 150 cameras based on i3-4330,E3-1225 and E3-1275 Intel processors. Meanwhile, the calculator indicates that the EonServ5012/5016 should support 30 cameras at the benchmark level based on scenario 2, and it was able to support a maximum of 70,110 and 140 cameras based on i3-4330,E3-1225 and E3-1275 Intel processors.
The system performs at a high level of data throughput, and with acceptable read/write latency when using the optimal logical disk configuration, please also see the "test scenarios" for the detailed configuration. The EonServ5000 Series family of NVR products are certified solutions. The maximum performance of the EonServ5000 series family are listed below, in each of these scenarios there was one XProtect Recording Server installed on each NVR and it was recording and archiving as many cameras as possible to the NVR's built-in storage and Infortrend JBODs.

- XProtect Corporate 60 cameras Continuous Recording

Test Scenario 1 (NVR only)	NVR Model	Processors	Stream Profile (#of cameras, compression %)	Live Video Database Read Latency (millisceonds)	Individual Video Stream Size(Mbps)	Maximum Disk I/O (MBps)
Benchmark	EonServ 5012 EonServ 5016	i3-4330	60 camera, 30%	2	10.17	120.64
		E3-1225	60 camera, 30%	2	10.17	375.92
		E3-1275	60 camera, 30%	9	10.65	293.71
Maximum	EonServ 5012 EonServ 5016	i3-4330	110 camera, 60%	4	13.94	119.98
		E3-1225	145 camera, 60%	7	9.91	267.61
		E3-1275	150 camera, 60%	10	14.41	498.1

- XProtect Corporate - Video Motion Detection - RAID5 - Archiving

Test Scenario 2 (NVR +JBODs)	NVR Model	Processors	Stream Profile (#of cameras, compression %, Motion detection %)	Live Video Database Read Latency (millisceonds)	Individual Video Stream Size(Mbps)	Maximum Disk I/O (MBps)
Benchmark	EonServ 5012 EonServ 5016	i3-4330	30 camera, 30%, 30%	3	10.06	493.41
		E3-1225	30 camera, 30%, 30%	2	5.2	486.79
		E3-1275	30 camera, 30%, 30%	1	10.23	557.91

Test Scenario 2 (NVR +JBODs)	NVR Model	Processors	Stream Profile (#of cameras, compression %, Motion detection %)	Live Video Database Read Latency (millisceonds)	Individual Video Stream Size(Mbps)	Maximum Disk I/O (MBps)
Maximum	EonServ 5012 EonServ 5016	i3-4330	70 camera, 60%, 30%	1	5.09	445.29
		E3-1225	110 camera, 60%, 30%	2	5.07	631.17
		E3-1275	140 camera, 60%, 30%	2	5.18	516.83

Test Scenarios:

Agreed upon test scenarios (between Infortrend and Milestone) are detailed below:

Scenario 1: XProtect Corporate 60 cameras Continuous Recording

Benchmark Test - 60 cameras total - 1 XProtect Recording Servers

- 1 Megapixel resolution (1280x720)
- H.264 codec
- 30% compression
- 30 FPS
- Continuous recording
- One Smart Client displaying recorded video loop from 25 cameras per Recording Server
- All 16 EonServ5016 Disks in one pool
- RAID 10

Maximum Performance Test

- 3 Megapixel resolution (2048x1536)
- H.264 codec
- 30-60% compression
- 10-30 FPS
- Continuous recording
- One Smart Client displaying recorded video loop from 25 cameras per Recording Server
- Same Disk Configuration

Scenario 2: XProtect Corporate - Video Motion Detection - RAID5 - Archiving

Benchmark Test - 30 cameras total - 1 XProtect Recording Servers

- 1 megapixel resolution (1280x720)
- H.264
- 30%
- 30 FPS
- 30% motion with Video Motion Detection based recording
- Smart Client displaying recorded video loop from 25 cameras/server
- All 16 EonServ5016 Disks in one pool
- RAID 10
- Archiving to JB216
- All 16 JB216 Disks in one pool RAID 5

Maximum Performance Test

- 1 megapixel resolution
- H.264
- 30-60%
- 10-30 FPS
- 30% motion with Video Motion Detection based recording
- Smart Clients displaying recorded video loop from 25 cameras/server
- Same Disk Configuration

Conclusion:

The EonServ5000 series is a certified storage server as NVR platform for use with the Milestone XProtect VMS. With the chosen hard disk configuration used in the test, the Product easily supported the benchmark level of performance. The calculator indicates that the EonServ5012/5016 should support 60 cameras at the benchmark level based on scenario 1, and it was able to support a maximum of 110,145 and 150 cameras based on i3-4330,E3-1225 and E3-1275 Intel processors. Meanwhile, the calculator indicates that the EonServ5012/5016 should support 30 cameras at the benchmark level based on scenario 2, and it was able to support a maximum of 70,110 and 140 cameras based on i3-4330,E3-1225 and E3-1275 Intel processors.

Other test findings include enable 30% motion with Video Motion Detection based recording and also archiving to Infortrend JBODs on the scenario 2 that is more than four times IP cameras number higher than the benchmark levels determined by the Milestone Server and Storage Calculator based on scenario 2 with E3-1275 Intel processor.

Integrators and end users designing, installing and operating surveillance systems which incorporate these solution components can have confidence that the system will record and archive video reliably. Customers who wish to gain the maximum value and performance out of their surveillance system can also refer to the best practices and performance limitations outlined in this document to help design a system that exceeds the benchmark limitations for video recording which are followed by the Milestone Server and Storage Calculator.