



TECHNICAL BRIEF

Red Hat Open Video Surveillance Storage

From the partnership between Red Hat, Milestone Systems and Intel, comes a single, complete and open software-defined storage solution to modernize the video surveillance industry's backend storage.

INTRODUCING RED HAT OPEN VIDEO SURVEILLANCE STORAGE

Featuring the combined expertise of three industry leaders to modernize the video surveillance industry's storage backend for new digital demands. With Red Hat Gluster Storage certified for Milestone's powerful video management software, multiple streams of high-resolution video capture and archives are assured for agile retrieval, analytics and innovation, even on the most complex of video surveillance networks.

Video surveillance storage market

worth USD
18.28b
by 2020

Based on CAGR of 22.41% from
2015 to 2020

Estimates according to **MarketsandMarkets**

Video surveillance market

worth USD
68.34b
by 2023

up from USD 36.89 billion in 2018

SOLUTION PARTNERS



ABOUT INTEL

Intel makes possible the most amazing experiences of the future. You may know us for our processors. But we do so much more. Intel invents at the boundaries of technology to make amazing experiences possible for business and society, and for every person on Earth. Harnessing the capability of the cloud, the ubiquity of the Internet of Things, the latest advances in memory and programmable solutions, and the promise of always-on 5G connectivity, Intel is disrupting industries and solving global challenges. Leading on policy, diversity, inclusion, education, and sustainability, we create value for our stockholders, customers, and society.



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 150,000 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.



ABOUT RED HAT

Red Hat is the world's leading provider of open source software solutions, using a community powered approach to provide reliable and high-performing cloud, containers, Linux, middleware, storage, and virtualization technologies. Red Hat also offers award-winning support, training, and consulting services. As a connective hub in a global network of enterprises, partners, and open source communities, Red Hat helps create relevant, innovative technologies that liberate resources for growth and prepare customers for the future of IT.

SOLUTION OVERVIEW

The growing ubiquity of high-definition cameras and less costly bandwidth is moving the video surveillance industry toward dedicated systems with higher capacities and capabilities. Legacy storage backends that are not factored into this transition will struggle to keep pace with the demands of more high-resolution video files and complex systems functions.

OPEN VIDEO SURVEILLANCE STORAGE

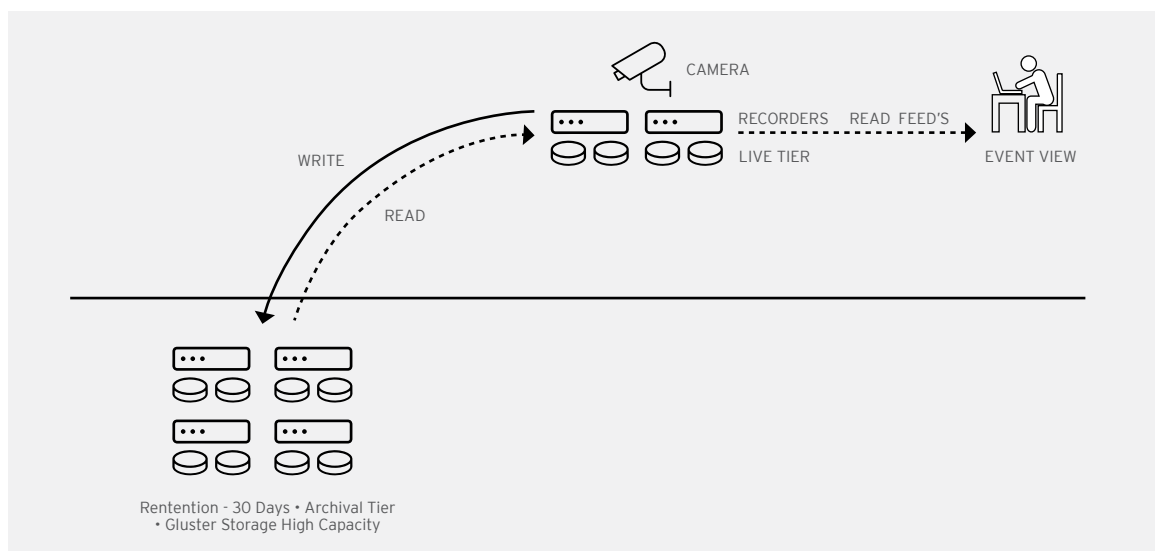
The Red Hat-Milestone-Intel Open Video Surveillance Storage solution is a product collaboration to modernize the storage backend of the video surveillance industry. Combining the domain strengths of three industry leaders, it is certified on Milestone's MTP certification program for effective use in large video surveillance networks.

The solution consists of Red Hat Gluster Storage mounted on XProtect via SMB protocol, with the cluster trivial database (CTDB) configured for highly available SMB exports. With CTDB adding virtual IP addresses and a heartbeat service to Red Hat Gluster, incoming footages are kept from being dropped in the event of a node failure, thus keeping services available at all times.

STORAGE ARCHITECTURE

Red Hat Gluster Storage is a software-defined storage platform that runs on standard x86 server hardware. This means that the intelligence of the storage functionality comes from the software itself, and is not tied to specific hardware.

Unlike storage solutions with a distributed file system, Red Hat Gluster Storage does not create, store, or use a separate index of metadata that needs to be externally stored. Instead, it places and locates files algorithmically, and all of the needed metadata is stored in extended attributes of files and directories. To locate a file, the storage node server only needs to know the filename and apply the algorithm. This provides fully parallel access to the data and ensures linear performance scaling.



WHY BE CERTIFIED?

The MTP certification program ensures that Open Video Surveillance Storage is tightly integrated with the Milestone XProtect Corporate video management software (VMS) that supports more than 150,000 Milestone video surveillance installations worldwide.

CERTIFICATION & TESTING

The certification process consists of tests that are set up to evaluate the Live DB, Archive DB and XProtect Corporate configuration modifications required to achieve maximum performance and stability. Performance data gathered during the benchmarking has been factored into the recommendations and suggestions in the design of the test solution.

KEY FINDINGS	
<ul style="list-style-type: none"> • 100 cameras / Red Hat Gluster Node • Total 600 cameras across 6 nodes of Gluster 	<ul style="list-style-type: none"> • 100% recording and deletion of feeds • Concurrent writes and deletes on archival tier
Based on the following camera specifications:	
<ul style="list-style-type: none"> • 1920 x 1080 resolution 	<ul style="list-style-type: none"> • H.264 Video Codec • 30fps
Performance of the solution may vary if different XProtect products and/or system components not listed in the tests details are included.	

TEST ENVIRONMENT

On a test bed of multiple Gluster nodes integrated with Milestone XProtect Corporate components, a test surveillance system was built to verify Red Hat Gluster Storage's support for Milestone XProtect Corporate VMS applications, and to confirm effective record and archive on the set up recommended.

The test environment was a large, high-performing storage pool that aggregated disk, CPU, and I/O resources on three physical XProtect recorders, with four recording instances load balanced across Gluster nodes to exploit storage cluster performance. The H.264 videos has 30fps on 1920 x 1080 resolution.

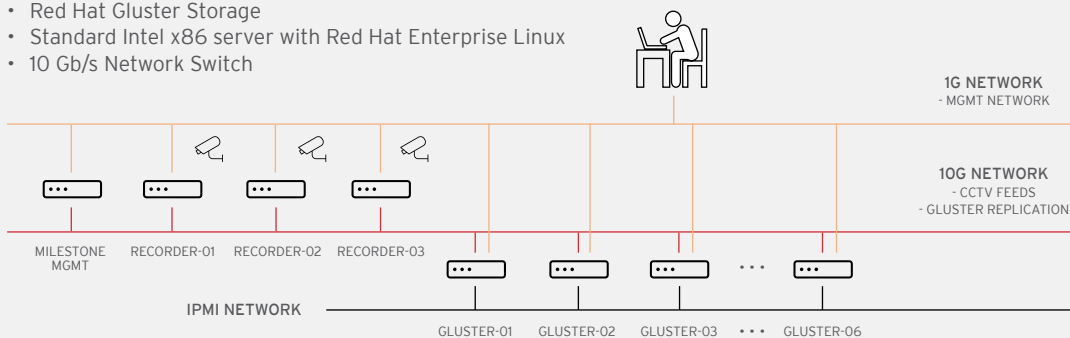
GLUSTER CLUSTER SPECIFICATIONS - TEST BED	
Number of nodes	6 nodes, 432TB/288TB raw/usable capacity
Scale up increments	6 nodes, up to 1440TB raw capacity
Data protection	Erasure coding, EC 4:2, two disk/node failure protection
Network	<ul style="list-style-type: none"> • Two 10Gb RJ-45/SFP + ports (storage network) • One 1/10Gb RJ-45 (Gluster management network) • One IPMI RJ-45 (optional out of band management)
Red Hat Gluster Storage	Version >3.2
Client support	Windows
Protocol support	SMB for Milestone XProtect
High availability	<ul style="list-style-type: none"> • No single point failure • CTDB for highly available mount points • Erasure coding ensures cost-effective availability across disk, server and network failures

COMPONENT SPECIFICATIONS	
Processor	Intel Xeon Silver Processor 4114 SKU, 2.2 GHz, 20C 13.75M cache or higher
RAM	128GB DDR4 2400MHz 8GB 24 (128GB)
Live tier (drives in Milestone recorder)	2 x 1.6TB P4610 Intel SSD NVMe PCIe drives 2.5in, 3D2, TLC or higher
Network	Intel C622 chipset family integrated on motherboard, providing 2 x 10GB LOM
Data drives (Gluster)	24 * 6TB, 3.5" SATA

For optimal performance, the live database was configured on internal disks within the recording server and archive database on Gluster. All VMS recorders recorded data on the same namespace, or one single volume (archive tier); with 600 cameras tested without frame loss for throughput of 172Mbps.

TEST BED

- Milestone XProtect management server 2017 R3
- Milestone XProtect smart client
- Milestone XProtect recording servers
- Feed Simulator - StableFPS
- Red Hat Gluster Storage
- Standard Intel x86 server with Red Hat Enterprise Linux
- 10 Gb/s Network Switch



FINDINGS

Milestone XProtect's Live DB was optimized for block storage, and the test bed was configured on NVMe cards under RAID -1 configuration. The live tier was also partitioned with an allocation unit size of 64K.

For optimum performance, XProtect DB should be mapped to an appropriate tier.

KEY FINDINGS

Storage	Database	Protocol	Tested
Internal SSD	Live DB	Block (DAS)	Yes
Red Hat Gluster	Archive DB	SMB2	Yes

Archive DB used Red Hat Gluster Storage as the platform for longer retention time periods, while XProtect moved the feeds from live tier to archival tier based on the retention period set in live tier, and the Gluster volumes are mounted to the XProtect software via SMB protocol.

For maximum efficiency, the live DB is recommended to be formatted at 64K block size - as this block size can significantly improve performance of the archive process.

RESULTS

Storage	Number of Camers	Number of Recorders	Numer of recording instances/recorder	Numer of recording cameras/instance	Image resolution
Continuous Recording	600	3	4	50	1080p@2.3Mbps

OUTCOME

MTP-certified products in this solution:

- Standard Intel x86 based server
- Red Hat Gluster Storage (software-defined storage)
- Milestone XProtect Corporate 2017 R3
- Milestone XProtect Expert
- Milestone XProtect Enterprise

CONCLUSION

Red Hat Open Video Surveillance Storage factors new mandates in the cost and operational efficiencies of large capacity storage. Its open architecture balances heavy storage and archiving demands with increasingly complex video streaming and recall – fulfilling expectations for more versatile and granular scale out of tiered storage.

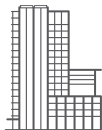
DEDICATED, VERSATILE AND COST-EFFECTIVE

With Red Hat Gluster Storage now verified on Milestone's MTP certification, this partnered solution is assured to run, interoperate and intelligently manage demanding video workloads, specific to surveillance storage environments. Video surveillance operators will appreciate the choice of a cost-effective, complete solution to modernize their backend storage on off-the-shelf x86 servers, thanks to the combined expertise of Red Hat, Milestone Systems and Intel.

The Red Hat-Milestone-Intel Open Video Surveillance Storage solution has many benefits:

- Lower total cost of ownership (both CAPEX and OPEX)
- More secure than other OSs' (e.g. not susceptible to WannaCry malware)
- 2x more cameras per server (due to Red Hat Enterprise Linux OS infrastructure and Red Hat Gluster Storage being able to process more cameras)

Jim Sherman, Manager, Global Safety + Security Operations Isaac @ Red Hat Inc



ABOUT RED HAT

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