



Dell EMC validates your virtualized Genetec video management system before it reaches your hands

The Dell EMC PowerEdge R740xd2 server powered by Intel Xeon processors handled a 240-camera workload without failure

Video surveillance is on the rise, with estimates of 180 million network and CCTV surveillance cameras shipped worldwide in 2019 alone.¹ For digital surveillance infrastructure to be effective, your cameras have to record around the clock without issue, and your servers must be able to process and store that data without disruption due to hardware issues such as disk failures.

Dell EMC™ offers software and hardware solutions validated by its Surveillance Validation Labs to attack this need. We worked with engineers at the Dell EMC Surveillance Validation Labs in Durham, NC, to validate the Dell EMC PowerEdge™ R740xd2 server, powered by Intel® Xeon® Gold 5120 processors, and a virtualized instance of Genetec™ Security Center 5.8, a software platform for managing video surveillance. The Dell EMC solution passed validation testing with 240 cameras recording continuously—first during normal operation and then during a simulated disk failure and rebuild—indicating that it's a reliable surveillance infrastructure solution for the Genetec platform.

If your organization is considering a virtualized Genetec Security Center video management solution (VMS), Dell EMC PowerEdge R740xd2 servers powered by Intel processors offer a validated surveillance infrastructure that could help protect your customers, employees, inventory, and more.

Different surveillance setups met stringent verification standards

Efficient recording under normal load

- ✓ 199 MB/s average disk throughput
- ✓ 16% average CPU utilization

Reliable performance during simulated disk failure and rebuild

- ✓ 192 MB/s average disk throughput
- ✓ 15% average CPU utilization

About the Dell EMC PowerEdge R740xd2 server

The enterprise-grade [PowerEdge R740xd2](#) server allows organizations to “[b]ring compute closer to storage” and help “save space” with 2U design.² With the PowerEdge R740xd2, organizations can store up to 364 TB of data in a 2U rack server or scale out to 7.2 PB (520 drives) in a 42U rack full of R740xd2 servers.³ Learn more in the Dell EMC PowerEdge R740xd2 server [data sheet](#).

The PowerEdge R740xd2 server used in this testing had two Intel Xeon Gold 5120 processors, 28 physical cores, and 256 GB of memory, and it ran Microsoft® Windows Server® 2016 Datacenter Edition. For storage, the server had 26 8TB 3.5-inch NLSAS HDDs. We configured the storage under test using the Dell EMC PERC H730P Mini controller and created a RAID6 disk group with two dedicated hot spares for a total usable capacity of 160 TB.



What is the Dell EMC Surveillance Validation Lab?

Not all major data center technology suppliers have their own validation lab for surveillance solutions, which is what makes Dell EMC stand out in the surveillance infrastructure marketplace. The Surveillance Validation Lab works with leading surveillance providers from the Dell EMC partner ecosystem to test their video management solutions. Dell EMC then uses those findings to help organizations choose a tested and validated solution that meets the organizations’ demands. Dell EMC believes their Surveillance Lab is the “most advanced, longest running video surveillance validation lab in the world.”⁴ Globally, Dell EMC runs three surveillance testing and validation labs, which are part of a network of 20 test centers total.⁵ Dell EMC claims to be the number one global surveillance infrastructure provider.⁶

Engineers in the Surveillance Lab put hardware and software solutions through the paces in what Dell EMC calls extreme, real-world scenarios.⁷ Extreme conditions include zero video frame drop over multiple failure scenarios, including drive, network, and controllers failures. The performance numbers the Dell EMC Surveillance Lab produces are not hero numbers, but worse case numbers, as the lab aims to show customers they can maintain performance without video loss under strenuous conditions.

Because the Surveillance Lab looks for worst case realistic test scenarios, their results may vary when compared to the results from other partners (i.e., integrators and VMS vendors).

Hardware and software validations include:⁸

- Virtual/non-virtual
- Best practices
- Compute
- Networking
- Storage
- ISV application

Dell EMC also provides validation support that includes “solution documentation including reference architectures, white papers, technical notes, sizing guidelines, and technical presentations.”⁹ When your business implements a VMS validated by Dell EMC, you do so knowing that Dell EMC has already tested and approved it for use.

About Genetec Security Center

According to Genetec, the unified security platform of Genetec Security Center merges IP security systems within a single interface.¹⁰ About Security Center, Genetec says: "From access control, video surveillance, and automatic license plate recognition to communications, intrusion detection, and analytics, Security Center empowers your organization through enhanced situational awareness, unified command and control, and connectivity to the cloud."¹¹ Security Center allows organizations to consolidate current independent security tools into a unified security solution. [Learn more about Genetec Security Center.](#)

How we tested and what we found

We worked with Dell EMC engineers to validate the Intel Xeon processor-powered PowerEdge R740xd2 server running the virtualized Genetec VMS. The Dell EMC Surveillance Lab in Durham, NC, housed the server under test and testing equipment. Our engineers installed BIOS and firmware updates. Dell EMC engineers configured the networking, deployed the software required to complete the validations, and performed the validation testing. Our engineers ensured the server performed optimally during testing. We also reviewed raw testing results as well as Dell EMC Live Optics™ storage and server performance reports captured during validation testing to ensure that Dell EMC engineers completed the validation successfully without error.

A surveillance solution can fail to receive validation by either dropping one or more frames or losing video. The virtualized Genetec solution passed the validation testing in two different use cases: (1) normal server load with 240 cameras recording continuously, and (2) 240 cameras simultaneously recording while experiencing a server disk failure and a disk rebuild.

Genetec Security Center uses virtual Archivers, which discover camera feeds, check cameras to see if they are recording, process all video and multimedia streams, and commit them to storage. The results in this report show data for four virtual Archivers. In both use cases, each Archiver had 60 camera streams, for a total of 240.

About Intel Xeon Scalable processors

According to Intel, their Xeon Scalable processors support "hybrid cloud infrastructure[s] and most demanding applications - including in-memory analytics, artificial intelligence, autonomous driving, high performance computing (HPC), and network transformation."¹² Intel Xeon Scalable processors are available in four feature configurations (Platinum, Gold, Silver, and Bronze) to match the needs of organizations operating at many different levels. [Learn more about Intel Xeon Scalable processors.](#)

Test results - Use case 1 - server under normal load

Camera parameters

- 5Mbps camera
- 1280x720 resolution
- 30 frames per second
- Continuous recording enabled for all cameras

Recording results	Four virtual Archivers w/ 60 cameras each
Maximum number of cameras	240
Read/write ratio (%)	92/8
Average read/write latency (ms/ms)	1/0
Disk throughput (MB/s)	199.4
IOPS at 95% CPU utilization	2,267
Peak IOPS	3,205
Average CPU utilization	16.5%

Test results - Use case 2 - server under simulated disk failure and disk rebuild

Camera parameters

- 5Mbps camera
- 1280x720 resolution
- 30 frames per second
- Continuous recording enabled for all cameras

Recording results	Four virtual Archivers w/ 60 cameras each
Maximum number of cameras	240
Read/write ratio (%)	91/9
Average read/write latency (ms/ms)	4/4
Disk throughput (MB/s)	192.6
IOPS at 95% CPU utilization	2,089
Peak IOPS	2,839
Average CPU utilization	15%

For detailed performance results, see [Appendix A](#).

As you might expect, continuous recording requires greater throughput than on-motion recording. This applies to throughput to disk and network throughput. If surveillance infrastructure isn't validated to meet the needs of a Genetec VMS, you have no way of knowing if it can handle the necessary throughput, which could lead to video loss or missing frames from archived footage. Missing or incomplete footage might, for example, keep a retail store from delivering reliable evidence when prosecuting theft.

It's important to note that the number of cameras and the throughput results were the minimum requirements set for this validation. These results do not indicate the maximum capability of the Dell EMC and Genetec surveillance solution.

What do these results mean for your business?

A validated Dell EMC and VMS partner surveillance infrastructure can simplify the process of implementing a surveillance solution. Choosing a pre-validated, custom-tailored solution provided by Dell EMC can help take the guesswork out of the purchasing equation, which cuts down on research, trial and error time, and more. This frees IT staff to focus on other critical tasks while ensuring your organization gets a properly sized solution. By reducing the costs associated with solution acquisition and implementation, organizations can see a higher overall return on investment for their purchase. Buying a solution that's too big or small could require additional time and effort from IT staff to get infrastructure up and running and increase the time to successful implementation.



Conclusion

The right digital surveillance infrastructure may put your organization in a good position to handle the security issues of today and tomorrow. But reliability in surveillance infrastructure should be confirmed—you're protecting your customers, employees, and inventory, among other vital elements. The Dell EMC Surveillance Validation Labs can help your organization choose tested and validated solutions that meet your needs. We worked with engineers at the labs to validate a Genetec Security Center VMS on a Dell EMC PowerEdge R740xd2 server. The solution proved to be reliable by meeting verification requirements in two use cases, demonstrating its reliability by handling the tests with no dropped frames. This validation shows that your organization can be confident running these Genetec Security Center VMS configurations on Dell EMC PowerEdge R740xd2 servers for a dependable digital infrastructure.

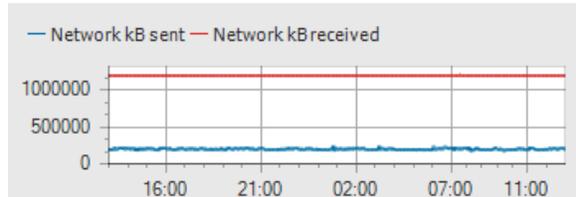
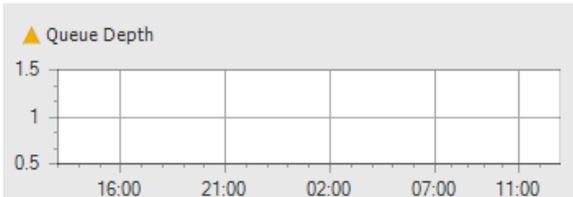
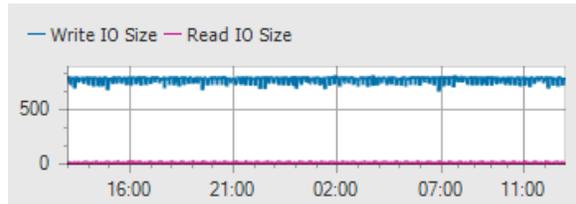
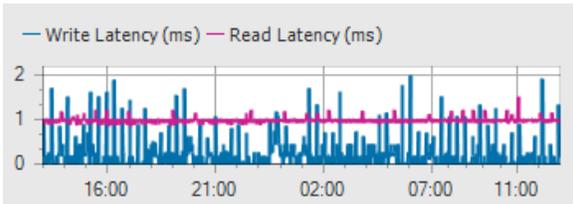
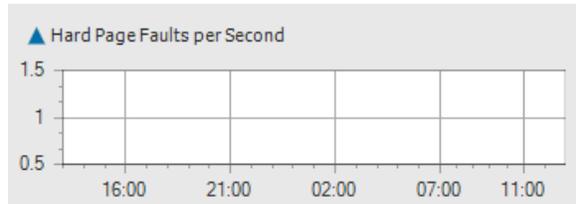
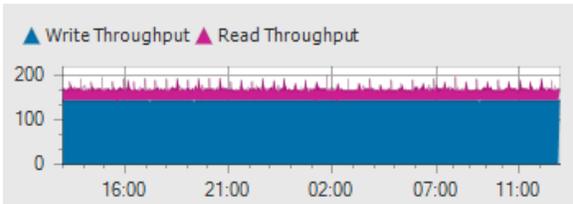
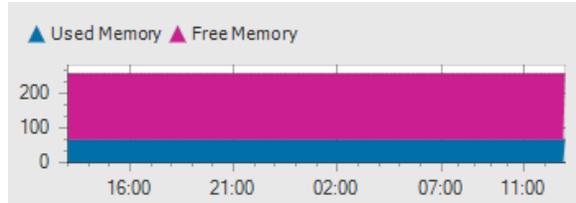
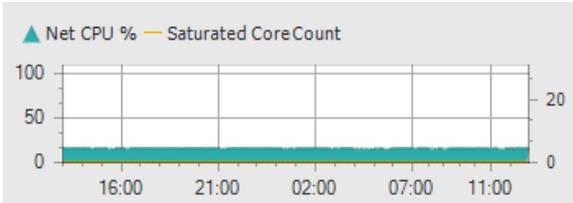
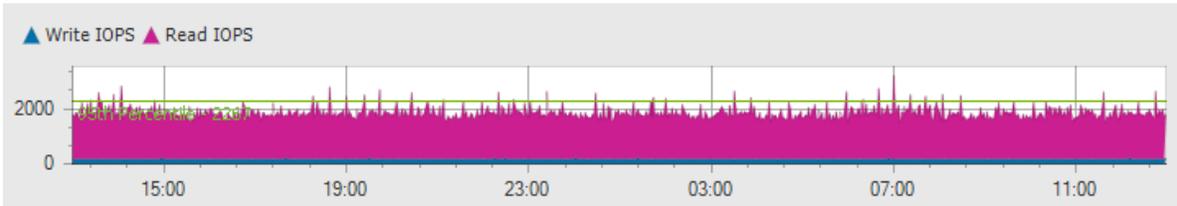
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- 1 IHS Markit, "Top Video Surveillance Trends for 2019," accessed December 19, 2019, <https://cdn.ihs.com/www/pdf/1218/IHSMarket-Security-Technologies-Trends-2019.pdf>.
 - 2 Dell EMC, "R740xd2 Spec Sheet," accessed December 12, 2019, https://i.dell.com/sites/csdocuments/Product_Docs/en/poweredge-r740xd2-spec-sheet.pdf.
 - 3 Dell EMC, "R740xd2 Spec Sheet."
 - 4 Dell EMC, "The Secret To A Successful Surveillance Solution," accessed December 12, 2019, <https://www.dell EMC.com/en-us/collaterals/unauth/brochures/oem-surveillance-infographic.pdf>.
 - 5 Dell EMC, "The Secret To A Successful Surveillance Solution."
 - 6 Dell EMC, "Protecting what matters to make the world safer," accessed December 12, 2019, <https://www.dell EMC.com/en-us/solutions/surveillance-security.htm#scroll=off>.
 - 7 Dell EMC, "Protecting what matters to make the world safer."
 - 8 Dell EMC, "Dell EMC Safety & Surveillance Validation Labs: Protecting what matters to make the world safer," accessed December 19, 2019, <https://www.dell EMC.com/th-th/collaterals/unauth/offering-overview-documents/h17004-dell EMC-surveillance-sb.pdf>.
 - 9 Dell EMC, "Dell EMC Safety & Surveillance Validation Labs: Protecting what matters to make the world safer."
 - 10 Genetec, "Genetec Security Center: Comprehensive unified security," accessed December 12, 2019, <https://www.genetec.com/solutions/all-products/security-center>.
 - 11 Genetec, "Genetec Security Center: Comprehensive unified security."
 - 12 Intel, "Intel Xeon Scalable processors," accessed December 12, 2019, <https://www.intel.com/content/www/us/en/processors/xeon/scalable/xeon-scalable-platform.html>.

We concluded our validation on December 10, 2019. The results in this report reflect configurations that we finalized with Dell EMC on December 10, 2019 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Appendix A: Live Optics performance overview

Performance of R740xd2 solution under normal load

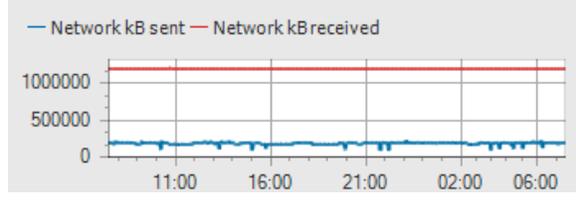
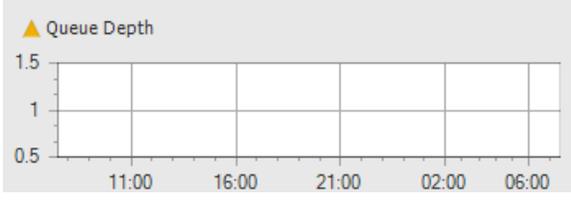
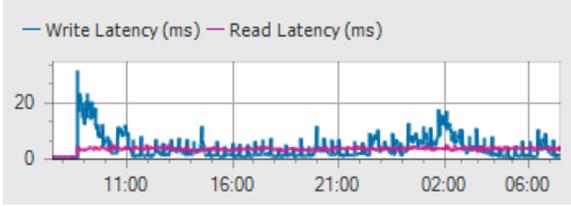
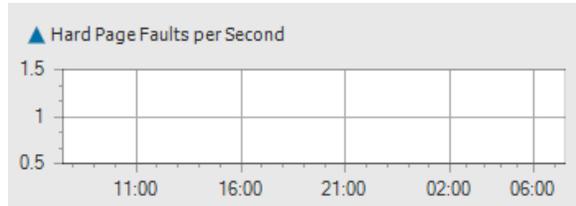
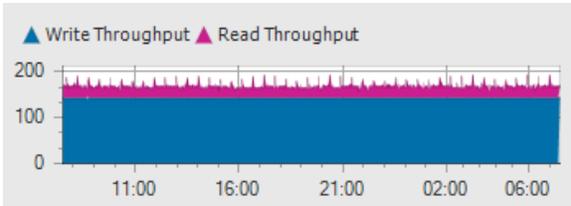
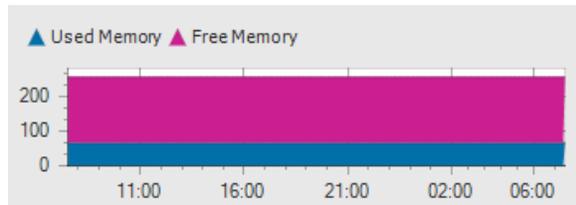
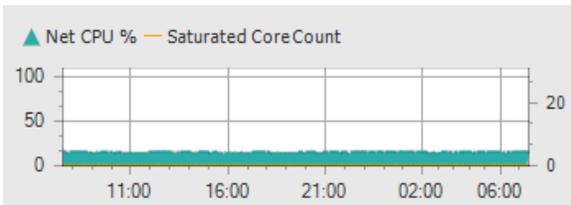
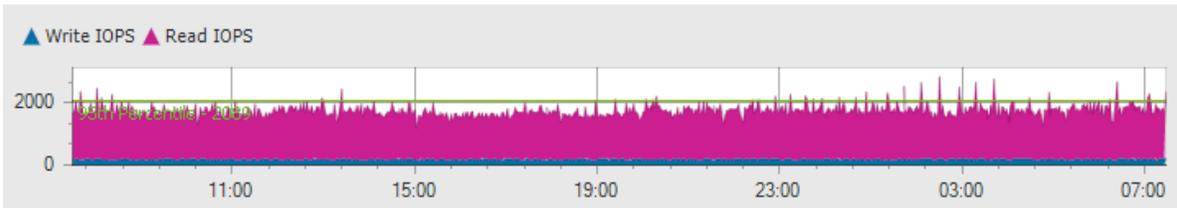
Operating System	VMware ESXi 6.5.0 build-13932383		
Time Recorded	23 Hour(s), 58 Minute(s), 10/23/2019 - 10/24/2019		
Disk Throughput	199.40 MB/s	Average IO size	Read: 15.05 KB / Write: 784.95 KB
IOPS	2267 at 95%	Average Latency	1 ms Reads and 0 ms writes
Read/Write Ratio	92% / 8%	Average Queue Depth	0.00
Total Local Capacity	167.80 TB	Peak/Min CPU	18% / 15%
Free Local Capacity	4.48 TB (3%)	Peak/Min Memory	185.75 GB / 185.76 GB
Used Local Capacity	163.32 TB (97%)	Peak/Min Memory In Use	68.71 GB / 68.69 GB



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Performance of R740xd2 solution during simulated failure and disk rebuild

Operating System	VMware ESXi 6.5.0 build-13932383		
Time Recorded	23 Hour(s), 58 Minute(s), 10/25/2019 - 10/26/2019		
Disk Throughput	192.60 MB/s	Average IO size	Read: 15.16 KB / Write: 785.26 KB
IOPS	2089 at 95%	Average Latency	4 ms Reads and 4 ms writes
Read/Write Ratio	91% / 9%	Average Queue Depth	0.00
Total Local Capacity	167.80 TB	Peak/Min CPU	18% / 12%
Free Local Capacity	4.48 TB (3%)	Peak/Min Memory	185.75 GB / 185.76 GB
Used Local Capacity	163.32 TB (97%)	Peak/Min Memory In Use	68.71 GB / 68.69 GB



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Appendix B: System configuration information

Server configuration information	Dell EMC PowerEdge R740xd2
BIOS name and version	Dell 1.0.2
Non-default BIOS settings	N/A
Operating system name and version/build number	Windows Server® 2016 Standard, Version 1607, Build 14393.2273
Date of last OS updates/patches applied	11/06/18
Power management policy	Performance
Processor	
Number of processors	2
Vendor and model	Intel Xeon Gold 5120
Core count (per processor)	14
Core frequency (GHz)	2.20
Stepping	H0
Memory module(s)	
Total memory in system (GB)	256
Number of memory modules	16
Vendor and model	Micron® MTA18ASF2G72PDZ-2G6E1
Size (GB)	16
Type	DDR4-2400
Speed (MHz)	2,400
Speed running in the server (MHz)	2,400
Storage controller	
Vendor and model	Dell PERC H730P Mini
Cache size (GB)	1
Firmware version	25.5.3.0005
Driver version	6.603.6.0
Local storage (type A)	
Number of drives	26
Drive vendor and model	Dell ST8000NM0185 (Seagate OEM)
Drive size (GB)	8,192
Drive information (speed, interface, type)	7.2K, 12Gbps, SAS, HDD

Server configuration information	Dell EMC PowerEdge R740xd2
Local storage (type B)	
Number of drives	2
Drive vendor and model	Dell SSDSCKJB240G7R (Intel OEM)
Drive size (GB)	240
Drive information (speed, interface, type)	6Gbps, SATA, M.2 SSD
Network adapter	
Vendor and model	Broadcom® BCM57412 Dual 10G SFP+ Ethernet
Number and type of ports	2 x 10GbE
Driver version	20.8.24.0
Cooling fans	
Vendor and model	Nidec® UltraFlo® 4VXP3-X30
Number of cooling fans	6
Power supplies	
Vendor and model	Dell D1600E-S0
Number of power supplies	2
Wattage of each (W)	1,100

Appendix C: How we tested

We installed BIOS and firmware updates. Dell EMC engineers configured the networking, installed the hypervisor, configured the VMs, deployed the software required to complete the validations, and performed the validation testing. We ensured that server performance was optimized during testing and reviewed raw testing results and Dell EMC Live Optics storage and server performance reports captured during validation testing. We cannot disclose Dell EMC proprietary processes related to this testing.

Installing firmware updates on the PowerEdge R740xd2 server

1. Download all the firmware updates from the Dell EMC firmware repository.
2. To update the firmware on the following components, run the .exe files in this order:
 - a. Dell iDRAC
 - b. BIOS
 - c. CPLD
 - d. OS Driver Pack
 - e. Network firmware and drivers
3. Reboot the server as required between firmware updates.

This project was commissioned by Dell EMC.



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