



The Benefits of a Modern File Storage Solution for Video Surveillance and Security

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Introduction

The term “video surveillance” covers a wide variety of components, such as CCTV, body cameras, and aerial surveillance. The implementation of video surveillance systems is now often a requirement for security, safety, legal, and regulatory compliance. Many public and private organizations, including state and local government organizations, educational facilities, law enforcement, airports, transit systems, stadiums, and retail centers, install and utilize video surveillance systems to help ensure the safety of people and property.

Video surveillance management software (VMS) records live video feeds which are ingested into storage systems, to protect and retain for the purpose of replay in the event of an investigation of persons within the field of view of a single or a group of cameras. Hundreds or thousands of cameras can be deployed within geographically dispersed areas. Cameras are set to record based on each organization’s needs; some will continuously record 24 hours per day, 7 days per week, or will be activated for a shorter period by motion detection technology. Video retention periods differ for each organization. For example, public video retention periods depend upon the laws required by local or state governments, and can range from months to years.

In this paper we will outline the challenges that today’s organizations grapple with relating to video surveillance data, the limitations of traditional storage, and how modern file storage solutions, such as Qumulo, can address and alleviate these challenges.





Today's Video Surveillance Challenges

Video surveillance data continues to grow rapidly worldwide, and its management comes with unique storage challenges.

Growth in Higher Resolution Cameras

Worldwide growth in the number of higher resolution internet protocol (IP) cameras used with comprehensive video surveillance systems to prevent crime, protect property and improve public safety has greatly increased over the last ten years, and will continue to grow and evolve. Better quality resolution cameras deliver higher clarity images, which improve overall results. Typically IP cameras start at a 1 Megapixel (Mp) resolution, with some organizations choosing to use 4K cameras, equivalent to 8Mp. In addition, the frame rate used (number of images per second) can vary. As organizations deploy higher resolution cameras, they are also increasing the frame rate for more detailed information capture. Thus, the technology changes in IP cameras, and other devices, require changes in storage technologies.

Longer Retention Periods

Government and industry regulations surrounding compliance, privacy, long-term retention and the use of captured surveillance video, dictate the retention period for different industries. The VMS will automatically delete and reuse storage capacity based on time period or capacity policies provided. Other factors that drive increased retention periods are litigation risk, increased security concerns, and security strategies. These retention periods can range from days to weeks, to months and years, and can change over time, so the storage needs to easily adapt to these changes without additional management overhead.

Here are some examples of storage capacity requirements to show how capacities can change when camera resolutions change:

100 cameras @ 1Mp x 90 days = 209TB

100 cameras @ 2Mp x 90 days = 376TB

100 cameras @ 4Mp x 90 days = 653TB

100 camera @ 4K x 90 days = 1.25PB

Performance, Capacity and Protection that meets budget

Organizations want to keep their storage costs down, but they must have the performance to store multiple streams of video content and access those streams quickly, when needed. Budgets often struggle to accommodate the cost of the storage performance and capacity needed, along with the desired level of data protection. Storage should easily and cost effectively scale to support growth and protection should be built-in.

Independent Silos Due to File System Limitations

Many files systems have support limitations with regard to the number of files, capacity, and the number of cameras. The response to these limitations with most organizations is the development of silos across the organization which results in the segregation of data across several environments. The management and planning to support future growth with a siloed environment is burdensome and costly. A modern file system using a node-based infrastructure that creates a single file system view reduces costs and increases efficiency.

Insight and Control over Video Surveillance Infrastructure

Many video surveillance systems grow over time, as more demands are added. The ability to uniformly add performance and capacity, and to monitor how the system continues to operate, is very important. Dropped frames due to underperforming storage can be invisible to administrators, yet can lead to the VMS being less effective. Tools to monitor and alert administrators that specific camera data is being lost, as well as providing insight to the overall health of the infrastructure, is becoming increasingly vital to ensure system effectiveness, and to help the organization make more proactive decisions for future growth.





Traditional IT Solutions Can't Meet Today's Video Surveillance Demands

In response to increased demand, the video surveillance market is rapidly deploying new technologies for both hardware and software. While these advancements offer many features and benefits, they also greatly increase the system overhead. Data capacities are now measured in petabytes rather than terabytes. Coupled with this growing data footprint, is the fact that most organizations are retaining video surveillance data for longer than ever before.

Traditional IT solutions are inadequate for these challenges. They employ scale-up storage platforms with many disk trays, volumes, and file systems. As the number of video assets have multiplied and retention rates have increased, the management overhead of those systems has become unworkable.

Administrators and surveillance architects should focus on the complicated tasks associated with cameras, camera analytics, surveillance alarms/alerts, and surveillance monitoring. They should not have to worry about which surveillance assets use which volumes in the storage pool and if those volumes are filling up or underperforming. Placing all of the surveillance assets on a single volume removes the complexity of managing and growing storage, without performance impacts.

Also, video surveillance storage requirements are different compared to those for traditional IT storage, as VMS workloads are over 90 percent writes and less than 10 percent reads. This necessitates a re-think for many traditional storage systems, which are mainly designed for IT storage with a much higher read percentage overhead. Uninterrupted writing of video content is the number one requirement.

In addition, traditional enterprise data services don't work well for this type of content. Services such as compression, deduplication, clones, over provisioning, and thin provisioning, are completely unnecessary. Protection methods such as replication are costly and complicated.

There are no analytics available with traditional IT systems, which result in lost value to insights that are contained in video, yet mostly not harvested and analyzed. And most traditional solutions do not offer a simple, cost-effective path to the cloud.

With regards to DAS (direct-attached storage), SAN (storage area network), and NAS (network-attached storage) - Internal DAS or small SAN appliances are ideal for small video surveillance installations with very few cameras. However, once the installation grows beyond several recording servers or has remote sites with recording servers, then NAS, or a combination of SAN and NAS, is the preferred solution.

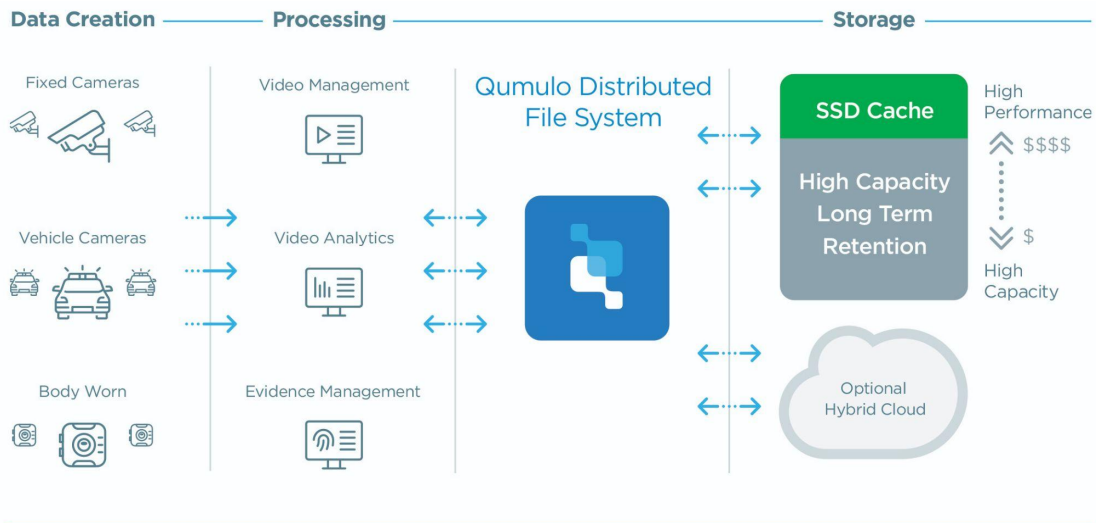




Qumulo, a Modern Storage Solution for Video Surveillance

As video surveillance data continues to grow in many markets, so will its unique storage challenges, including the increasing number of higher resolution cameras and the need to keep media assets longer. Budgets often can't accommodate the cost of the performance and capacity needed, along with the desired level of data protection, so the need for a cost effective modern solution, is a necessity.

Qumulo, the leader in hybrid cloud file storage, provides a modern high performance, scalable storage solution, with enterprise-class customer support for large-scale video surveillance and security deployments.



Here are some of our key features that make our file storage solution the best in the industry for video surveillance.

Unlimited Linear Scalability and Performance

Qumulo hybrid cloud file storage is purpose-built for demanding, data-intensive video workloads of any size. It is simple to implement using ethernet-attached storage and processor nodes which can be easily incorporated into data centers and with leading video management software solutions. Qumulo provides a simple-to-manage scale-out

architecture that gives organizations control to add capacity and performance when and where needed, to support hundreds or thousands of surveillance devices, locally or regionally.

Reliable High Availability and Efficient Data Protection

Never Lose Access – Never Lose a Frame. Qumulo file storage allows for simultaneous failures of multiple drives or nodes without loss of video ingest or playback. Any failure within the storage nodes is completely transparent, as storage connectivity uses Qumulo's 'Floating IPs', a high-availability feature that allows connections to be distributed across multiple nodes, to avoid client-side interruption.

Individual video assets are protected using erasure coding. This data protection is superior to RAID, as it works at the block level rather than the drive level. Failure scenarios can be configured to protect against multiple drive or node failures, which avoids impact to surveillance storage performance. Also, unlike many legacy systems that employ double or triple parity to protect data, Qumulo efficiently protects data with minimal storage overhead. Finally, if needed, recording and evidence archives can be replicated between sites as part of the failover/failback process. Bottom-line: data protection is built into Qumulo's solution, reducing cost and complexity, while ensuring availability and redundancy.

Flexible Cost-Effective Architecture and a Path to the Cloud

Qumulo runs on industry-standard hardware that is provided by Qumulo or from other qualified vendors such as HPE and Dell. There are two series of Qumulo products for data centers that are particularly suitable for video surveillance; the Qumulo Nearline Archive series, which offers nearline performance with the economics of archive, and the Qumulo Hybrid Capacity series, which offers a wide variety of configurations to balance performance and capacity based on an organization's specific needs. Qumulo's storage software was designed from the ground up to allow you to seamlessly scale to cloud environments, as and when needed to support future growth.

Real-Time Insights and Visibility

Qumulo provides built-in real-time analytics, which not only provide administrators with actionable insights to identify storage usage and capacity trends, but also insights on how the storage and the video management system (VMS) are working together. Administrators can see the throughput increase each time they add a camera to a VMS server. This allows them to make the most of their investment by only





adding additional recording servers when they truly need to. Finally, insights from storage data can also help organizations look at the longer-term effects of the new cameras over days, weeks and months. Administrators will be able to build an internal sizing calculator for each VMS server, based on the number of cameras of each resolution/frame rate



Conclusion

While storage is just one component of an overall video surveillance system, it is clear that traditional storage solutions are not effectively addressing the modern needs of video surveillance. Finding the right storage solution can make all the difference. Qumulo's hybrid cloud file storage answers the challenge of unified video surveillance data storage, providing the required performance for any size workflow with the economics of archive storage, and allowing linear scalability to grow both performance and capacity, with no downtime.

Qumulo's simple-to-manage, scale-out NAS architecture easily integrates with many popular video management software solutions such as Milestone and Genetec. Our solution provides cost-effective, reliable data protection, which assures optimum high availability and security with minimal storage overhead, unlike many legacy systems. Organizations have simple, centralized access to all of their data on-prem, and can leverage Qumulo's single solution to provide a path to the cloud.

With the use of Qumulo's valuable real-time analytics, administrators have the control to instantly identify throughput and IOPS hotspots, as well as the most active clients and paths, while also accessing accurate reports on usable storage - all to ensure optimal efficiencies.

About Qumulo

Qumulo is The file data management platform for storing the world's unstructured data. Gartner named Qumulo an industry leader for four years in a row and our customers are continuously delighted with new capabilities, 100 percent usable capacity, and direct access to Qumulo experts via Slack. Qumulo radically simplifies enterprise data management by providing simplicity at scale across any environment. For more information, visit qumulo.com.

For more on **Qumulo Video Surveillance Solutions**, visit <https://qumulo.com/solution/surveillance/>