

# A Comparison of the Infrastructure Architectures Available from Pivot3 and Dell EMC to Support their Respective Video Surveillance and Security Solutions

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## PRODUCTS

### Pivot3 Surveillance Series

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### Dell EMC Surveillance Solutions

URL ► <https://www.dell.com/en-us/solutions/surveillance-security.htm>

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## Overview of the Video Surveillance and Security Infrastructure Architectures Available from Pivot3 and Dell EMC

Any company looking to implement a video surveillance and security solution evaluates many items as part of the project. Video cameras and the video management system (VMS) often top the list. But the backend infrastructure from providers such as Pivot3 and Dell EMC that will host the VMS as well as any security applications to include access control and video analytics can easily get overlooked.

In delivering its infrastructure solutions, Dell EMC uses one or more of the following architectures:

- 1. Direct Attached Storage (DAS).** The VMS and/or security application server uses internal hard disk drives (HDDs) or connects to a storage enclosure with HDDs using a connecting cable.
- 2. Hyperconverged Infrastructure (HCI).** HCI solutions use a hypervisor such as VMware ESXi that virtualize application(s) running on a MS Windows VM. Using HCI, the storage resides on multiple different servers called nodes. Each node contains software that enables them all to work together and appear as one logical group. The HCI solution can act as a shared storage target to the application server(s) and can host the VMS software and other security applications on it as VMs.

**3. Networked Storage.** The storage is deployed on a separate, standalone device to which the VMS and/or security servers connect using some type of networked storage connectivity. Using this approach, a company can independently add and scale storage as well as share it among multiple servers.

In contrast, Pivot3 only offers a backend HCI architecture in support of its video surveillance and security solutions.

## Architecture by Use Case

It may appear that Dell EMC's approach of providing multiple infrastructure architectures gives a company more choices and, therefore, more flexibility. This holds true to a point. However, providing multiple choices in the infrastructure architecture does not automatically translate into simplicity of initial design, ongoing management, and/or the scalability of the solution.

Only by looking more carefully does one see the differences in their respective offerings. Dell EMC must use multiple architectures to satisfy different requirements. To satisfy a small deployment of 200 cameras or less, it uses one type of architecture. For a midsize deployment of 200 to ~1000 cameras, Dell EMC will generally use another architecture. To meet the needs of a large deployment of 1000+ cameras, it will generally use yet another. In contrast, Pivot3 uses the same architecture for all size deployments as this chart illustrates (Figure 1.)

In each of these use cases, it behooves a company to understand how each provider's architecture will impact the overall success of the video surveillance and security deployment for each size deployment.

FIGURE 1: Deployment Architectures

SMALL	MIDSIZE	LARGE
<ul style="list-style-type: none"> <li>• Dell PowerEdge servers host applications</li> <li>• Dell EMC MD, Unity or SC Series hosts production data</li> <li>• Dell VxRail hosts production applications and data</li> <li>• Dell EMC ECS for deep archive</li> </ul>	<ul style="list-style-type: none"> <li>• Dell PowerEdge servers host applications</li> <li>• Dell EMC Isilon, Unity, or SC Series hosts production data</li> <li>• Dell VxRail hosts production applications and data</li> <li>• Dell EMC ECS deep archive</li> </ul>	<ul style="list-style-type: none"> <li>• Dell PowerEdge servers host applications</li> <li>• Dell EMC VxRail hosts production applications and data</li> <li>• Dell EMC Isilon for production data</li> <li>• Dell EMC ECS for deep archive</li> </ul>
<p>Pivot3 Acuity HCI hosts applications and data Private/public cloud providers for deep archive</p>		

## Small Deployments (Less than 200 cameras)

For a small deployment of less than 200 cameras, Pivot3 HCI hosts the VMS and security applications on its HCI platform. Its HCI platform provides the processing power and storage used by these applications. It can also scale using these same nodes and connect to private and/or public clouds if needed.

Dell EMC will generally connect its servers to its external storage systems.<sup>1</sup> The servers host the VMS and security applications. These would connect to external storage systems using existing networking storage topologies (NAS or SAN) or via a direct connection. Dell EMC may optionally use its VxRail HCI solutions in lieu of servers and storage. Dell EMC also offers its Elastic Cloud Storage (ECS) for deep archiving.

Pivot3's HCI architecture can start very small with only a few terabytes (TBs). However, it can scale up to two petabytes (PBs) in a single virtual protection group (vPG) and to tens of PBs in a single deployment. Since both applications and data reside on a single platform, a company only has one platform to manage.

Dell EMC may use only one or multiple backend platforms for small deployments. This architecture will likely consist of servers and external storage though it could use its HCI platform, VxRail. It may also introduce yet a third Dell EMC platform, ECS, for archival and long-term data retention.

databases, email, and file serving that typically consist of 80 percent reads and 20 percent writes.

Video surveillance workloads behave differently and can approach 99 percent writes. Exactly how well Dell EMC can tune either its HCI and networked storage systems to optimize them for write-heavy workloads is unclear. At most, a single disk group in VxRail can only write to a maximum of 35 internal HDDs.<sup>3</sup> Further, how VxRail moves data from its internal HDDs to Isilon for data retention merits further scrutiny.

Absent the ability to optimize its devices for these heavy write workloads, Dell EMC will likely need to deploy more hardware resources to ensure its infrastructure delivers the predictable performance and throughput that a company needs.

**Handling Mixed Workloads**

A company should also consider how well the solution can handle mixed workloads as a company may want to host analytics and security applications along with its video surveillance applications.

Pivot3's software provides multiple ways to configure and even dynamically reconfigure its storage volumes to optimize each one for the workload it hosts. If using a volume to store video surveillance feeds, Pivot3 offers Erasure Coding for data protection with an iSCSI front end that provides predictable performance and guaranteed interoperability. Its HCI software can also simultaneously support other storage volume types such as CIFs, SMB, and NFS to better enable the support of multiple applications workloads on the same platform.

Due to how Dell EMC's storage platforms were originally intended for use, the write-intensive nature of video surveillance workloads will impact how they operate and perform. To compensate, Dell EMC will have to carefully balance and monitor which workloads use which resources, under what conditions, and when. Any company that seeks to mix traditional application workloads with video surveillance workloads on the same shared infrastructure should exercise caution.

A company runs the risk the infrastructure will not deliver the predictable performance and throughput it needs. If a company seeks to pursue this option, it should verify that the solution offers the appropriate quality of service (QoS) features. This will enable a company to effectively balance multiple workloads on the same underlying infrastructure that can dynamically adapt to changing workload requirements.

**FIGURE 2: Small Deployments Comparison Summary**

	Pivot3	Dell EMC
<b>Architecture</b>	HCI	DAS, HCI, Networked Storage
<b>Architectural Advantages</b>	<ul style="list-style-type: none"> <li>• Easy/flexible to scale up/down</li> <li>• Reduced risk if unexpected changes in video use arise</li> <li>• Single management interface</li> </ul>	<ul style="list-style-type: none"> <li>• Lower price point for small deployments using DAS</li> <li>• Widely used storage architectures</li> </ul>

**KEY QUESTIONS TO ASK:**

- If the company's needs for video surveillance increase in size and scope, can the company afford to upgrade the backend storage infrastructure?
- How much time does the company have to spend on managing the infrastructure?

**Midsize Deployments (200 – ~1000 cameras)**

The infrastructure choices available from Pivot3 and Dell EMC for midsized deployments are very similar to the small deployments, though Dell EMC may introduce its Isilon system as a storage option.<sup>2</sup> As a company evaluates the choices from these two providers, two key factors come into play.

**The Video Surveillance Workload**

In evaluating the platform used to host the video surveillance workload, Pivot3 originally designed its Acuity platform to support video surveillance workloads. It first caches write I/Os. It then breaks them apart and writes them in 1MB chunks to all the disks in all the nodes in a vPG. This approach accelerates write I/O with bandwidth throughput able to scale as a company adds new nodes into the HCI cluster.

In evaluating Dell EMC's offerings, a company must determine how well Dell EMC optimizes its HCI and networked storage solutions for video surveillance workloads. Its HCI and storage products were intended for traditional enterprise application workloads such as

**FIGURE 3: Midsized Deployments Comparison Summary**

Pivot3	Dell EMC
<ul style="list-style-type: none"> <li>• Acuity HCI originally architected to support video surveillance workloads</li> <li>• Can create different types of storage volumes to host different workload types</li> <li>• Quality of service (QoS) to help infrastructure meet specified workload thresholds</li> <li>• Predictable, scalable performance</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure must be appropriately configured for video surveillance</li> <li>• Uses a mix of infrastructure components to balance performance and throughput</li> <li>• Type of QoS used and its effectiveness will depend upon infrastructure deployed</li> </ul>

1. <https://dellmecevents.com/uploads/Cairo-Forum-Surveillance-Presentation.pdf>, pg. 14  
 2. Ibid  
 3. <http://www.vmwwarena.com/configuration-maximums-of-vmware-vsaa-6-6/>

**KEY QUESTIONS TO ASK:**

- How is the infrastructure optimized to host video surveillance workloads?
- Can the company experience significant cost savings by consolidating workloads?
- Will the company run mixed workloads on the infrastructure?
- What scaling challenges does the architecture present?
- What QoS options are available to use to manage mixed workloads?

**Large Deployments (1000+ cameras)**

A company looking to deploy over 1000 cameras will again use Pivot3’s Acuity HCI solution. Dell EMC will likely offer up its VxRail HCI solution backed by its Isilon and/or ECS storage systems.<sup>4</sup> In these environments, in addition to the factors already mentioned, a company should also evaluate these variables.

**Infrastructure Resiliency**

Every company will have different needs for the resiliency of the infrastructure that supports its video surveillance deployments and its impact on video capture. Pivot3’s architecture makes it unlikely it will ever experience video loss under any conditions. To Dell EMC’s credit, it acknowledges its Isilon systems could experience video frame loss when adding or removing a node from an Isilon cluster.<sup>5</sup>

**Certifications**

Both Pivot3 and Dell EMC certify their respective infrastructure solutions with multiple VMS providers. This certification is often a prerequisite for any solution deployed by a company. However, different certification tiers exist. Pivot3 often achieves the highest rating in throughput from VMS providers that benchmark their products.

**Professional Services**

Any company will likely need some level of professional service engagement when deploying 1000 or more cameras. As part of the process in choosing a provider, they should assess the scope of the engagement required initially and over. The Dell EMC Best Practices Guide for configuring Isilon systems discloses it’s intended for use by Dell EMC’s internal personnel and qualified partners.<sup>6</sup> Pivot3 designs its Acuity HCI systems to give a company flexibility to manage and maintain it without requiring professional services.

**FIGURE 4: Large Deployments Comparison Summary**

Pivot3	Dell EMC
<ul style="list-style-type: none"> <li>• Very low probability of video frame loss</li> <li>• Very high infrastructure resiliency</li> <li>• Company can manage and maintain infrastructure</li> <li>• Certified by multiple VMS providers</li> </ul>	<ul style="list-style-type: none"> <li>• Acknowledges that video frame loss can occur during maintenance periods</li> <li>• Professional services engagement likely</li> <li>• Certified by multiple VMS providers</li> </ul>

**KEY QUESTIONS TO ASK:**

- Can the solution capture all video frames under all conditions?
- Does the company want to manage the infrastructure itself? To what degree?
- Is the infrastructure certified by the VMS provider?
- How well does the infrastructure perform when the VMS provider benchmarks it?
- What type of infrastructure is required to achieve these benchmarks? ■

4. Ibid.  
 5. <https://www.emc.com/collateral/white-papers/h13476-emc-storage-genetec-sec-center-configuration-wp.pdf>, pg. 18  
 6. <https://www.emc.com/collateral/technical-documentation/h14823-isilon-universal-config-video-surveillance.pdf>, pg. 6

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