# A Comparison of How Pivot3 and BCDVideo Deliver on the Oft Overlooked Infrastructure Component of Video Surveillance and Security Solutions

*by DCIG President Jerome Wendt*

## PRODUCTS

**Pivot3 Surveillance Series**

URL ▸ https://pivot3.com/product/surveillance/

> 221 W 6th St #750
> Austin, TX 78701
> (512) 807-2666

**BCDVideo Video Surveillance Solutions**

URL ▸ https://www.bcdvideo.com/

> 901 Deerfield Pkwy
> Buffalo Grove, IL 60089
> (847) 205-1922

## Zeroing in on the Oft Overlooked Infrastructure Component of Video Surveillance and Security Solutions

A company looking to implement a video surveillance 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 that will host the VMS and other security applications such as access control and video analytics can easily get overlooked.

A company may underestimate the impact that the backend infrastructure will have on the overall success of its video surveillance and security deployment. This miscalculation may not matter if a company deploys only a few cameras up to a few dozen. However, the infrastructure's importance to resiliency, performance, and overall TCO of the overall video surveillance and security solution changes when any of the following conditions hold true:

- A company must deploy dozens, hundreds, or even thousands of cameras

- The company will use cameras with high degrees of resolution, such as 4K or higher

- The company wants to do analytics on the captured video streams

- The company can never afford to lose a frame or have a frame image quality degraded

- The VMS must run uninterrupted even during maintenance periods

- The company wants to minimize the amount of time spent managing the infrastructure

- The deployment will start small and scale rapidly

In these circumstances, it behooves a company to carefully examine the video surveillance solution's backend infrastructure when considering solutions from leading video surveillance providers such as Pivot3 and BCDVideo. While both providers support the same range of VMS and camera providers, the infrastructure solutions provided by Pivot3 and BCDVideo can differ. This will directly influence the overall business outcomes and how easy each one is to deploy, manage, scale, and use for other datacenter purposes.

## Video Surveillance Storage Architectures

### OVERVIEW

Providers of video surveillance solutions generally use one or more of the following storage architectures to support their offering. These include:

1. *Direct Attached Storage (DAS).* The VMS 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 are virtualized using a hypervisor such as VMware ESXi that can host any virtualized application(s) that runs in a MS Windows VM. Using HCI, the storage resides on multiple different servers called nodes. Each node contains software that enables all the nodes to work together and appear as one logical group. The HCI solution can function as a shared storage target to the VMS server(s) and can even host the VMS software and other security applications on it as a virtual machine (VM).

3. *Networked Storage.* The storage is deployed on a separate, standalone device to which the VMS server connects using some type of storage area network connectivity. Using this approach, a company can more easily add and scale storage as well as share storage among multiple VMS servers.

It may appear video surveillance and security solutions that support one, multiple, or all these storage architectures provide a company with more choices and therefore more flexibility. This is true

to a point. However, choice in the video surveillance storage architecture does not necessarily equate to simplicity in initial design, ongoing management, and/or the scalability of the solution.

## PIVOT3 AND BCDVIDEO

Pivot3 relies solely upon an HCI architecture optimized for video use cases to deliver its Surveillance Series solutions. While this represents fewer architectural choices than what BCDVideo offers, Pivot3's HCI architecture gives a company the same range of choice when it comes to performance and scalability. Using Pivot3's HCI architecture, a company can start very small with only a few terabytes and can scale to over two petabytes. This architecture mitigates the risk of having to get the upfront design sized correctly and gives a company flexibility to scale as required.

BCDVideo offers a DAS, HCI, or networked storage architecture to support its Video Surveillance Solutions.  BCDVideo's use of multiple storage architectures dictates that a company has a firm handle on the initial size of its video surveillance deployment, its projected growth, and how the system will be utilized initially and over time.

The assessment will determine the type of storage architecture deployed as part of the video surveillance solution. If the video surveillance environment changes, it may result in a company having to invest more later to put in place a more appropriate storage architecture.

### Storage Architecture
#### Comparison Summary

| | Pivot3 | BCDVideo |
|---|---|---|
| **Storage Architecture** | HCI | DAS, HCI, Networked Storage |
| **Architectural Advantages** | • Easy/flexible to scale up/down<br>• Reduced risk if unexpected changes in video use arise | • Lower price point for small deployments using DAS<br>• Widely used storage architectures |

### Key questions to ask:

- On a scale of 1 to 10, how confident is the company about the accuracy of the information it has regarding the size and scope of its proposed video surveillance deployment?

- 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 any storage upgrades?

## The Criticality of Video Surveillance to the Business

### OVERVIEW

A company may use video surveillance for many business-critical use cases. It may have regulatory and compliance requirements around the capture, management, and storage of video. It may run analytics on the videos. It may need to use the videos as evidence in court cases. It may use the videos for process improvements. Therefore, the better a company can anticipate its intended use cases for the video surveillance system, the more it will increase its odds that it selects the right system for its environment.

For instance, a company needs to determine the importance of the video surveillance solution capturing every video frame. This may seem like a small detail. But one only detects image pixilation and interrupted video feeds when it is too late: during playback and/or when analyzing the video. Further, analytics software requires high quality images (often 4K or higher) to perform its job. If the backend infrastructure is unavailable and/or does not capture all the images, the investment made in high resolution cameras goes to waste.

The inability to capture a video feed may even impact the bottom line. For example, in the high roller pits of some casinos, if a video feed is offline, the pit cannot open. This can cost a casino hundreds of thousands of dollars per minute.

A company must also determine in what ways, if any, it plans to use the stored video feeds. If a company only plans to store and never view or analyze the videos, it needs a less robust backend infrastructure. However, more companies plan to do analytics on captured videos to monitor security as well as analyze traffic patterns and behaviors in public spaces such as airports, cities, malls, stadiums, etc. Third parties may find this data invaluable when making decisions on where to deploy new retail outlets.

However, video analytics is a process intensive task and videos must be readily accessible for playback. Not all backend video surveillance architectures are sufficiently equipped to handle this workload.

A company may also be unsure in what direction its video surveillance will go. It therefore must give itself as much flexibility as possible going forward in how it uses the solution. In that case, the company will want a solution that it can adapt for multiple use cases.

### PIVOT3 AND BCDVIDEO

Pivot3 designed its own HCI software platform that was optimized to handle video surveillance workloads. Specifically, it distributes writes as they occur across all the nodes in its HCI cluster and to all the HDDs within each node. This serves two purposes.

1. *It eliminates latency.* Latency is the death knell of video surveillance. By distributing writes to pre-mapped distributed volumes, Pivot3 mitigates latency and maximizes performance across its pool of HDDs in its HCI

configuration. This virtually eliminates the possibility of dropping frames as it captures real time video feeds.

2. *It mitigates the possibility of any type of interruption in service.* Distributing writes also ensures that when a company does need to perform routine maintenance or experiences a hardware failure, the overall performance of the video surveillance system remains unaffected. Pivot3 accommodates the 24x7x365 requirements of video surveillance deployments without a company having to compromise on availability or performance during these times.

BCDVideo essentially functions as a value-added reseller. It uses off-the-shelf, OEMed DAS, networked storage or an HCI solution as part of each video surveillance solution it assembles. Each of its deployment types relies upon software that ships with the VMS and/or the provider. Further, it uses storage and HCI solutions optimized for enterprise read and write workloads. These are typically 80% read and 20% write. These may not handle the heavy write-only workloads of video surveillance very well, especially at scale.

Further, a company must carefully balance the number of video streams used if selecting BCDVideo. This must be done to ensure the storage infrastructure remains highly available and provides the needed levels of performance and throughput.

## Video Surveillance Infrastructure Criticality
### Comparison Summary

| Pivot3 | BCDVideo |
|---|---|
| • Maintains performance of video streams using fewer storage resources<br>• High availability during maintenance windows and hardware outages<br>• Chances of video frame loss very minimal | • Must architect, deploy, and manage high amounts of storage resources to ensure high availability and performance<br>• Chances of video frame loss cannot be fully mitigated |

**Key questions to ask:**

- If using DAS and there is a disk failure, the VMS system may be degraded or even offline while the disk is replaced. Is this ever an acceptable scenario?

- Can the company risk the loss or degradation of a single frame of video?

- Can the company afford any downtime?

- Will video still be captured without frame loss and remain accessible if the video surveillance is in a degraded state?

## Hosting Other Application Workloads
### OVERVIEW

A company must, in almost all cases, dedicate all the components of a video surveillance system (*the cameras, the VMS, and perhaps even the networking that carries the video surveillance feeds*) to its support. However, a company may want the option to share the infrastructure resources that underlies the video surveillance system for other application workloads.

A company may want this option to share these infrastructure resources for multiple reasons. It may want to run analytics on the saved video feeds. It may want to run other security applications related to video surveillance such as access control, time, and attendance. It may have a limited budget. It may have minimal available floor space. It may want to do all the above.

Due to the unique workloads associated with video surveillance, a company must have a great deal of confidence that the video surveillance infrastructure can handle these additional workloads without negatively impacting the availability and performance of the video surveillance solution itself.

### PIVOT3 AND BCDVIDEO

The Pivot3 HCI platform supports other workloads running on it. 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 only 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.

The networked storage and HCI options that are part of BCDVideo's video surveillance offerings can theoretically handle other workloads. However, its networked storage and HCI are optimized for traditional enterprise application workloads. Any company that attempts to mix traditional application workloads with video surveillance workloads on the same shared infrastructure runs the risk these infrastructure types will not deliver the predictable performance and throughput they need.

## Application Workload Hosting
### Comparison Summary

| Pivot3 | BCDVideo |
|---|---|
| • Supports the creation of different types of storage volumes to host different types of workloads<br>• Offers a quality of service (QoS) feature to ensure infrastructure meets specified workload thresholds<br>• Predictable performance | • Infrastructure components must host workloads for which they were not originally designed<br>• Availability and effectiveness of QoS will vary depending upon type of infrastructure used |

**Key questions to ask:**

- Could the company benefit from saving costs by consolidating both security and video surveillance workloads on the same backend infrastructure?

- Does the backend infrastructure offer any QoS features to manage and ensure specified application workload performance thresholds?

- What is the backout plan if the shared infrastructure cannot meet stated performance thresholds initially or over time?

## Simplicity of Deployment and Management

### OVERVIEW

The simplicity of a video surveillance system's deployment and ongoing management will greatly influence its long-term success. The simplicity of the deployment will hinge upon how much data a company has at its fingertips in advance of the deployment and the reliability of that data. A company that already had a video surveillance in place will probably have a much better idea of what it needs than a company deploying one for the first time. The number of backend infrastructure options that the video surveillance solution supports may simplify or complicate the deployment.

Once deployed, the focus will shift to the ease and simplicity associated with managing the solution. It will minimally account for these three variables:

1. Integrating with existing IT best practices

2. Performing routine maintenance operations such as system fixes and upgrades

3. Scaling the system to add more capacity or performance.

### PIVOT3 AND BCDVIDEO

Pivot3's HCI architecture gives a company the flexibility to start with a solution that is right-sized for its initial deployment. Using its HCI architecture, a company only needs to acquire as much capacity and performance as it initially needs. If its requirements change or grow over time, more nodes can be easily and non-disruptively introduced. By distributing writes across all its nodes,

Pivot3 provides a high degree of resiliency that ensures predictable performance during routine maintenance events. Its HCI architecture also facilitates system refreshes as new nodes are introduced and existing ones decommissioned.

The multiple backend configurations associated with BCDVideo's video surveillance solutions make ease of deployment and ongoing management more difficult to predict. If anything, the ease or difficulty of deployment and ongoing management falls into the nebulous *"it depends"* category.

If a very small video surveillance deployment where the BCDVideo only uses DAS, it may be very easy to deploy and manage over time. Conversely, if it is a larger deployment with dozens, hundreds, or thousands of cameras, it could become highly complex to initially architect and then labor intensive to manage over time.

## Deployment and Management
### Comparison Summary

| Pivot3 | BCDVideo |
|---|---|
| • Single backend infrastructure | • Multiple backend infrastructure options |
| • "Right-sized" deployments | • DAS used for small deployments |
| • Capacity and performance easily added | • HCI or networked storage for larger deployments |
| • Product refreshes completed non-disruptively | • Size of video surveillance will determine simplicity of managing the solution |
| • Simplicity or complexity of management relatively constant regardless of size of solution | |

**Key questions to ask:**

- How large is the video surveillance deployment today and likely to be 3 years from now?

- How many people do you have to manage the video surveillance solution and what skills do they have?

- How much time do you have to dedicate to managing the video surveillance solution? ■