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The True Costs of IP Video Surveillance

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Cost is one of the primary factors that influence the selection of one integrator's bid over another in the purchasing process of a video surveillance system. While acquisition expense is significant, there are other factors that impact the system cost.

Only by understanding the different components of the system and their associated expenses, can you truly comprehend the total cost of ownership (TCO) of the system.

This knowledge is particularly important as security personnel are increasingly working with their IT colleagues in selecting vendors and designing systems, as well as sharing departmental budgets. IT is accustomed to reviewing and studying TCO with their systems and will want to be able to measure security investments in the same way.

Estimating TCO involves understanding the initial acquisition cost, the operating requirements, labor for installation and maintenance, and exposure to risk or liability -- such as fines for non-compliance with regulatory requirements for video surveillance in certain industries. Time savings and efficiencies achieved must also be considered in the equation.

Some design choices only impact the acquisition and installation costs of a system. For example, in installations where Ethernet cabling is already in place, the choice of IP cameras over analog cameras can help to decrease the costs by eliminating the need to run coaxial cabling and by using Power over Ethernet instead of added power supplies for the cameras.

Other options can impact manpower needs. For example, video content analytics will alert system operators to video where an alarm is raised. This addition to the design can help to reduce the number of personnel required to monitor the system or make the existing personnel more efficient and effective.

However, the greatest impact to TCO in large video installations comes from the recording and storage technology. It is common for storage to make up the biggest share of the capital expenditure -- often 50 to 80 percent of the cost -- and the recording technology chosen can greatly impact maintenance costs over time.

There are three main reasons for high storage requirements for modern CCTV systems: a large quantity of cameras; recording at a very high video quality; and/or retaining video for a long period of time -- months or even years. If any of these descriptions fit your needs for video surveillance, then you will want to understand how different approaches to IP video recording and storage can impact the TCO of your system.

Common Approaches to IP Video

Digital Video Recorders

There are two broad categories of digital video recorders, embedded DVRs and PC-based DVRs. PC-based DVRs are carefully customized PCs that typically run a Microsoft Windows or Linux operating system and anti-virus software to protect the machine. Embedded DVRs are more like a purpose-built appliance and often run a real-time operating system that does not require the same degree of maintenance or protection.

While they differ in terms of on-going maintenance, both are designed as stand-alone systems, meaning the hard drive storage is either included inside the unit, or for more storage, a disk array can be directly attached to the DVR. The consequence is that each DVR is a silo, making the storage available only to its cameras. The storage is very rarely, if ever, shared between multiple DVRs, so you cannot take advantage of economies of scale. A single 10 Terabyte storage unit will invariably be more economical and frequently more reliable than 10 units with one Terabyte of storage for each or embedded hard drives.

DVRs are an excellent solution to specific challenges. However, in order to achieve shared storage to meet the demand of higher quality video, the industry is moving to network video

recorders (NVRs), but as we shall see, this move does not overcome the high, yet hidden, costs of maintaining PCs.

Network Video Recorders

Many dealers and integrators install IP video surveillance systems that use PC-based NVRs. NVRs are comprised of three key components -- management software, a server platform and attached storage to record video. These systems typically require one NVR for every 64 cameras, because the PC is a bitrate bottle-neck for the video trying to reach the storage.

For large facilities, such as airports, this can mean a significant investment in servers as well as time required by IT to administer this technology with operating system patches and anti-virus updates. Some estimate that for every dollar spent on computer hardware, nearly double the amount of time is spent on maintenance. Consider now how that time translates into money spent for an organization that has a managed services contract with an IT outsourcing company.

IT knows well that the total cost of ownership of server hardware and software can vary anywhere from 1x to 5x the initial purchase cost per year -- that means over three years, the TCO is between 3x and 15x the purchase price. This stark reality is completely understood by IT. They know why they need enormous resources to maintain systems.

You should also keep in mind that the maintenance costs of the hardware does not include any expenses associated with adjustments made to the system after the initial installation. If you decide at a later point that you need to expand the system and add cameras, you will need to purchase additional NVRs as well as the NVR software licenses, operating systems and anti-virus software.

Increasing video quality or retention time will also require purchasing additional storage. While increasing the amount of storage sounds like it might be a simple task, it is not. Each

camera or NVR has to be allocated a fixed amount of storage space. To change this, your integrator will need to reconfigure each affected camera or NVR, telling it which storage device it now needs to send video to. In this scenario, you are not only paying for the extra hardware and software required, but you are also paying the labor rate for the integrator. This reformatting can take days, depending on how many cameras are impacted.

While DVRs and/or NVRs may make sense for your video needs and your budget, and while NVRs can occasionally offer value-added functionality such as real-time data processing, there is an emerging approach that may be the better alternative to help you lower your video systems' total cost of ownership.

An Alternative Approach -- Eliminating the NVR PC

An alternative approach to video storage is to by-pass the need for NVR PCs altogether and make IP cameras stream directly to the disk array storage. The same principle also applies to encoders -- the devices that translate analog camera signals into digital. Disk array RAIDs that use an IP-based storage networking standard called iSCSI (Internet Small Computer System Interface) can record video without the added expense of NVR server hardware and software and the maintenance costs they invariably demand.

With the addition of video recording management software that acts as a traffic cop, video can be distributed in one Gigabyte blocks across various disk arrays on the network. Each storage unit is no longer a silo. Rather, the software will pool all RAID arrays in a system and, after dividing the total capacity into one Gigabyte storage blocks, allocates storage on demand to IP cameras and encoders.

This approach allows for automatic load-balancing, better storage utilization, as well as greater system flexibility and easier adaptation to changing storage demands. It also supports a phased deployment of storage, allowing you to add storage when you need it and when you choose to buy and install it.

With the steady reduction in storage costs that have occurred recently -- typically halving every two years -- and that are expected to continue, purchasing the full amount of storage equipment up front is a large capital investment that does not make economic sense. If long-term retention is required, you can initially purchase a certain amount of storage, wait for storage costs to decrease or wait for next year's budget allocation to become available, and then purchase the additional storage needed. With video recording management software that treats all RAID arrays as a virtual pool, your integrator will simply need to add the storage devices and alert the software to their presence. The software will then begin to make those storage devices available to all of the cameras or encoders in the system.

All of this can be done with the addition of one PC server for every 2,000 cameras.

By reducing maintenance costs and better utilizing storage technology, you have the ability to reduce the total cost of your system by up to 30 percent over its lifetime. All you need to do is ask your integrator to eliminate NVRs from the system design.

As a buyer that is educated on the various approaches to IP video and their associated costs, you can better challenge your pool of potential integrators to design the most appropriate system for your needs -- one that meets your budget for acquisition and for long-term maintenance.

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