Flexibility without compromising security

– video surveillance for data centers.

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1. Introduction

Depth is an important aspect when designing security systems. This is particularly true when it comes to securing data centers. Hence, surveillance systems at such locations are often built with layer upon layer of protection – from the outer perimeter of the plant, to the grounds, to the building, the server halls and, finally, to the individual server cabinet.

Working with different layers is a well-established and efficient approach. It accomplishes reliable systems at a level of security that many customers today expect and demand. However, setting up a certain number of levels must not become an end in itself when designing a network video security system.

1.1 Adding quality to layers

In order to accomplish an efficient, yet flexible, video surveillance installation there is a variety of other aspects that also should be considered. These include both strategic decisions, such as the choice of manufacturer, and more practical choices, e.g. selecting the most useful camera model for a specific spot. A thorough evaluation of available alternatives can improve performance as well as cut purchase costs and operating costs.

Some important factors to consider when designing a video surveillance system are:

> Image quality
> Scalability
> Ease of integration
> Future-proof products
> Energy consumption

2. Image quality

There are several advantages with the high resolution and high frame rates of network video cameras. HDTV image quality makes these cameras versatile and multi-purpose. Most obvious, of course, is that clear and crisp pictures are invaluable for surveillance as well as for recognition and identification.

Moreover, HDTV cameras with PTZ (pan/tilt/zoom) enable a 360-degree panoramic overview of large open spaces, and also to zoom in on areas of interest to catch detailed information. Similarly, with high resolution comes the ability to use multi-view streaming from a single camera. This essentially means that you get several different views from selected areas from one single camera position.

In both these instances a surveillance system can be built using fewer, but more resourceful cameras. This will not only reduce investment cost but also cut expenses for installation, maintenance and operation. Furthermore, streaming from selected areas only can reduce bandwidth and storage needs.

2.1 More than counting pixels

Image quality is not just about counting pixels or conforming to open standards, such as the HDTV standard from Society of Motion Picture and Television Engineers (SMPTE). In many instances it is just as crucial to have a camera that is able to overcome difficult lighting conditions and still deliver useful images.

2.2 No light

By visualizing heat radiating from people, vehicles and objects, thermal cameras let you see in total darkness as well as through smoke and haze. A thermal camera is also less sensitive to complex light conditions, such as deep shadows, backlight, darkness or even camouflaged objects.

These properties make thermal cameras ideal for detecting people, objects and incidents. Another benefit is that they do not require installation of any additional light sources – conventional or IR – that consume energy.

2.3 Some light

However, thermal cameras do not provide images that allow reliable identification. But there are cameras on the market that are extremely light sensitive and deliver excellent color images even in environments with very little light.

Axis' Lightfinder is a cutting edge technology that enables network video cameras to deliver life like color images even if the available light is down to fractions of a lux.

2.4 Difficult light

Similarly, image processing technologies such as Wide Dynamic Range (WDR), can deliver usable video also in scenes with very complex lighting conditions. WDR – Forensic Capture, is a built-in technology on some Axis' camera models that can compensate for changing light conditions and big differences between the lightest and darkest spots in a scene. The result is video optimized for forensic purposes.

3. Saving power

Aside from the improvement in the image quality in demanding or low light environments, these techniques have a potential in power saving since they require less ad¬ditional lighting.

4. Saving bandwidth and storage

Compressing video saves both bandwidth and storage. It is typically achieved with a video coding format, for instance H.264. But too strong compression can have a negative impact on image quality and usability. Zipstream is an Axis technology that analyzes and optimizes the network camera's video stream in real time. Scenes containing interesting details are recorded in full image quality and resolution while other areas are filtered out, thereby saving bandwidth and storage without loosing vital forensic information such as faces, tattoos or license plates.

When monitoring areas that are more vertical than horizontal in shape, for example hallways, runways, tunnels or staircases, large parts of the field of view tend to be redundant, increasing network load and wasting storage in the process.

Axis' Corridor format is an ingenious solution to the problem. It allows the camera to be rotated 90 degrees and yet be configured to deliver a vertically oriented video stream that can be viewed as it is meant to. The solution is especially useful for HDTV network cameras with their 16:9 aspect ratio.

5. Scalability

Business is about constant movement and change. And as your business evolves, so must your surveillance system. Scalability is consequently a key element when choosing surveillance system.

Solutions designed with open IP standards – whether it is network video cameras, door controllers or video door controllers – can all easily and seamlessly connect with other IP equipment. The cabling demands are far less complex than those for corresponding analog systems, and since they are founded on open standards customers are not locked in to proprietary technology.

IP-based devices are flexible and scalable, and will work out of the box with network switches, routers, screens, computers, tablets, smartphones etc. New possibilities can be added when need arises since network system can grow with one device at the time. In analog systems, on the other hand, expansion must often be done in set multiples, e.g. of 4, 8, 16 or 32 components, which can make the addition of a single unit prohibitively expensive.

6. Ease of integration

It should not just be easy to expand your system with devices that are already included in the installation. Equally important is the ability to add new features or applications – even those that come from other suppliers or vendors.

IP cameras enable video intelligence and video analytics, such as motion detection, auto tracking and license plate recognition. These and other tasks reduce pressure on operators, deliver vital business data and increase surveillance efficiency.

Open standards ensure interoperability and facilitate integration between different devices from different manufacturers. Likewise, open architecture and open application programming interfaces make it possible to add on various third party solutions, such as motion detection, people counter or cross line detection. This gives customers a great freedom of choice and allows them to tailor their specific solutions for their specific needs.

7. Protecting the security

Network cameras are part of both the physical security infrastructure and the IT security infrastructure. The responsibility to secure the network, devices and related services is shared by manufacturers, integrators and end user.

The system owner defines the security level of his particular surveillance system. Cameras are just like any other network device and should be hardened in accordance with the end user's existing IT policy regarding passwords, anti-virus updates, firewalls etc.

Network camera manufacturers should be chosen from those who closely and continuously monitors cyber security and therefore can provide products and services that have a minimum amount of exploitable flaws, yet easily aligns with different infrastructures and IT policies.

Finally, the reliance on open standards ensures that the surveillance system is robust and future proof. Firmware based on open source, such as Linux, is a good safeguard for discovering and addressing any type of system threats and vulnerabilities at an early stage. And any security equipment provider worthy of the name will offer a range of tools and services for cyber protection – from privacy masking to strong encryption and password management.

7.1 Security at every layer

Once you have become aware of these considerations, they are relatively simple to put into the actual design of a network video surveillance system. There are solutions that will help to maximize the security at every layer.

7.2 Perimeter

HDTV cameras are excellent for covering large areas. In combination with thermal imaging cameras, which are unmatched when it comes to detecting, they make up a superior perimeter surveillance and deterrence. Entry points can be equipped with and seamlessly integrated with IP-based a video entry intercom or access control unit.

Camera functionality can be further enhanced by various intelligent video applications, supplied by the manufacturer or trusted software partners. These applications increase security and simultaneously ease the burden on the operators, for instance by detecting motion, discovering tampering or identifying false alarms. Even more advanced features can automatically read license plates or recognize faces.

7.3 Grounds

High resolution and powerful zoom as well as pan and tilt capabilities let you effectively monitor grounds, parking areas, loading docks etc. Extremely light sensitive cameras can secure high quality images also in situations with very little light.

7.4 Buildings

Shadows, reflections, backlight and changing lighting conditions are common challenges for indoor video surveillance solutions. Advanced image processing, such as Wide Dynamic Range, WDR, and development of special camera lenses, enable images with an excellent degree of detail even in difficult lighting conditions.

7.5 Server hall

Cameras covering aisles and halls can be set to give a portrait-shaped video stream – known as Corridor format – with a 9:16 aspect ratio that is perfectly adapted to the monitored area. This maximizes image quality, while eliminating bandwidth and storage waste. Intelligent video applications, such motion and audio detection, further enhance and improve security.

7.6 Rack

Rack mounted network camera keeps track of unauthorized access to individual or groups of racks. Also in this case, motion detection, tampering alarm and similar applications can set off various actions that may include video recording, activating lights, opening or closing doors and sounding alarms.

8. Summary

Data centers are typically protected by advanced security systems and network video surveillance cameras are crucial components in such a system. Therefore cameras should be carefully selected. Close attention should be given to image quality as well as other factors like scalability and energy consumption. Thus it is possible to build a system that is future-proof, can be easily scaled and is cost-effective to run and maintain – without ever compromising on security.

9. Check list

Some key points when choosing video surveillance system

> Future proof the installation
> Ensure scalability
> Consider energy consumption
> Evaluate bandwidth and storage needs
> Build security in several layers
> Optimize surveillance at every layer by considering
  - Image quality
  - Single or multi purpose camera
  - General purpose camera or specialized camera
  - Available applications

About Axis Communications

Axis offers intelligent security solutions that enable a smarter, safer world. As the market leader in network video, Axis is driving the industry by continually launching innovative network products based on an open platform - delivering high value to customers through a global partner network. Axis has long-term relationships with partners and provides them with knowledge and ground-breaking network products in existing and new markets.

Axis has more than 2,100 dedicated employees in more than 50 countries around the world, supported by a global network of over 80,000 partners. Founded in 1984, Axis is a Sweden-based company listed on NASDAQ Stockholm under the ticker AXIS.

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