

# Moving from Analog to IP

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Hybrid Design and Equipment Options

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In today's world of video security the market is moving towards IP based solutions. Manufacturers traditionally associated with analog products are allocating R&D resources to develop IP cameras and recording platforms. There is a trend for security professionals to move towards IP based video solutions because of the clear value the technology brings:

1. Better image quality through megapixel resolution and progressive scan image sensors.
2. Lower cost and more flexible infrastructure through Ethernet cabling, Power over Ethernet functionality and ability to transmit multiple channels of video, data, audio & PTZ control through a single cable.
3. Digital encoding guarantees image quality over long distance transmission and over wireless transmission mediums.
4. In-camera or edge processing can mean a reduction in the required server computing resources.

There are millions of analog cameras in place today. Customers adding to their video security system typically consider options to use IP and analog cameras together in what is called a hybrid system. There are several technologies which can accomplish this, all of which have benefits in different installation scenarios. This document will consider different installation scenarios to evaluate the benefit of hybrid video management, encoder & media conversion devices for various applications.

## The right tool for the job

**Encoders** convert analog cameras to IP. An encoder compresses the analog video feed and makes it available over the IP network.

An analog camera attached to an encoder does not have the same image quality benefits as an IP camera, such as progressive scan capability and the resolution is still limited to D1/4CIF resolution (about .4 megapixel). Some encoders do have image enhancement features, such as deinterlacing, gamma/brightness correction and noise reduction filters built in.

Encoders are available from a variety of manufacturers and depending on the manufacturer and model of encoder it may be supported by a variety of video management platforms allowing for a wide range of system configuration choices. Encoders may be more expensive on a per-video-channel basis than connecting cameras directly to a hybrid server because they are network connected. The network connection directly built into the encoder adds hardware cost, as well as additional infrastructure costs. Each encoder requires CAT5/5e/6 cabling and a switch port to connect to the IP network.



High density encoder

A **Hybrid Video Management System** uses video capture cards installed in the server to capture the NTSC/PAL video signal, digitize it and compress the video. It provides a function similar to using an encoder separate from the video management software but combines the functions of encoding and video management into one device. Because each video capture card does not require as much intelligence as an encoder, and it does not need to have individual network communication capability, cost savings may be realized in product cost on a per-video-channel basis and infrastructure costs.



Server with video capture cards installed

A hybrid system using capture cards may however not allow for a high density of video channels to be captured. This is because the server is not built as a high density analog camera conversion device. There are a limited number of slots available to install capture cards in a server.

Encoders are typically available in form factors allowing the system designer to convert more analog channels in less rack space. In addition there is some overhead cost in a hybrid system such as processor, memory and motherboard used to run the video management software. Some installation scenarios, such as converting a few remote analog cameras to IP, may be completed at a lower cost by using encoders.

Benefit	Encoder	Hybrid Video Management
Wide range of video management choices	✓	
Cost		✓
High density	✓	
Lower complexity installations		✓

A **media converter** (in this context) allows for Ethernet over coax. This means TCP/IP based communication can take place over coax as the cable medium instead of Fiber or CAT5/5e/6 cabling. These devices serve a different role in a hybrid installation than either the encoders or hybrid video management systems.



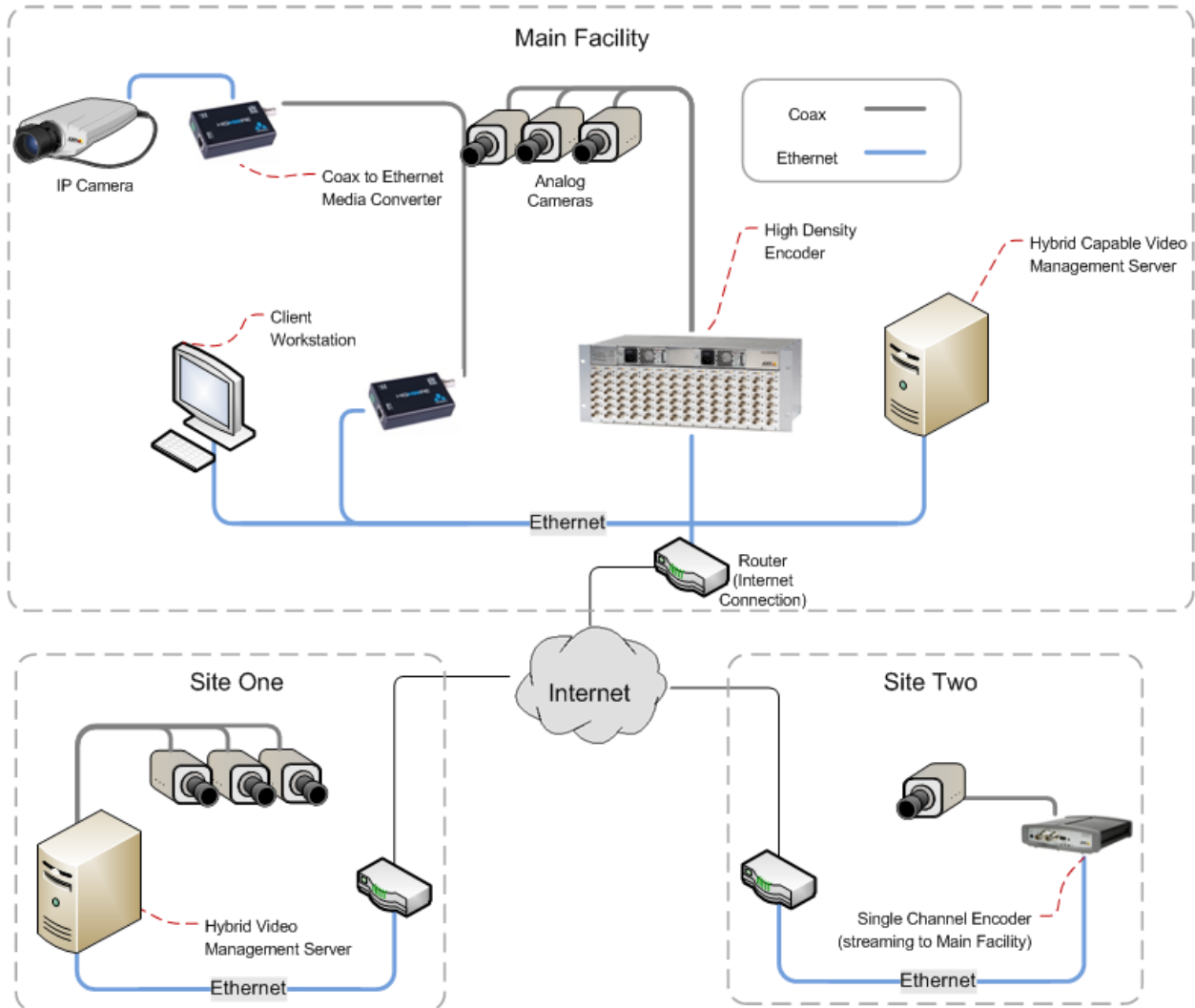
Coax to Ethernet media converter

The media converter allows the system designer to replace an analog camera with IP cameras without replacing the existing cabling infrastructure for the analog cameras. Without a coax to Ethernet converter the installer would need to pull traditional Ethernet cabling (CAT5/5e/6 or Fiber) to the camera location in order to replace the analog camera with an IP camera. There is a tremendous cost associated with replacing infrastructure in existing buildings, so without these devices it would be cost prohibitive to replace existing analog with IP.

Many security consumers are using media converters to replace analog cameras with megapixel cameras without overhauling infrastructure. Some of these devices can even provide Power over Ethernet to the cameras, although this is not always needed because power should already be at the location previously used for the analog camera.

## Installation Scenario

In this installation scenario, the organization has a main facility and two additional sites. The organization is planning to add IP cameras, replace some analog cameras with IP and wants to view both locations from one interface. To satisfy that requirement the same Video Management platform should be used.



The Main Facility has many existing analog cameras, and therefore a high density encoder is the solution of choice. The high density encoder makes the analog video feeds available over the IP network, effectively converting them to IP cameras. The Hybrid Capable Video Management Server treats these video feeds as if they were IP cameras. The Hybrid Capable Video Management Server does not have any direct attached analog cameras at the Main Facility. Additionally, some analog cameras have been replaced with IP Megapixel cameras. The coax infrastructure was used for the IP cameras by installing a media conversion device which allows for Ethernet over coax.

Site One has a lower camera count than the Main Facility. Too many video feeds are present to transmit all the video over the Internet back to the Main Facility for recording therefore a Video Management System is required onsite to record the cameras. The ideal solution for this location is a Hybrid Video Management Server with video capture cards installed to record the analog cameras. A high density encoder is not required because of the lower camera count. The same Video Management platform is used at this location as in the Main Facility to allow for centralized monitoring and management.

Site Two only has a few analog cameras. The site has a low level of activity and it is decided to record video only when motion is detected. The encoder used has built in motion detection functionality so video is only transmitted when activity occurs. Because of the low camera count and by transmitting video only on event the system designer is able to use encoders exclusively at this site. Video is streamed back to the Main Facility for recording.

Because the Video Management platform used is hybrid capable, IP cameras can be installed at any of the sites and viewed or managed in a common interface along with the analog cameras.

## **Conclusion**

IP cameras available today provide enhanced functionality which is often desirable in modern video security installations. When upgrading systems to use IP cameras it is impractical to replace all existing equipment. Using encoders, hybrid video management and media converters can allow an organization to upgrade their surveillance installation while keeping costs down.

## **ABOUT SALIENT SYSTEMS**

Salient Systems offers network friendly, comprehensive IP and analog video surveillance management systems (VMS) built on open architecture. As the recognized transition leader from analog to digital video, Salient Systems' VMS, CompleteView™, is scalable and provides everything needed to manage a multi-server enterprise from a single desktop. Salient delivers simple and scalable security today...and tomorrow. For more information about Salient Systems and CompleteView, visit [www.salientsys.com](http://www.salientsys.com).

## **ABOUT THE AUTHOR**

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