

IP Video Versus Analog CCTV

In a traditional CCTV system, analog cameras are connected to the DVR by independent runs using either coaxial or CAT5 cabling. In an network video recording (NVR) system the cameras have built-in servers that allow each camera to be assigned a unique internet protocol (IP) address. The cameras are connected to a network via CAT5/6 or fibre optic cable and transmit video back to a central server with a video management software (VMS) platform.

Analog cameras can also be connected to an NVR system by using compatible video encoder devices. Systems using both analog and IP cameras are often referred to as hybrid systems.

Both NVR and DVR systems provide remote access through the internet or via local area networks.

Selected Feature Comparison

Resolution

Perhaps the most important difference between IP and analog cameras begins at the image sensor. IP cameras feature megapixel sensors capable of capturing images at very high resolution in terms of pixel count. A standard analog camera can provide a maximum of 704 x 480 pixels (roughly 400,000 pixels). By comparison a 1.0 megapixel image sensor captures one million pixels.

However more pixels do not automatically translate into better image quality in real world applications. IP megapixel cameras use CMOS image sensors whereas CCD sensors are the standard for analog cameras. CCD sensors have better imaging capabilities in conditions such as high glare and low light. In these situations it is common for an analog camera to provide better image quality than a megapixel camera. Megapixel cameras have direct digital output meaning that there is no conversion of the video signal to analog. Whenever a video signal is converted there is a minimal data loss so it follows that a direct digital signal is superior in this regard.

Storage - Scalability & Redundancy

In DVR systems the storage capacity is determined by the hard disk space available within the unit. For most applications this storage capacity is adequate. In VMS systems the storage capacity can be scaled to meet the requirements of the system by increasing the number of network servers or by mirroring the data to other servers on the network. Likewise DVR storage can be expanded with the addition of external hardware. However the cost of additional storage is typically less for IP video systems due to the availability of "off the shelf" hardware.

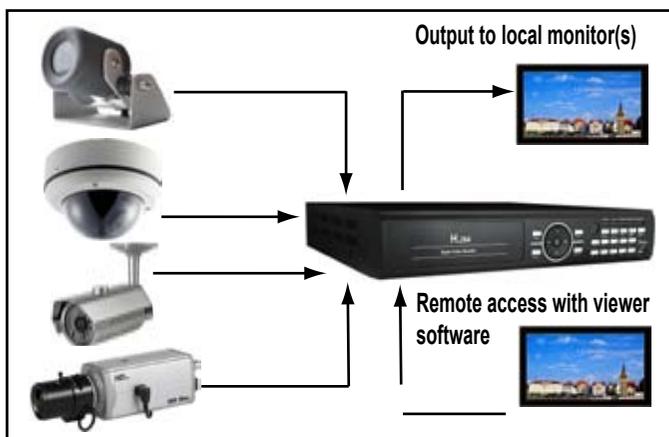


Diagram 1: Standard DVR system with analog cameras

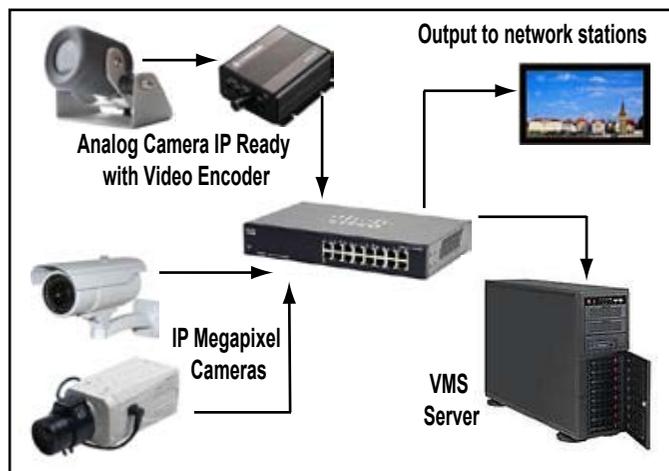


Diagram 2: NVR system with IP and Analog cameras



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System Expandability

DVR's typically provide 4, 8 or 16 channels of video. Larger DVR systems are available but ultimately the maximum number of cameras is determined by the DVR selected. Similarly the VMS platform selected will determine the maximum number of cameras that can be installed with an NVR system. Entry level VMS systems have specified limits to the number of video channels while advanced platforms (often referred to as "Enterprise" systems) can handle an unlimited number of cameras.

Quick Comparison of DVR & NVR CCTV Systems

System	Camera	Storage	Remote	Installation & Maintenance	System Cost
DVR	Analog Cameras	Internal Storage on DVR; Expandable via external RAID arrays	Full Remote Access to DVR via Internet, LAN or WAN	Dedicated cabling (coax or CAT5) for each camera. Simple installation & training of personnel in system use & maintenance.	DVR & Analog Hardware costs less than Ip Video hardware. Installation typically simpler & lower in cost especially if existing cabling in place.
HD DVR	Analog & HD Cameras	Internal Storage on DVR; Expandable via external RAID arrays	Full Remote Access to DVR via Internet, LAN or WAN	Dedicated cabling (coax or CAT5) for each camera. Simple installation & training of personnel in system use & maintenance.	Hardware costs comparable to IP Video hardware. Installation typically simpler & lower in cost especially if existing cabling in place.
NVR (IP Video)	Megapixel & Analog Cameras (using video encoders)	Network Server; Expandable by addition of servers.	Full Remote Access to each camera via Internet, LAN or WAN	Normally requires installation of a dedicated network. Requires trained IT personnel for system maintenance.	Higher camera costs. Fast PC's capable of running NVR software often cost more than DVR's. Longer install time for programming of each camera & setup of dedicated network. Installation costs typically higher.

Common Misconceptions about IP Video Systems

The Misconception	The Reality
I can use my existing network for my IP Video system.	Maybe - but probably not. According to a 2012 IPVM survey (IP Video Market Info) 76% of system integrators install a dedicated network for IP video.
Megapixel IP cameras provide better image quality than analog cameras.	Megapixel IP cameras provide higher resolution which can and often do provide higher image quality. However light problems such glare, shadows and low light can quickly reduce image quality to that of analog cameras.
I can't use analog cameras with my IP Video system.	Video encoders can make any analog camera accessible through a VMS platform. However the encoder must be compatible with the VMS software.
I can replace many analog cameras with a single megapixel camera.	Variations in light conditions and target location usually require individual cameras to be selected specifically for each location. It is true that in some cases (usually indoors) a megapixel camera may replace several analog cameras.
I'll be able to integrate all my other systems (alarm, access control etc.) with my IP video system.	This can be done but each other system must be made compatible using an API (Application Programming Interface). Getting the VMS system to work with other systems usually requires collaboration with the other system manufacturers. Compatibility issues must be thoroughly examined before the VMS system is selected.

Resources: IPVM (IP Video Market Info) provides unbiased information on IP video and CCTV in general. It is an excellent information resource. Visit them online at www.ipvm.com.

Look for the next issue of Video Installation Tips: Solutions for High Vibration Applications

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