Technician's Guide
to Networking for Security Systems

SECURITY
NETWORKING
INSTITUTE

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The "Technician's Guide to Networking for Security Systems" provides detailed information on all aspects of utilizing IP-addressed electronic security equipment, including installation planning, cabling options, proper connections, IP addressing, network device issues, and Internet connections. The following is the table of contents, and just one of thirty-three chapters, each fully illustrated.

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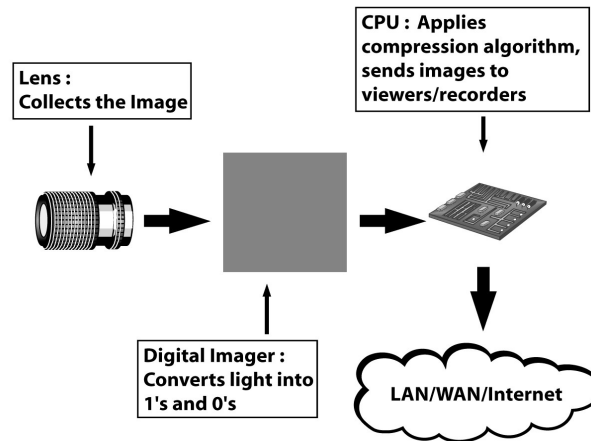## Chapter 16: Planning a Network Video System Installation

When considering a network video application, the installing company can face a wide variety of options in terms of equipment and software that can be used. To achieve a successful installation, security dealers must carefully consider bandwidth limitations, picture quality, desired monitoring and control capabilities, and potential future expansion of the proposed system. The following section will highlight potential choices of devices, and explain some general benefits or detriments of particular types of equipment.

AUTHOR'S NOTE: The following section of this manual contains references to specific products from specific vendors. These references are used to illustrate the features and applications of security networking products. The inclusion of information about a particular product in this manual is not an endorsement by the author or the Security Networking Institute of a product's functionality in any particular installation.

The cameras

Either network-enabled cameras or standard analog CCTV cameras connected to network video servers can be selected to provide the transmission of video images onto the network. Below are the pluses and minuses of each technology.

Functions of a Network Camera

Lens :
Collects the Image

CPU : Applies
compression algorithm,
sends images to
viewers/recorders

Digital Imager :
Converts light into
1's and 0's

LAN/WAN/Internet

Network camera benefits

1. Built-in Ethernet NICs or Wi-Fi transceivers- This provides a smaller form factor, less equipment to install, and possibly lower cost than the analog +video server equivalent.
2. Wi-Fi Portability- Wireless cameras can be moved or relocated throughout the Wi-Fi network's coverage area, providing temporary surveillance options for the client.
3. Built-in Web Server- Authorized users can access the camera(s) over the network using standard Internet browser software such as Internet Explorer or Netscape.
4. Quick Installation- Although not optimal, network cameras can be connected to any available Cat 5 jack using a patch cord, providing rapid installation.
5. Image Transmission Options- Some network cameras can be programmed to transmit images via email or to FTP (File Transfer Protocol) servers for storage and historical viewing
6. Motion Detection/Alarm Inputs- Some network cameras have selectable video motion detection that can provide "alarm" images when motion is detected. Also, some cameras provide optional inputs for door contacts or other alarm activation devices that can trigger the storage and transmission of "alarm" messages.
7. On Board Image Storage- Some network cameras can store alarm images themselves, which can be viewed by connecting to the camera over the network.

Network camera concerns or limitations

1. Proprietary Compression Codecs- Due to their use of different compression/decompression schemes, network cameras from different vendors may not easily interface with each other at the viewing console or computer.
2. Picture Quality/Frames Per Second- Many network cameras are limited in terms of how many images per second they will transmit, and at what quality level.
3. Lens Selection- Many lower cost network cameras have fixed lenses, and provide limited options for focusing, backlight compensation, and other video image issues.
4. Location Limitations- Many network-enabled cameras have been designed for indoor use only.
5. Recording Options- While a network camera may transmit images to an FTP site, retrieval and viewing of these images can be quite cumbersome for the system operator. An auxiliary software set may be needed to provide practical video storage and historical viewing.
6. Maximum Number of Cameras- Although there are exceptions, most network camera products are designed so that a maximum of four individual images can be viewed simultaneously on a single computer screen.
7. Limited Compression Options- Some network cameras use proprietary compression schemes that provide no options for the installing dealer. File size is dictated by the "scaling" of the image, with 640x480 providing the best image and biggest file size, while 160x120 provides a degraded picture with a much smaller file size.

Network cameras- the bottom line

Network cameras are the right choice for indoor residential and light commercial projects where there is little possibility of the system growing beyond four cameras. Wi-Fi equipped cameras, such as the Veo "Observer" and the SOHO Wireless Internet Camera, provide quick installation and flexibility of camera location. For example, parents can plug the Veo Observer into an outside AC outlet, aim it at the children playing in the back yard, and view the scene from their Wi-Fi equipped laptop, which they can carry from the kitchen to the bedroom, or anywhere within the Wi-Fi network's coverage.

Low cost network cameras may have difficult-to-use recording and historical viewing interfaces or may require specific software to view them, although some are better than others. Network cameras are simple to install and sell, as any Ethernet or Wi-Fi-equipped laptop can be used to demonstrate the camera's capabilities. Just plug in the wired camera, or program the Wi-Fi camera and laptop in "ad hoc" mode and the salesperson can demonstrate the camera right before the client's eyes.

Analog CCTV on the Network

LAN/WAN/Internet

Network Video Server
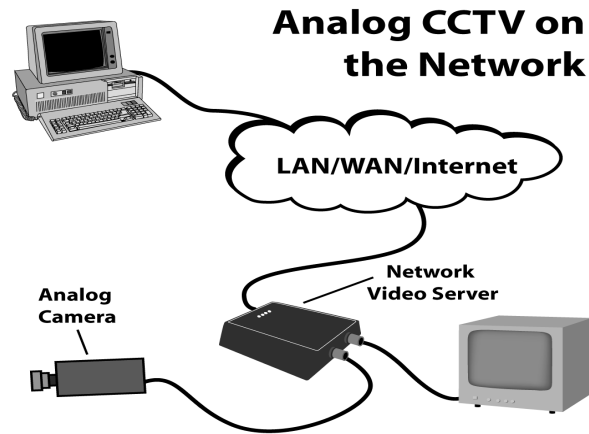
Analog Camera

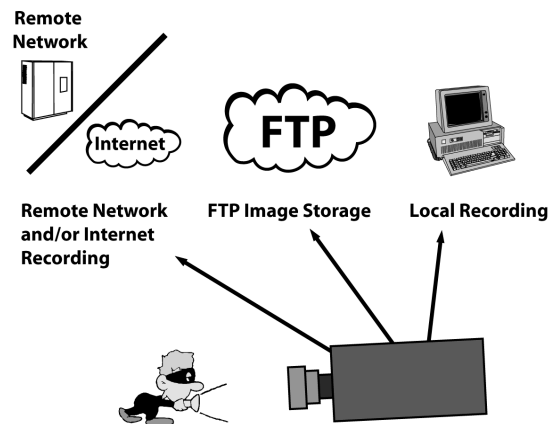### Analog camera+network video server benefits:

1. Connect to Existing Cameras and hardware- Video servers can connect existing cameras or quad viewing equipment to the network and the Internet.

2. Use any Analog Camera- Indoors, outdoors, p/t/z, all can be connected to video servers to transmit their images, and to receive control information.

3. Large Scale Networks and Systems- Video server systems can be used to connect hundreds of cameras into a single monitoring system.
4. Audio, Alarm Interfacing, other Outputs- Some video servers provide two-way audio, alarm input monitoring, and control output functions so that a single server can provide video, two-way audio, and control, all from one device.

5. Local Monitoring Capability- Some video servers are equipped with a "pass through" video connection, allowing the video signal to be transmitted over the network as well as viewed on a local CCTV monitor.

Analog camera+network server concerns or limitations

1. Cost- An analog camera and video server will likely cost more than an equivalent network camera. However, the video server generally provides more features and options than a similar network-enabled camera.

2. Proprietary Compression Codecs- As with the network camera, video servers can also utilize proprietary software for compression and decompression of video signals. As such, it may be difficult to interface video servers from one vendor with video servers from another at the viewing station.

Analog camera+network server-the bottom line

Network servers are the correct selection for large integrated systems requiring the connection of multiple cameras, access control, audio, alarm inputs, and control outputs. Existing CCTV systems can be connected to the network with video servers, pushing the images over the network while retaining local viewing on the existing CCTV monitor.

Remote
Network

Internet

FTP

Remote Network
and/or Internet
Recording

FTP Image Storage

Local Recording

Monitoring and recording options

After the selection has been made regarding the types of camera(s) or video servers to be installed, consideration must be given to how the camera's images are to be viewed, controlled, and recorded.   This is a critical issue, and is fully explored in a later section of this guide. It's important, when planning which camera technology is to be used on a particular installation, that the selected devices will provide the quality and quantity (fps) of images needed to meet the client's viewing expectations. It is also important to confirm that the video compression codec used by the camera or video server will properly function with the recording method selected.

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If you want to understand how to plan, install, program, and troubleshoot networked electronic security equipment, this guide provides the information you need. 300+ pages, 140 graphics, all presented from the security industry's perspective.

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