WHITE PAPER

Upgrading Analog Video Surveillance
with IP Technology

Panasonic Video surveillance systems

Panasonic

Table of contents

1. Introduction

With the increasing concern over better protecting people and assets, security departments are required to provide a higher level of security than before: proactive prevention, better situational awareness, earlier detection, quicker identification and prompter action. Conducting well-planned surveillance, training security staff well and ensuring good communication between all related parties is essential. Video surveillance has also become essential. Now many organizations are continually reevaluating and enhancing their video surveillance to provide optimal daily security and operational efficiency.

If you are considering the enhancement of your analog video surveillance, upgrading your analog system with the latest IP technology will increase effectiveness and efficiency. A proper update plan avoids extra costs and unwanted problems, protecting your investment in the analog system. This paper provides guidelines for a successful upgrade and migration to a future-proof IP video surveillance system for Panasonic and non-Panasonic analog system users.

2. IP technology benefits

2.1 Market trend

Technology drives business success more than ever before. Open standard-based IP and High Definition (HD) video technologies definitely have had the greatest positive impact on video surveillance. Analog systems were good but IP systems are is the future.

Worldwide forecast for analog and IP security cameras in quantities
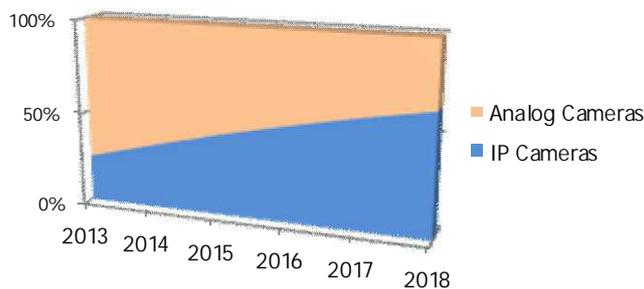
(The graph is created by Panasonic based on reliable information.)

2.2 Analog video surveillance

First, let's examine the difference between analog and IP systems. The diagrams on the next page show typical analog systems. The indoor/outdoor analog cameras, analog monitors and Digital Video Recorders (DVRs) are connected to each other through an analog matrix switcher that switches video inputs to monitor outputs. Most DVRs for small systems have some switch-

ing functions as well as a recording function. Much coaxial cable is required to connect analog equipment. Analog video surveillance systems are simple, but they offer very limited functionality and expandability.
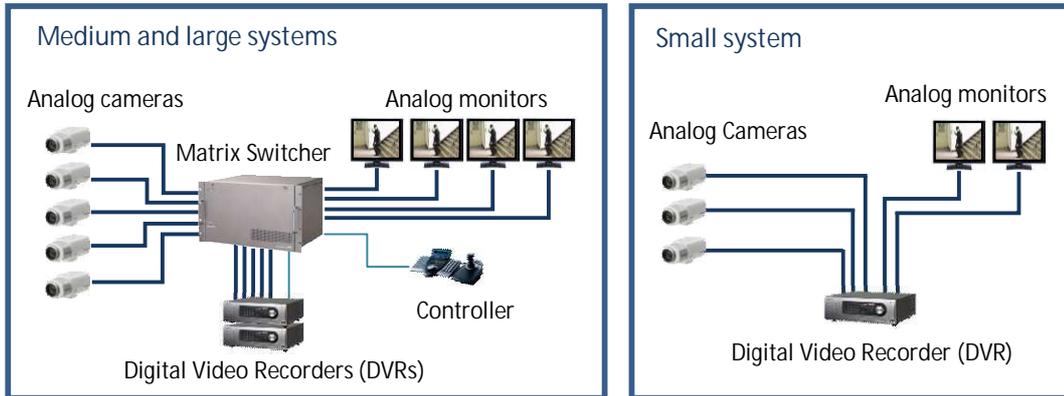
Analog video surveillance systems

2.3 IP Video surveillance

IP system diagrams are similar to IP-based data networks such as corporate networks and the Internet. All equipment, such as indoor/outdoor IP cameras, is connected by Ethernet (LAN) cables. An IP Matrix Server or Video Management System (VMS) manages the whole system. IP video surveillance can be easily networked with other sites, mobile devices and other systems such as face recognition systems. In a small installation, most Network Video Recorders (NVRs) have some IP Matrix Server/VMS functions. The IP video surveillance systems are open, feature-rich, flexible, scalable and easy-to-use.
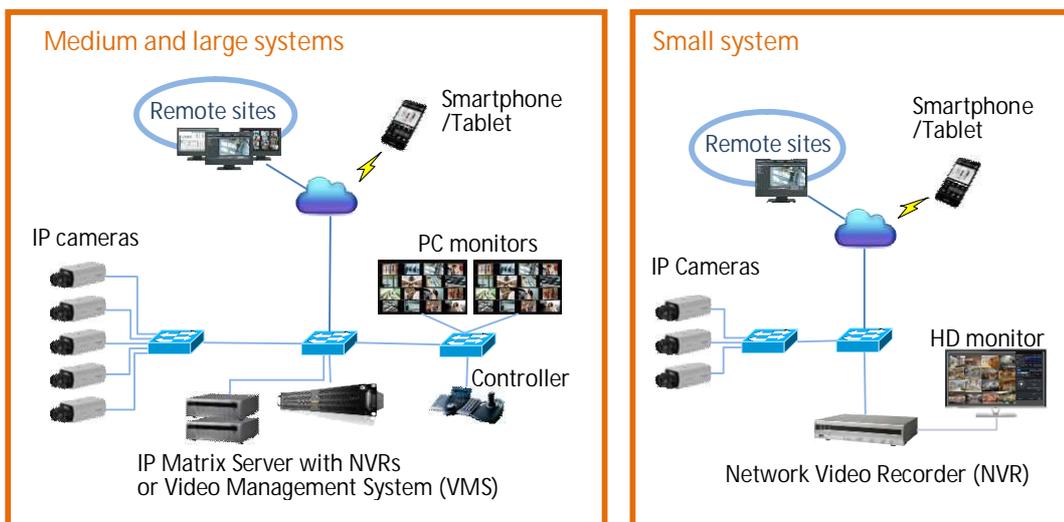
IP video surveillance systems

2.4 IP Video surveillance benefits

IP video surveillance offers countless benefits such as exceptional image quality, advanced Intelligent Video, remote and mobile monitoring, flexible and scalable systems and low Total Cost of Ownership (TCO).

-Exceptional image quality

Clear live and recorded images enable security staff to quickly identify suspicious individuals, objects and movements and act regarding the problems. While most analog cameras offer approximate 0.3 megapixel resolution, Full HD IP cameras provide over two-megapixel resolution, resulting in superb image quality. The latest 4K IP cameras offer astounding eight-megapixel resolution. With wide-angle view, IP cameras eliminate blind areas. The 360-degree IP cameras capture all-around views of the surrounding area, delivering clear fisheye, panoramic or de-warped images.

-Advanced Intelligent Video

Intelligent Video helps security staff quickly detect suspicious individuals, objects and movements, automatically analyzing the video stream and extracting useful information from images such as detected intruders. Intelligent Video also provides the new possibility of changing the video data to a business gold mine. Customer behavior is recorded and contains valuable information for improving marketing effectiveness and store operations, creating better layout designs and traffic patterns and even more. The IP system enables analyzing large quantities of video data, resulting in findings that will increase your business effectiveness.

-Remote and mobile monitoring

The IP network is a basic infrastructure for all businesses and organizations today. IP video surveillance enables monitoring your properties from anywhere on the IP network through a PC at a remote site, smartphone or tablet.

-Flexible and scalable system

IP video surveillance is easy to expand, add new functionalities such as audio monitoring and integrate with other systems when the need arises. Open standard-based IP means you are never locked in to proprietary technology, reducing the technology obsolescence risk.

-Low Total Cost of Ownership (TCO)

TCO assesses the complete cost including initial acquisition, maintenance, repairs and training. The IP system provides superior performance and advanced features for a low TCO made possible by easy installation and maintenance.

3. Upgrade strategies

You have two options: one-time migration and step-by-step upgrade. Both strategies include advantages and disadvantages.

3.1 One-time migration

All analog equipment is removed and a new IP system is installed. By deploying the new IP system at once, all IP video surveillance features are immediately available. One-time migration is simple, but can present financial challenges, especially for medium and large installations.

Advantages:
- ✓ Simple upgrade process
- ✓ Lower total cost compared to step-by-step upgrade
- ✓ Avoids problems that result from coexisting analog and IP systems

Disadvantages:
- ✓ Financial challenge for the initial investment to purchase and install all the IP equipment at once.
- ✓ Disposal loss of analog equipment that can be still used.
- ✓ Downtime till the new IP system starts (The duration depends on the installation plan.)
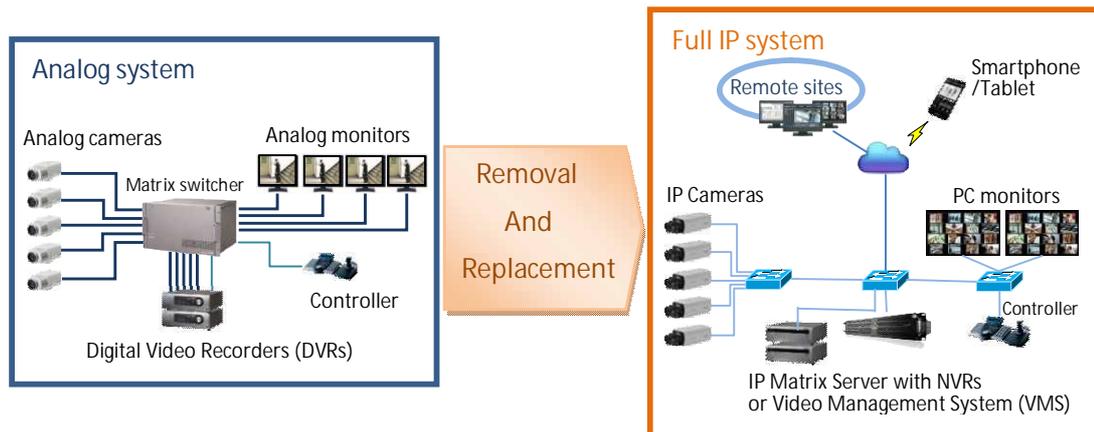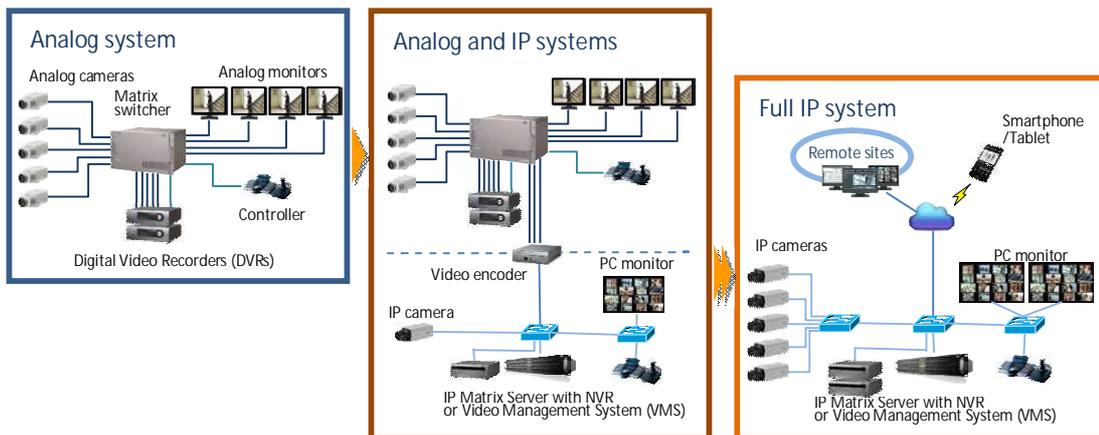

3.2 Step-by-step upgrade

A step-by-step upgrade follows a gradual approach that enables you to enhance the existing analog system at your own pace. Deploy IP equipment according to where it is needed, based on the feature and functionality requirements. Running analog and IP systems during the transition period, the video surveillance becomes a complete IP system. This scenario enables starting small according to your surveillance requirements, easing the financial burden for the initial IP equipment investment.

Advantages:

- ✓ Enhancement at your own pace
- ✓ Short downtime during migration
- ✓ Effective use of the existing analog equipment
- ✓ Ease of the financial burden for the initial IP equipment investment

Disadvantages:

- ✓ Potential problems that may result from coexisting analog and IP systems
- ✓ Expenses for migration equipment such as video encoders

4. Step-by-step upgrade plan

Panasonic provides optimal upgrade plans for Panasonic and non-Panasonic analog video surveillance users. This chapter is organized to offer specific guides for all users. Please refer to the appropriate section for your installation.

4.1 Matrix Switcher users (Medium and large systems)

This upgrade plan is appropriate for medium and large analog systems, leveraging the analog matrix switcher that medium and large systems have. The plan enables smooth migration by starting small from where necessary, easing the financial challenge of the initial investment for the IP system. When your system has a Panasonic analog Matrix Switcher and Digital Video Recorders (DVRs), please refer to section 4.3 for smoother migration.
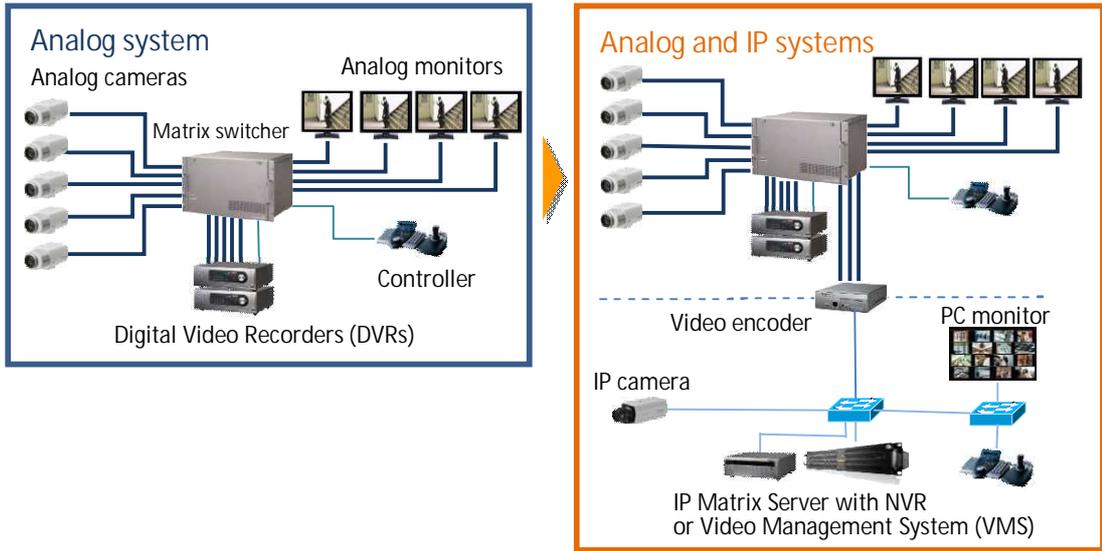
Phase 1 – Analysis and design
IP migration begins by analyzing security requirements, deciding the project goals, designing the target IP system blueprint and developing the deployment plan.

Phase 2 – First deployment
As the core of the new IP video surveillance, an IP Matrix Server with Network Video Recorders (NVRs) or a Video Management System (VMS) is installed. The new IP cameras and PC monitors are deployed where necessary. By connecting the analog Matrix Switcher to the new IP Matrix Server or VMS through the video encoders that convert analog video signal to IP video signal, both analog and IP cameras can be viewed on PC monitors.

At this phase,
✓   Both analog and IP cameras are viewed on PC monitors.
✓   Surveillance staff can use advanced IP system features on PC monitors.
✓   The analog controller still controls the analog cameras.

Analog system

Analog cameras

Analog monitors

Matrix switcher

Controller

Digital Video Recorders (DVRs)

Analog and IP systems

Video encoder

PC monitor

IP camera

IP Matrix Server with NVR
or Video Management System (VMS)

Phase 3 – Gradual expansion

Once video is networked, the IP cameras, NVRs, PC monitors and networking with remote sites or mobile devices can be introduced at a pace that works for your requirements.
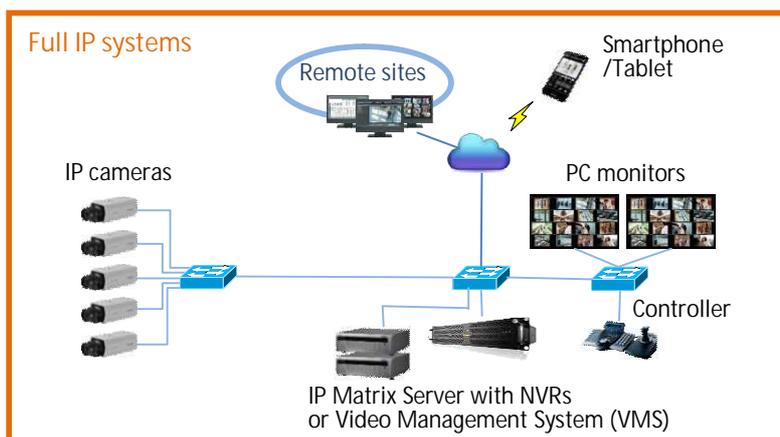
Sometimes, continuing to use the analog cable infrastructure is necessary because of factors including past huge investment for the cable, limited cable space and distance between the IP camera and operation center. The Panasonic Coaxial-LAN converter offers IP transmission over existing coaxial cables

Analog camera   Matrix switcher

Existing coaxial cable

IP camera

Coaxial-LAN converter
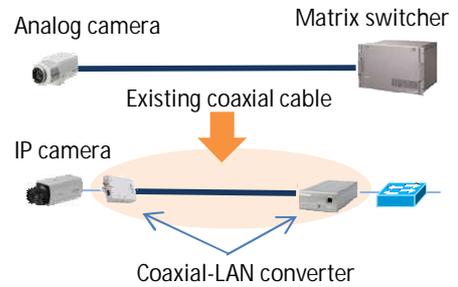
Effective use of existing coaxial infrastructure

Phase 4 – Full IP system

The system becomes a full IP system when the IP system has taken over the analog system and the analog system and video encoders are eliminated.

Full IP systems

Remote sites

Smartphone /Tablet

IP cameras

PC monitors

Controller

IP Matrix Server with NVRs
or Video Management System (VMS)

9

4.2 DVR users (Small systems)

Even small systems can use the step-by-step approach. This approach enables introducing advanced IP features and functionalities, protecting the investment in analog cameras. When your system has Panasonic Digital Video Recorders (DVRs), please refer to section 4.4 for simpler migration.

Phase 1 – Analysis and design
IP migration begins by analyzing security requirements, deciding the project goals, designing the target IP system blueprint and developing the deployment plan.

Phase 2 – First deployment
A Network Video Recorder (NVR) with an HD or PC monitor replaces the DVR and analog monitors. The analog cameras are viewed and recorded through the video encoders that convert analog video signal to IP video signal.
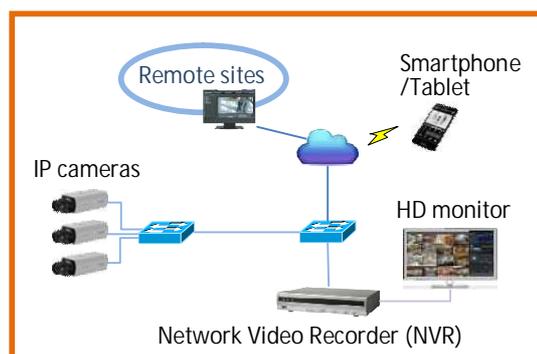
At this phase,
- ✓ Both analog and IP cameras are viewed on the HD monitor.
- ✓ Surveillance staff can use advanced IP system features on the HD monitor.
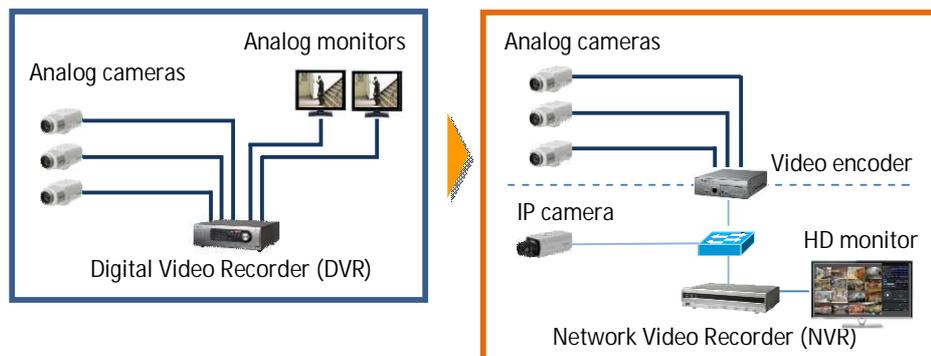
Phase 3 – Full IP system
The system becomes a full IP system when the IP system has taken over the analog system and the analog system and video encoders are eliminated.

4.3 Panasoic Matrix Switcher users

When your system has a Panasonic Matrix Switcher and Digital Video Recorders (DVRs), IP migration becomes simpler and more cost-effective. The close analog and IP integration provides surveillance staff with easy operation, enabling operating both analog and IP systems from the IP side. Equipped with a built-in encoder function, most Panasonic DVRs help save on migration costs, eliminating the need to purchase video encoders.

### Phase 1 – Analysis and design
IP migration begins by analyzing security requirements, deciding the project goals, designing the target IP system blueprint and developing the deployment plan.

Phase 2 – First deployment
As the core of the new IP video surveillance, a Panasonic IP Matrix Server with Network Video Recorders (NVRs) is installed. The new IP cameras and PC monitors are introduced according to your migration plan. Due to the close analog and IP integration between the Panasonic Matrix Switcher, DVR and IP Matrix Server, the existing analog system comes under the control of the new IP system.

At this phase,
- ✓ Both analog and IP cameras are viewed and controlled from the PC monitors.
- ✓ Surveillance staff can use advanced IP system features from the PC monitors.
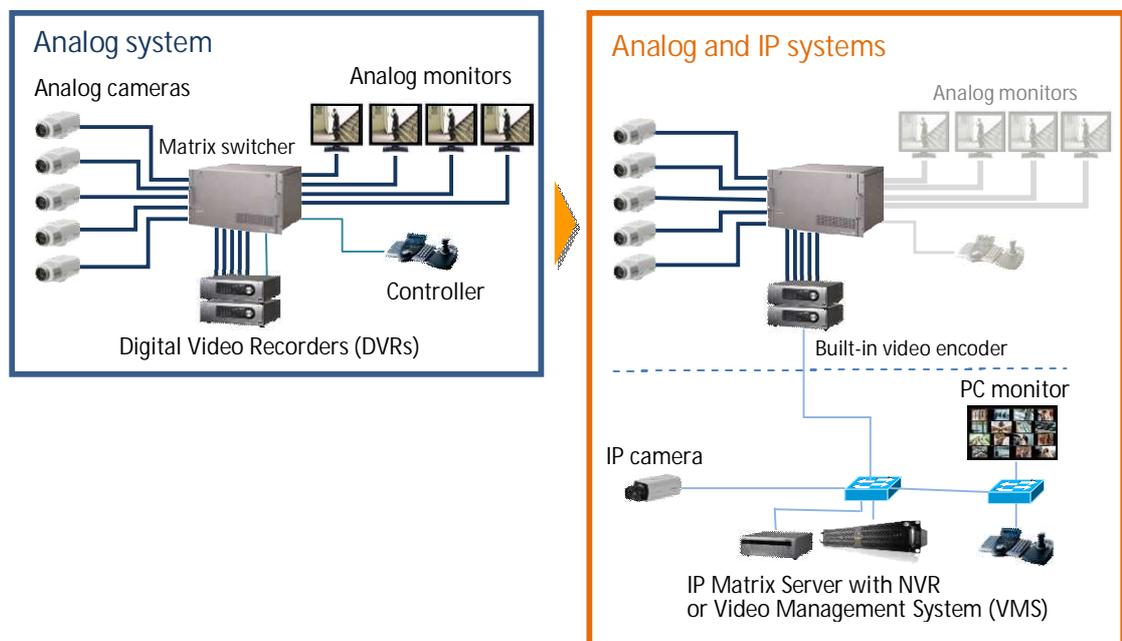
Phase 3 – Gradual expansion

Once video is networked, the IP cameras, NVRs, PC monitors and networking with remote sites or mobile devices can be deployed at a pace that works for your requirements.

Sometimes, continuing to use the analog cable infrastructure is necessary because of factors including past huge investment for cable, limited cable space and distance between the IP camera and operation center. The Panasonic Coaxial-LAN converter offers IP transmission over existing coaxial cables.
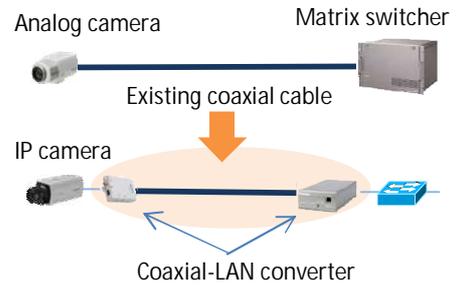
Effective use of the existing coaxial cabling

Phase 4 – Full IP system

The system becomes a full IP system when the IP system has taken over the analog system and the analog system and video encoders are eliminated.
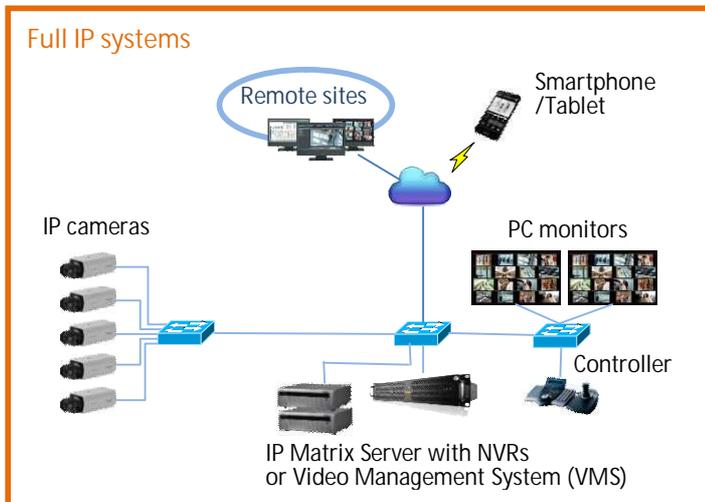
4.4 Panasonic DVR users

When your system has a Panasonic Digital Video Recorder (DVR), IP migration becomes more cost-effective. Equipped with a built-in encoding function, most Panasonic DVRs save the migration costs, eliminating the need to purchase video encoders.

Phase 1 – Analysis and design
IP migration begins by analyzing security requirements, deciding the project goals, designing the target IP system blueprint and developing the deployment plan.

Phase 2 – First deployment
A Network Video Recorder (NVR) with a PC monitor is installed, using the existing DVR as a recorder and video encoder for analog cameras.
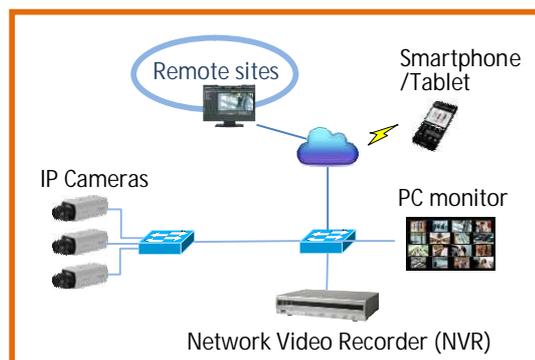
At this phase,
- ✓ Both analog and IP cameras are viewed on the PC monitors.
- ✓ Surveillance staff can use advanced IP system features from the PC monitors.
- ✓ The analog camera footage is recorded on the existing DVR. (The recorded footage is played back on the PC monitor.)
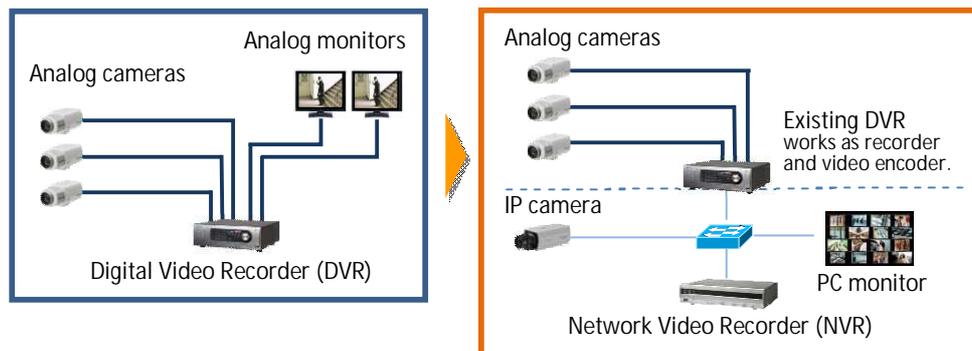
Phase 3 – Full IP system
When IP cameras replace all analog cameras, the DVR can be eliminated.

5. Equipment supporting IP migration

5. 1 Video Encoder

Video Encoders enable integrating your existing analog system with a new IP system, converting analog video signal to IP video signal. The Panasonic WJ-GXE500 Video Encoder delivers clear images with 3D Interlace-to-Progressive conversion and cable loss compensation. The compact WJ-GXE100 Video Encoder can be installed where convenient, including in an outdoor camera housing or outdoor power box, on a wall or ceiling or in a room.

- ✓ Clear digitalized images
- ✓ Easy-to-install
- ✓ Space-saving design (19-inch rack mountable)

WJ-GXE500 4-channel Video Encoder

- ✓ Compact
- ✓ Easy-to-Install

WJ-GXE100 1-channel Video Encoder

5.2 Coaxial-LAN converter

If you want to keep using the existing coaxial cable, the Panasonic BY-HPE11KT Coaxial-LAN converter enables IP transmission over coaxial cable. Electric power can be supplied to the IP camera through the coaxial cable.

- ✓ Effective usage of existing coaxial infrastructure
- ✓ Long distance connection (up to 2 km or 1.2 mile)

BY-HPE11KT Coaxial-LAN Converter (Left: Camera-side unit, Right: Center unit)

5.3 Video Decoder

The Video Decoder enables viewing IP cameras without a PC, converting IP video signal to HDMI or analog video signal. It is suitable for places such as remote sites.

- ✓ PC-less IP camera monitoring

WJ-GXD400 Video Decoder

6. IP System solution

6.1 IP Matrix Server

The Panasonic System 970 i-PRO Management System is a feature-rich, high-reliable, scalable and flexible IP-based video surveillance management system that manages up to 2,048 IP and analog cameras, up to 64 IP and digital recorders, application servers and more. Designed based on distributed system architecture, the System 970 is ideal for medium to large installations and multi-site systems. The System 970 offers smooth and cost-effective migration from an analog video surveillance system to an IP system.

6.2 VMS flexibility

Many industry-leading video management system (VMS) companies participate in the Panasonic System Developer Network (PSDN) partner program. These seasoned partners provide excellent video management solutions with unique features and functionalities.

7. Conclusion

IP video surveillance systems provide tremendous benefits including exceptional image quality and advanced functionalities. Due to these benefits, migration to IP system is only a question of time. Thanks to Panasonic's global support infrastructure, Panasonic can help you with the perfect video surveillance solution for your business no matter where your analog system is.

For more information about Panasonic video surveillance cameras and solutions, please visit us at http://security.panasonic.com.

About Panasonic System Networks Co., Ltd

Panasonic System Networks Co., Ltd. is a subsidiary of Panasonic Corporation. The company was newly launched in 2013 by merging three companies: Panasonic System Networks Co., Ltd. and Panasonic System Solutions Infrastructure Co., Ltd., which were engaged in product development and manufacturing, and Panasonic System Solutions Japan Co., Ltd., which marketed a variety of system solutions.

The new company offers everything from development and manufacturing to sales, implementation and maintenance. By leveraging the full capabilities of this comprehensive enterprise to help you resolve your problems and provide you with countermeasures, Panasonic System Network Co., Ltd can enable you to become more competitive while simultaneously developing and expanding your potential. Our wealth of image processing and communication technologies, backed by manufacturing knowhow, a versatile product range and IP expertise enable us to provide you with the system proposals that you deserve.

Version 1.00