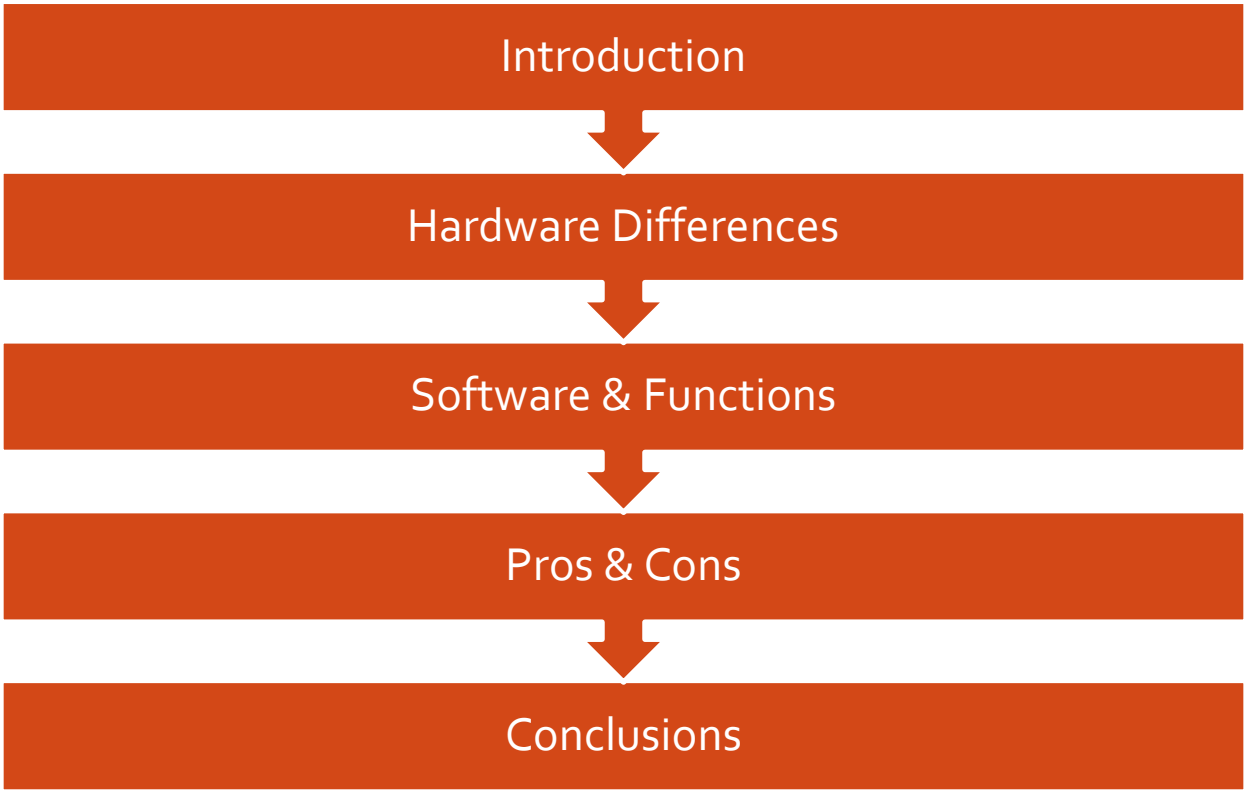
VIDEO SURVEILLANCE

Differences between IPVS and CCTV

Presented by Mao Cai, Smily Yu-Cheng Lin

Overview


Introduction
Hardware Differences
Software & Functions
Pros & Cons
Conclusions

Introduction

This presentation demonstrates the differences between IPVS (IP Camera + NVR) and CCTV (Analogue Camera + DVR) in terms of technology and functions. Also comparing the advantages and disadvantages of these two systems.

Hardware Differences

- Input device
- Medium
- Recorder

Software & Functions

Pros & Cons

- IPVS vs CCTV

Video Surveillance

Use of technology for monitoring purposes:

- Security monitoring
- Traffic control
- Crowd congregations

Locations:

- Building entrances
- Receptions
- Public places

Two types of VS systems

- CCTV
- IPVS

CCTV

CCTV – Closed Circle Television

A traditional solution for monitoring system.

- Analogue Technology
- Analogue cameras
- Coaxial cable
- Has been digitized
  - Analogue cameras
  - DVR – stroaged as digital format
- Dominant among the market

Two types of VS systems

- CCTV
- IPVS

IPVS

IPVS – Internet Protocol Video Surveillance

- A modern version of CCTV
- Fully digitized
- Based on IP (e.g. Uses network)
- IP cameras
- NVR – connets to network

Two types of VS systems

- CCTV
- IPVS

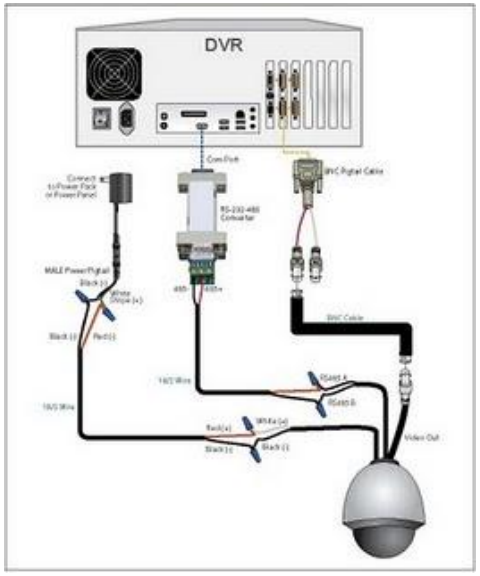
Hardware Differences

Similar structures

Different hardware and technologies

Hardware Differences

- Input device
- Medium
- Recorder/Displayer



Hardware Differences

CCTV – Analogue Camera

- Analog technology has been almost fully developed
  - Stable
  - Cheaper
  - Compatibility
- Technology limitation
  - Unencrypted signal
  - Resolution problem
    - 0.4megapixels
  - Interlacing problems
    - Interlaced lines – impossible to catch fast moving objects clearly.

Hardware Differences

- Input device
- Medium
- Recorder/Displayer

Hardware Differences

IPVS – IP Camera (Digital)

- Standard IP Camera
  - A camera + a chip
- IP based, digital technology
  - Capturing
  - Compression
  - Encryption – good use of IP/TCP features
  - Fragmentized, send out
- Newer Technology
  - Megapixels Resolution
  - High cost of camera and bandwidth

Hardware Differences

- Input device
- Medium
- Recorder/Displayer

Hardware Differences

Signal transmission in CCTV

- coaxial cable
- Low cost per unit but:
  - Complex wiring
  - Medium is not shareable
- Unavoidable problems
  - Can be interfered – limited by electronics
  - Signal attenuation

Type of coaxial cable	Maximum length	Cable diameter
RG59U	220m	0.63cm
RG6U	450m	0.7cm
RG11U	540m	1cm

Hardware Differences

- Input device
- **Medium**
- Recorder/Displayer

Hardware Differences

Data transmission in IPVS

- Standard network cable
  - Medium is shareable
  - No additional cable needed
  - Data transmitted via IP packets
  - Easier wiring – wired or wireless
- Security
  - Cannot be interfered easily
  - Less signal attenuation
- Power of Network
  - Establish communication easily
  - IEEE POE (power over Ethernet)

Hardware Differences

- Input device
- **Medium**
- Recorder/Displayer

Hardware Differences

DVR – Digital Video Recorder

- Digitized at the final stage
  - Switcher or Multiplexer
  - Conversion
  - compression
  - Storage
- Limited number of cameras per DVR
- Local only
  - Both recorder and displayer must be connected by specific cable to CCTV system

Hardware Differences

- Input device
- Medium
- Recorder/Displayer

Hardware Differences

NVR – Network Video Recorder

- Digital System
  - Simple as a PC – repair, develop
  - Decoded
  - Storage
  - Transmission and distribution across network
- Remote access
  - Can be recorded or viewed at any time at any place with internet working
- Must defense from hacking

Hardware Differences

- Input device
- Medium
- Recorder/Displayer

Software & Functions

CCTV has achieved the basic requirements of video surveillance.

- Monitoring
  - By human
  - Quality denpends on signal
- Recording
  - Use tapes or disk
  - Quality depends on signal
  - Cannot cover all
- Do more? – no

Software & Functions

- CCTV
- IPVS

Software & Functions

IPVS has extended all functions of CCTV

- Advanced technology
  - Motion detection recording
  - Time scheduled recording
  - Video analyzing
    - Crime detection by human actions
    - unmanned surveillance is achievable
- More requirements could be achieved by developing new software

Software & Functions

- CCTV
- IPVS

Software & Functions

IPVS has extended all functions of CCTV

- Advaned play back system
- Parallel systems
  - More than one recorders (local and remote NVR)
  - Can be viewed outside the local network
  - Upgrading without scheduling down time

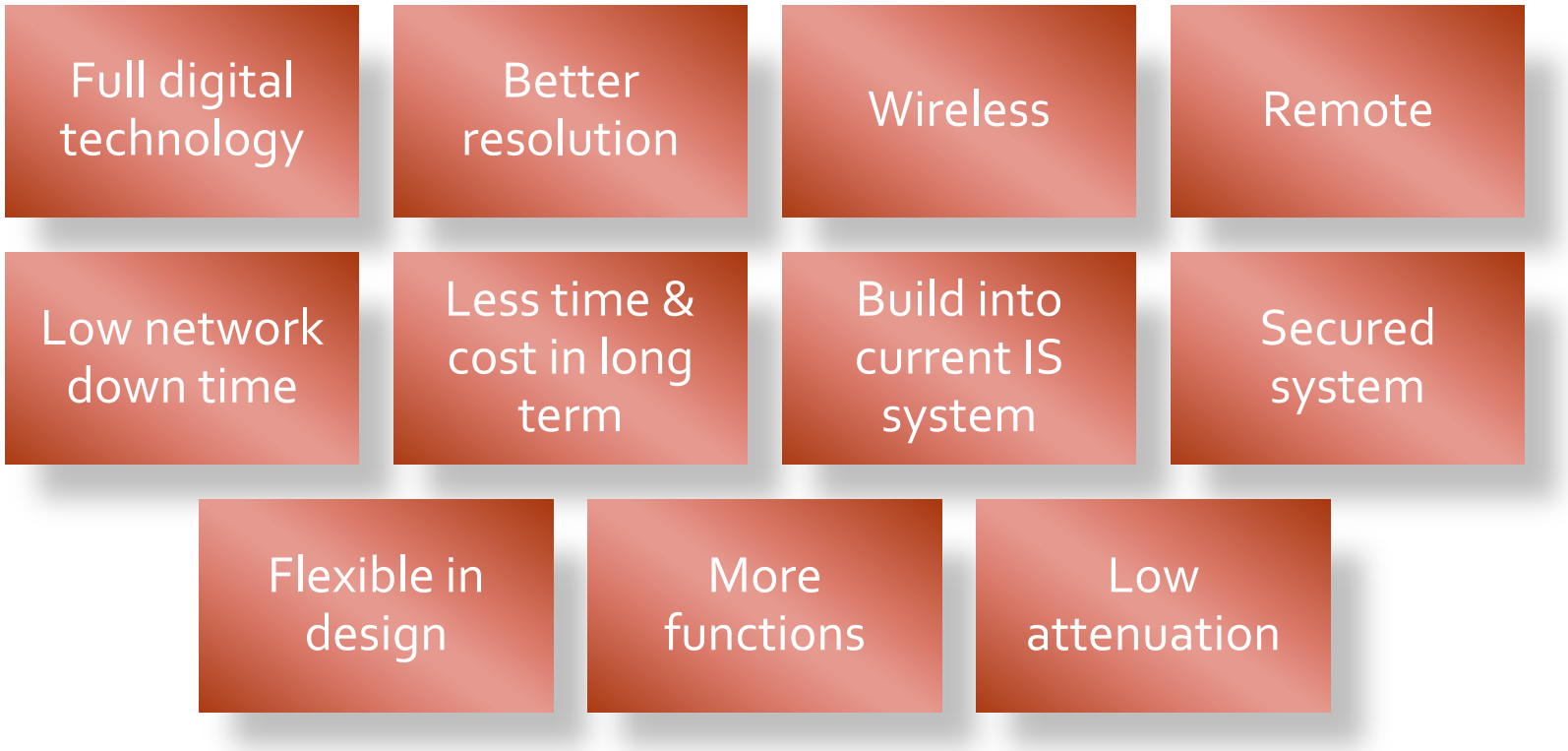
Software & Functions

- CCTV
- IPVS

Advantages of CCTV

- Low hardware cost
- Large variety of design
- Higher dynamic range
- Lower technique needed
- Easy to use

Advantages of IPVS



Disadvantages of CCTV

- Quality cannot be guaranteed
- Low video resolution
- Limitation on distance
- Infereance
- Extra hardware cost
- Complex wiring
- Limited functions
- System is vulnerable
- Remote control is hard to achieve
- More time on installation

Disadvantages of IPVS

- High cost of cameras
- Less choice of manufacturers
- Compatibility problems
- Huge bandwidth required
- Hard to setup
- Internet security problems

Users of Video Surveillance

- Bank
- Jail
- Hospital
- Education provider
- Groverment instiution
- Residential building
- Enterprise, retail & supermarket
- And more…

Images from http://www.cnz.co.nz/

Users of Video Surveillance

In most situations CCTV has been used, because it is an early technology and well known.

But it seems that IPVS is more suitable than CCTV…

Except for places that

- have no valueable items
  - Small grocer
- have been abandoned
  - Displaced factory

Choose CCTV or IPVS

CCTV

You do not need to pay additional wages to a network engineer to build (or rebuild current) VS system, but you do need at least one operator and one installer.

You need to hire a CCTV technician for repairments

IPVS

You may need to spend a lot of money on network design and installation, but you can hire a staff from your current IT support departments to do the installation and operation.

IT support can solve most problems

Choose CCTV or IPVS

CCTV

Cameras and viewer connected by cables like a cabled TV.

Video quality same as TV quality, it is clear enough for human monitoring
IF: Low traffic, short length of cables

IPVS

Components connected by network cables or wireless – you can use your current network cable.

Resoulation of video (1280*1024) is high enough for human monitoring with good quality and video analytic software, without conditions.

Choose CCTV or IPVS

CCTV

Cameras, viewer and recorder must be physically connected by cables, so you need to be at specific area to view and record the video.

IPVS

Components are connected into networks, so you can view and record the video at any place.

Conclusions

- IPVS has more features than CCTV
- If user already has a CCTV system and low security requirements, no upgrading needed
- New VS user with higher security requirement is suggested to choose IPVS because of lower long term cost etc.
- If user already informationized, IPVS is the best choice
- IPVS and CCTV in New Zealand market in future.

ThankYou

Questions?