Cisco Physical Security Video Surveillance

Osama I. Al-Dosary

Consulting Systems Engineer
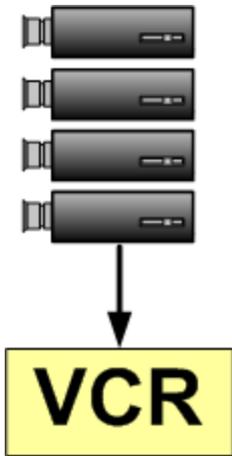
dosary@cisco.com

Agenda

- Trends and Evolution

- Open IP Components

- Cisco's Solution

- Deployment Models

- Other Design Considerations

- Summary

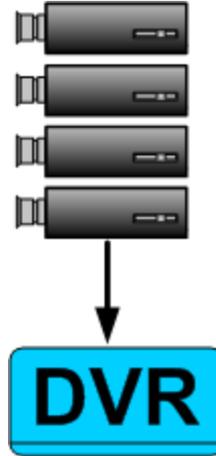# Trends and Evolution

Video Evolution

Analog Cameras

Analog Cameras

Analog Cameras

Multi-Format Cameras

Remote Storage

VCR

DVR

NVR

Cisco **Enabled Storage/ Archiving**

Local NAS

Secure Offsite Archiving

DVR

Legacy System Integration

Open IP Platform

VCR & Analog
- Standalone box
- Poor image
- Hard to search
- No remote access
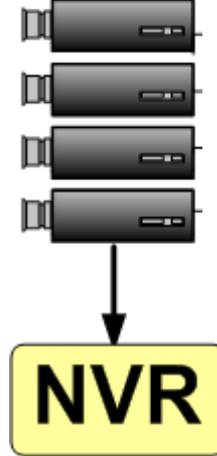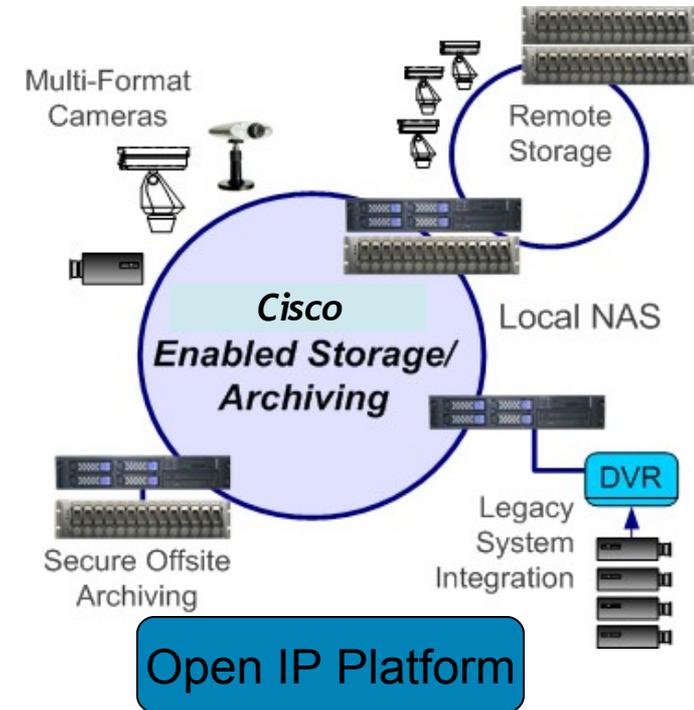
DVR
- Easier to search
- Consistent Quality

NVR
- DVR benefits
- More storage options
- Limited network connection

Cisco Video Surveillance Platform
- Secure viewing from anywhere
- Fail-safe redundant storage
- Easy integration with other systems
- Enterprise class storage and support

Open IP Components

Solution Components: Infrastructure

- **Network**
  TCP/IP network, typically on Ethernet.
  Conventional switches and routers.

- **Storage**

  Redundant RAID storage

  Direct Attached, SAN or iSCSI

Solution Components: Cameras and Applications

- **Video Encoders/IP Cameras**
  Source of digital video over IP.
  Compressed MJPEG, MPEG2, MPEG4.

- **Video and Application Servers**
  Open servers for streaming video between cameras, storage and viewers. May also run a Web server or application sever for delivering a Web application.

  (e.g. VSMS - VSOM – VSVM)
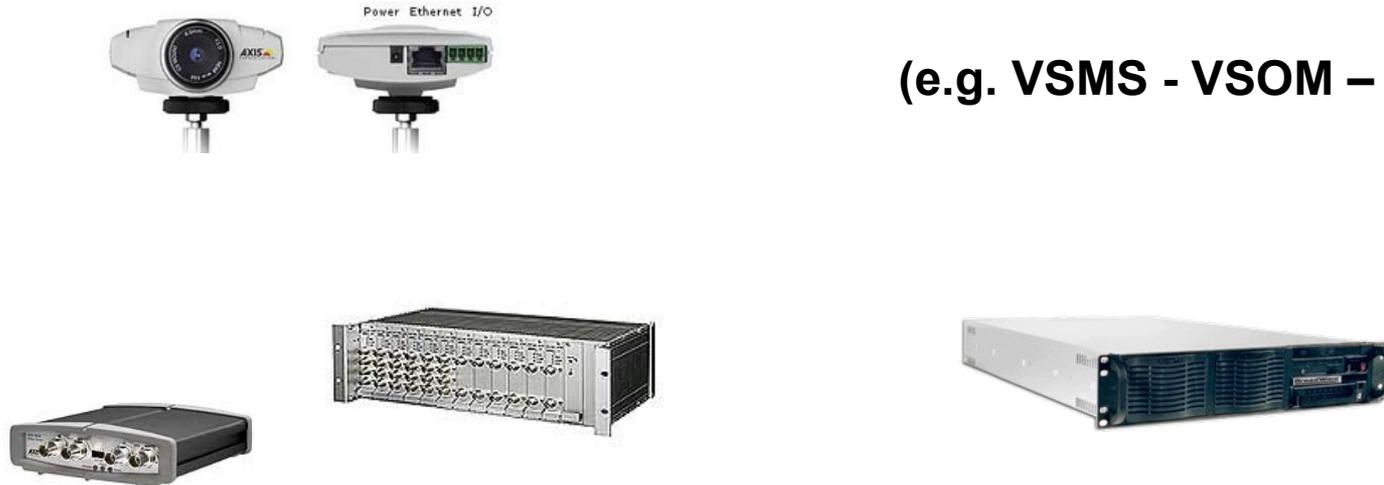
Solution Components: Client Side

- **Client Stations**

  Windows PCs for video decoding, display and control. Running Web browsers or specialized Windows applications.

Cisco's Solution

Video Surveillance Media Server (VSMS)

- Video Surveillance Media Server is the core component in the Media Platform, enabling distribution, archiving and management of video feeds.

    Make video an information resource

    VSMS

    Proxy and stream live feeds

    Store and stream recorded media

    Infinitely customizable

    Add custom UIs

    Use best-of-breed codec: Motion JPEG, MPEG-2, MPEG-4

    Highly Scalable – Cameras, Clients, Storage
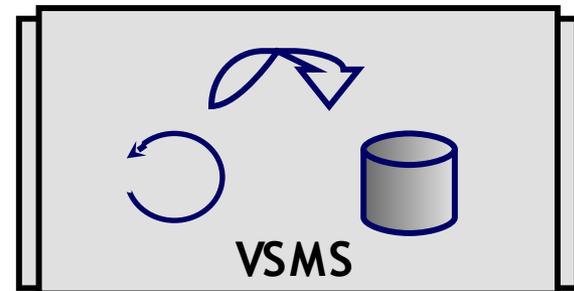
    Share IT Infrastructure intelligently – Storage Systems and Bandwidth
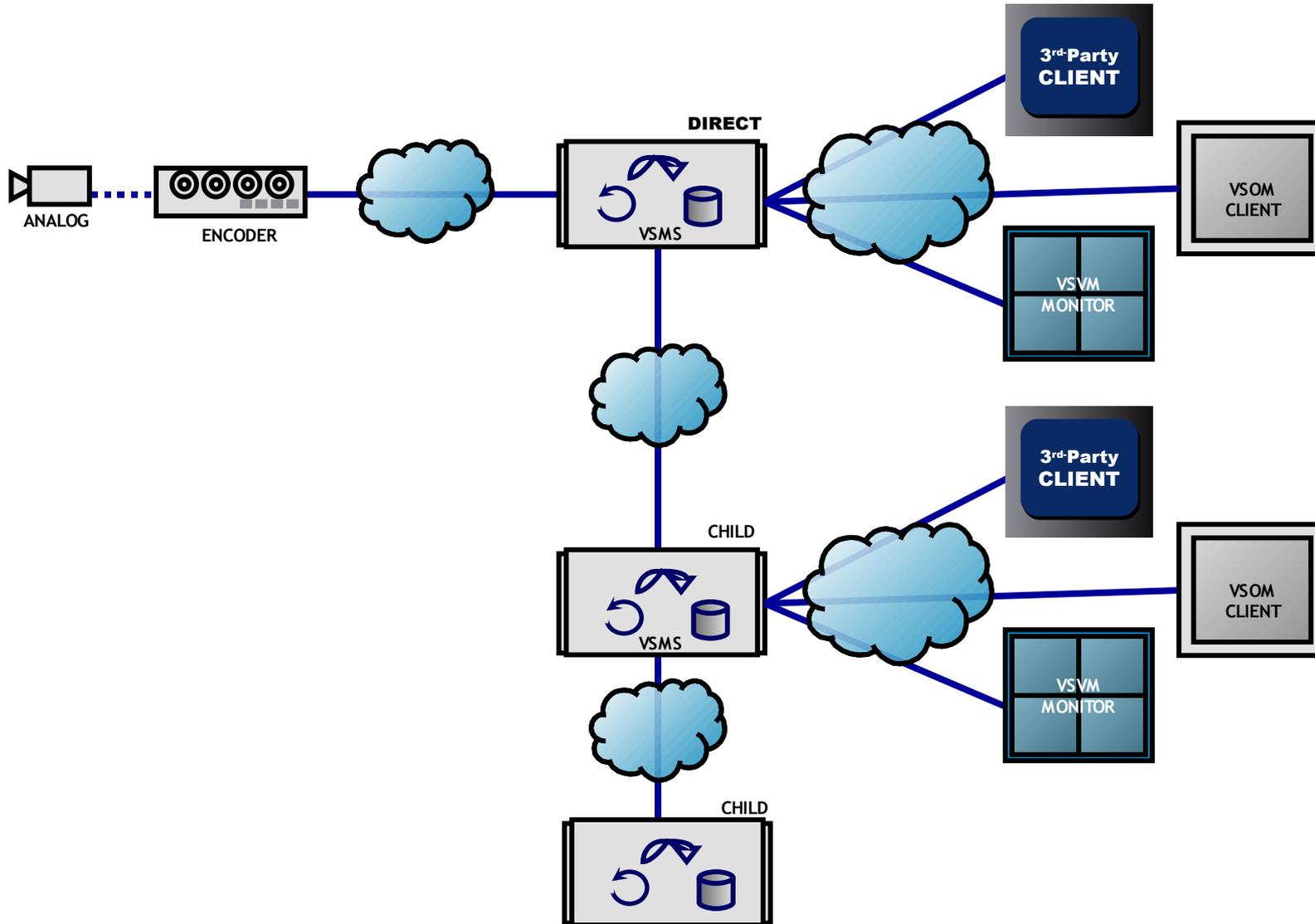
    Open and distributed

    Integrate with other systems

    Expand system as needed

    Harden System as needed (fail-over and redundancy)
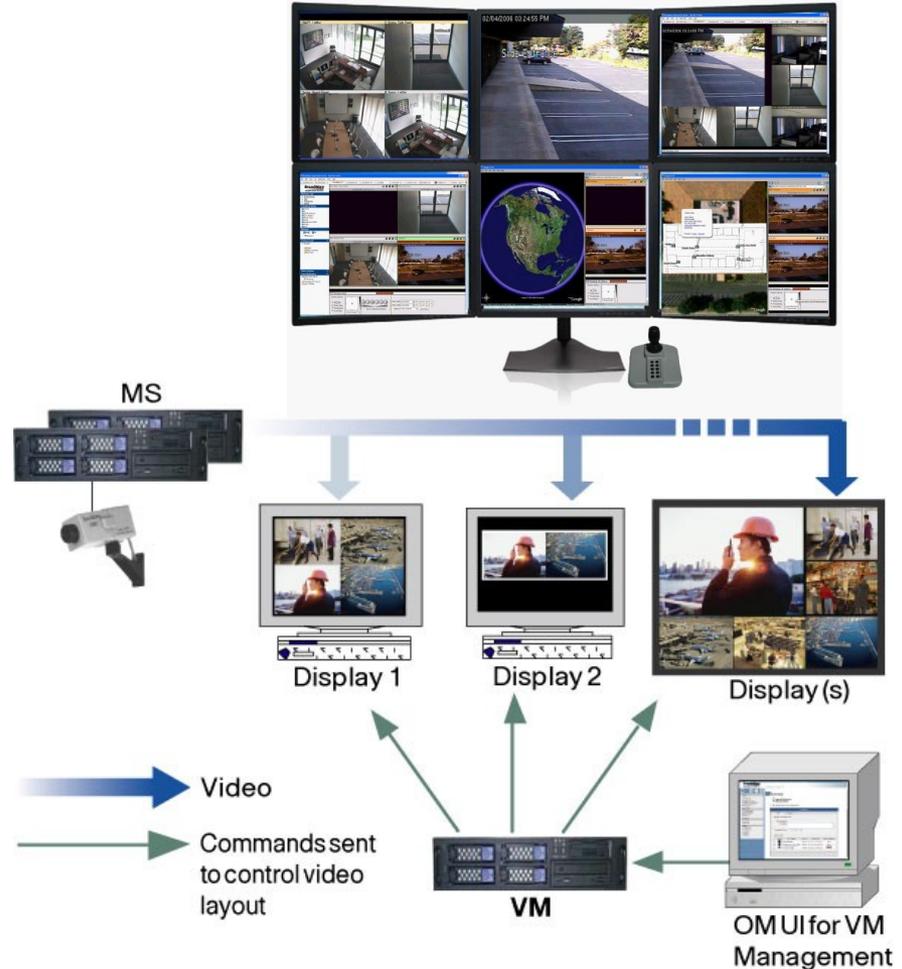
Proxy-to-Proxy

Video Surveillance Operations Manager (VSOM)

- Enterprise solution

- Highly configurable to effectively manage complex video applications

- 100% browser-based UI

- Multiple web-based consoles to configure, manage, display, and control video throughout a customer's IP network.

- Unlimited cameras, storage, viewers

Video Surveillance Virtual Matrix (VM)

- Controls an infinite number of video displays on network

- Easily integrates with other systems

- Flexible delivery of live & archived video

- Distributes to Video Wall

- Controls multiple video displays from a single station

- Event/Action

  Push video to remote screens

MS

Display 1   Display 2   Display (s)

→ Video

→ Commands sent to control video layout

VM

OM UI for VM Management

New line of Multiservice Platforms

- Leading Multiservice and IP Network capabilities
- Industry standard hardware
- Cost Effective, flexible for distributed systems

Video Management and Storage System

Analog Video Encoding Module

Cisco 3200

Mobile Solution

Cisco 2821

Cisco 2851

Multiple Services

Extended Modular Connectivity

Cisco 3825

Cisco 3845

High-Density Services

Modularity with Performance Optimized for "All-in-one" Solution

Cisco Multiservices Platform

1RU

Up to 4TB
~ 50 streams

Cisco Multiservices Platform

2RU

Modular storage
Up to 12TB

Cisco Multiservices Platform

4RU

Modular storage
Up to 24TB
Resilient

Enterprise Branch Office

Enterprise Campus

Scalability, Resiliency, Serviceability

Multi-Services Platform (MSP)

# Integrated Services Router (ISR) Video Surveillance Modules


EVM-IPVS-16A: Analog Video Encoding Module

NME-VMSS: Video Management and Storage System
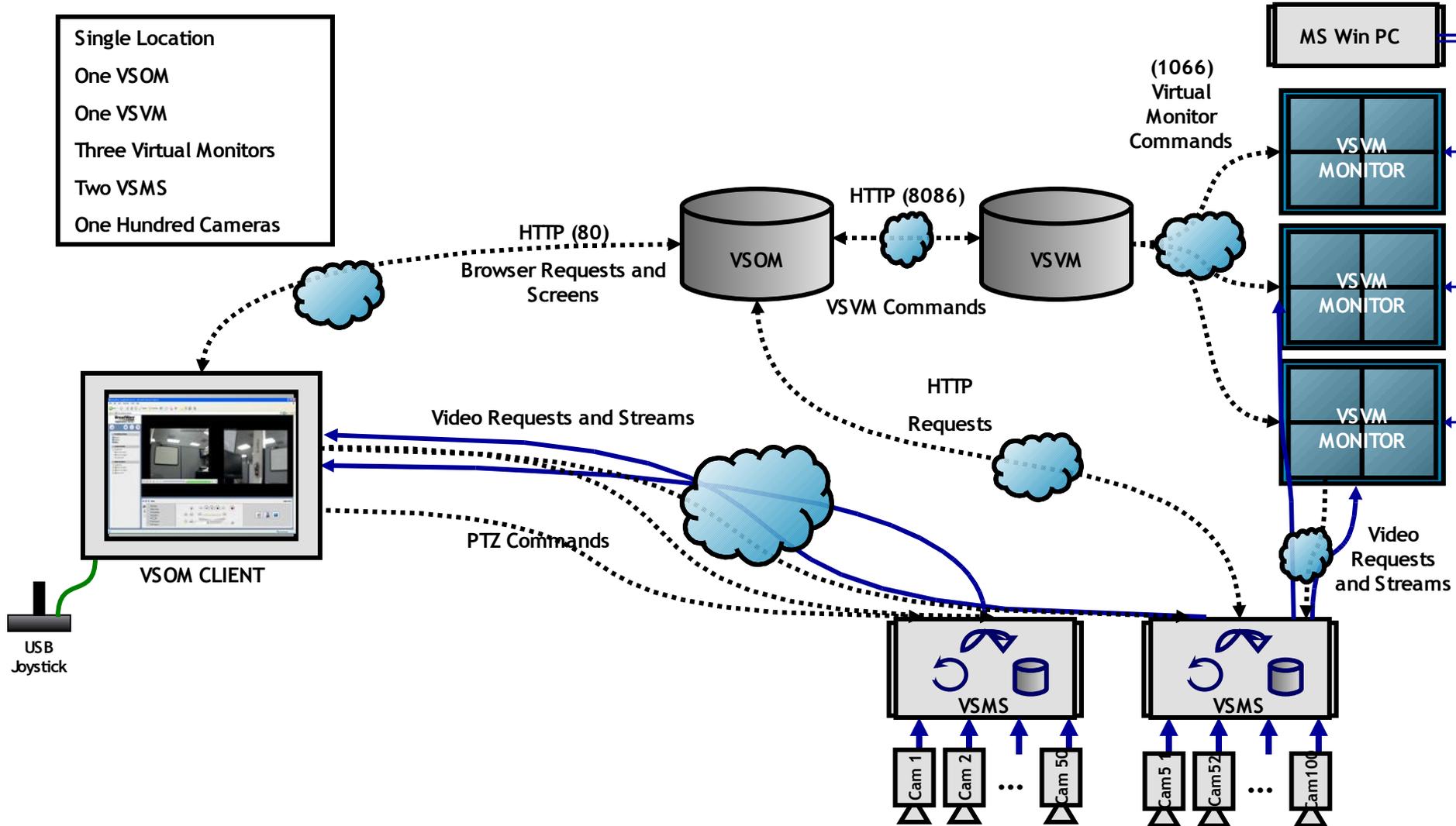
Cisco IP Video Surveillance Solution

Cisco 3845

Cisco 3825

Cisco 2851

Cisco 2821

High-Density Services

Multiple Services

Extended Modular Connectivity (EVM, NM, AIM, WIC/VIC)

Modularity with Performance Optimized for "All-in-one" Solution (HSDM, NM, EVM, AIM, WIC/VIC)

Enterprise Branch Office
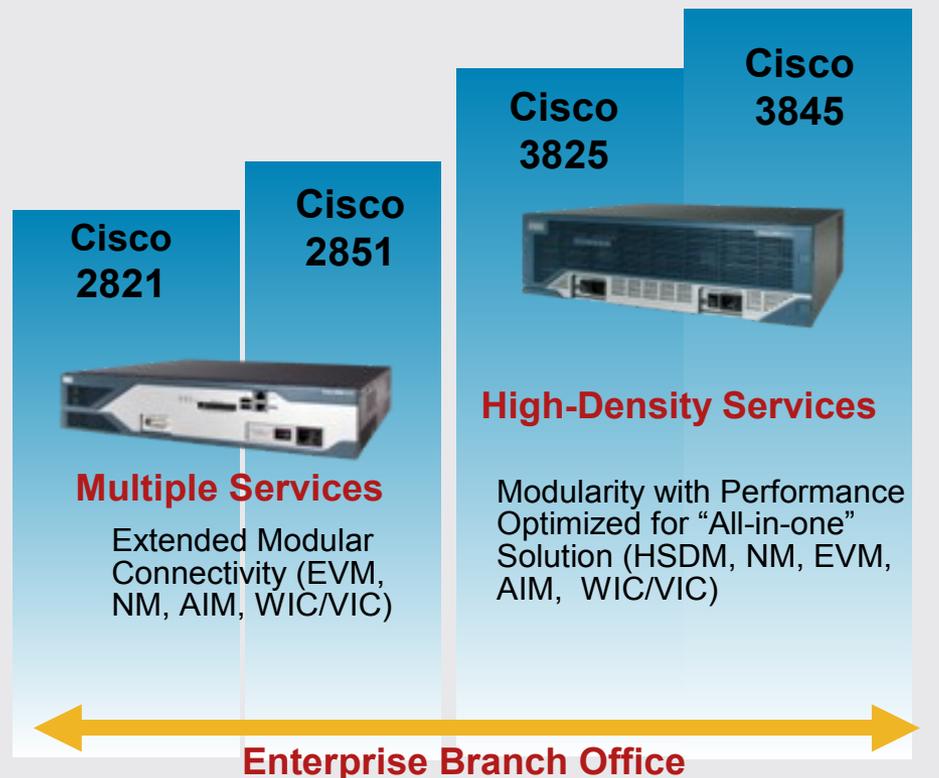
Cisco IP Video Surveillance Cameras and Encoders
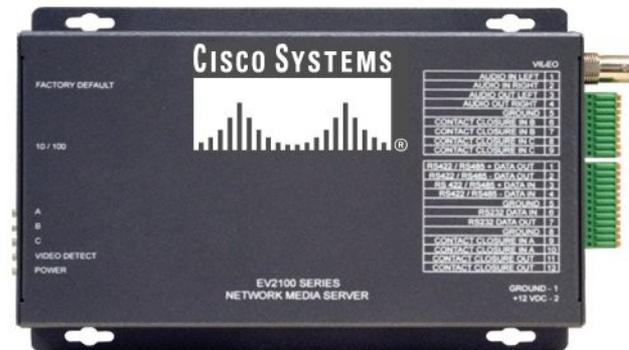
Deployment Models

# Single Site System Example Diagram

Single Location

One VSOM

One VSVM

Three Virtual Monitors

Two VSMS

One Hundred Cameras

MS Win PC

(1066) Virtual Monitor Commands

HTTP (8086)

HTTP (80) Browser Requests and Screens

VSOM

VSVM

VSVM Commands

VSVM MONITOR

VSVM MONITOR

VSVM MONITOR

HTTP Requests

Video Requests and Streams

PTZ Commands

VSOM CLIENT

USB Joystick

Video Requests and Streams

VSMS

VSMS

Cam 1 Cam 2 ... Cam 50

Cam 5 1 Cam 52 ... Cam100
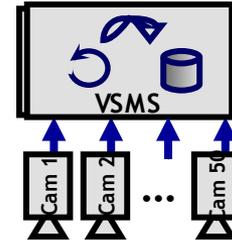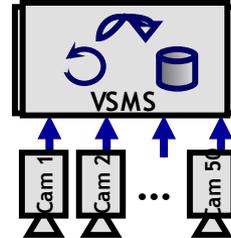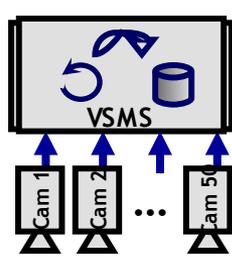
Multi-Site With Central Command & Control

10 Locations

One VSOM

One VSVM

Three Virtual Monitors

11 VSMS

Five Hundred Cameras
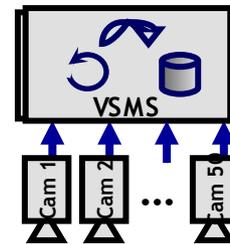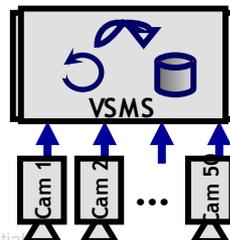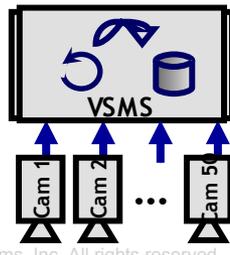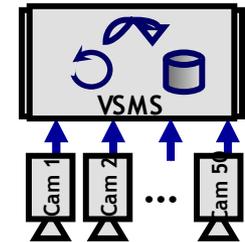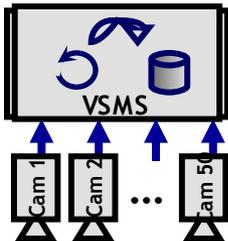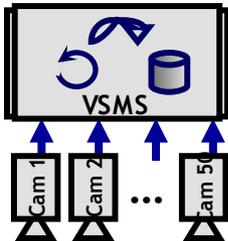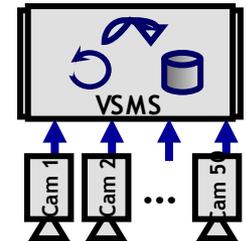
Design Considerations

Video Resolution

Dimensions	Resolution
VGA	**640 x 480**
SVGA	**800 x 600**
XGA	**1024 x 768**
QCIF	176 x 144
CIF	352 x 288
2 CIF	704 x 288
4 CIF	704 x 576
D1	720 x 576
HD 720	1280x720
HD 1080	1920x1080

Resolution Comparison
CIF [VCD] Resolution (352x240) vs. 1080 (1920x1080)

Resolution Comparison
4CIF/D1 [SDTV] Resolution (720x480) vs.1080 (1920x1080)

Resolution Comparison
1080 (1920x1080)

HD Cisco Video Surveillance IP Cameras 4X00 Series

- 1080p (1920 x 1080) 30 FPS

- 720p (1280 x 720) 60 FPS

- H.264, MJPEG Compression

- USB Memory Card

- IPv6 Capable

- Dedicated Digital Signal Processor (DSP) for Video Analytics

- 4 Models:

  CIVS-IPC-4500 (DSP)

  CIVS-IPC-4500W (DSP)

  CIVS-IPC-4300W

  CIVS-IPC-4300

Example Storage Calculations

Initial System Requirements:

Compression: MPEG4

Resolution: 4CIF

Frame Rate: 15fps
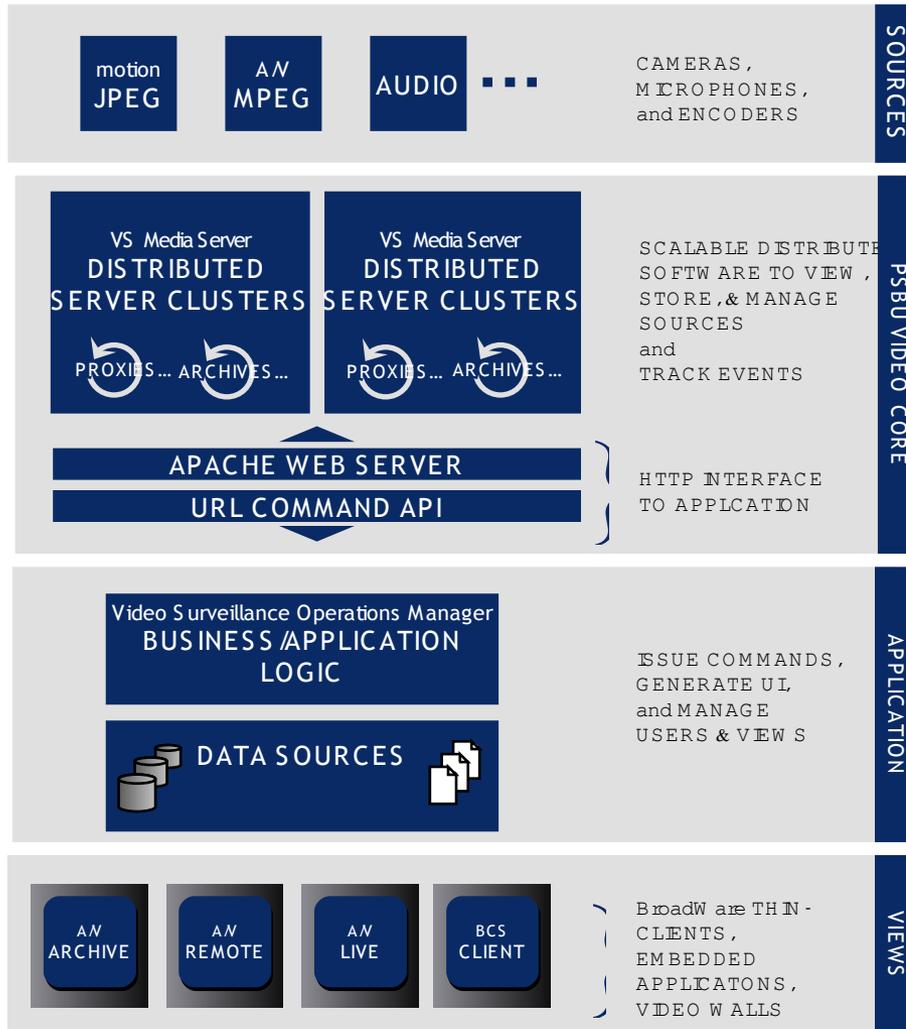
Archive Period: 30 Days

No. of Cameras: 500

Results:

- Data Rate: MPEG4, 4CIF, 15fps   = **1.5 Mbps**

- Daily storage/Camera: 1.5 x 3600x24/8 = **16 GB/day**

- Daily Storage for 500 Cameras: 500x16 = **8 TB/day**

- 30 Day Storage for 500 Cameras: 30x8 = **240 TB**

Summary

Platform for Video Systems

- **Multiple formats and devices supported for video and audio sources**

Video Surveillance Media Server (VSMS)
- **support multiple simultaneous viewers with low latency**
- **support any required storage capacity**
- **HTTP command interface integrates easily with other applications**

Video Surveillance Operations Manager (VSOM)
- **Applications created using any standard development environment**
- **Open interfaces for database, image analytics, and other functionality**

Video Surveillance Virtual Matrix (VSVM) Interactive Media Clients (IMC)
- **Thin-clients provide a broad range of viewing options**

For More info:

- **The Web** cisco.com/go/physicalsecurity
- **Email Me** dosary@cisco.com