Stephen R. Russo

Direttore delle soluzioni di Sicurezza Fisica

Securing a Smarter Planet

City by City

Security Day 2010

Security Environments are Becoming More Complex

More Sensors Sending
More Information

Access to streams of
information in the Real Time

New Forms of Collaboration

New possibilities.
New complexities.
New risks.

Selected IBM Physical Security Clients

IVECO

Bureau of Transportation Tokyo

NYC Department of Education

IBM's Solution Areas for Safety and Security

- Integrated Urban Infrastructure
- **Safety and Security**
- Metropolitan Transportation and Roads
- Tax and Revenue
- Social Services and Social Security

Crisis Management

- Support crisis management and planning
- Enable geographically dispersed teams to collaborate

Integrated Intelligence

- Drive intelligence from structure and unstructured data
- Identity of a person-of-interest and his network
- Support an integrated document management system

Real Time Crime Center

- Increase data quality and up-to-date data delivery
- Integrate siloed information to create a single "version of the truth"

Government Trusted Identity

- Defend against threats and attacks
- Comply with new laws for services, identity & privacy

Smart Vision Suite

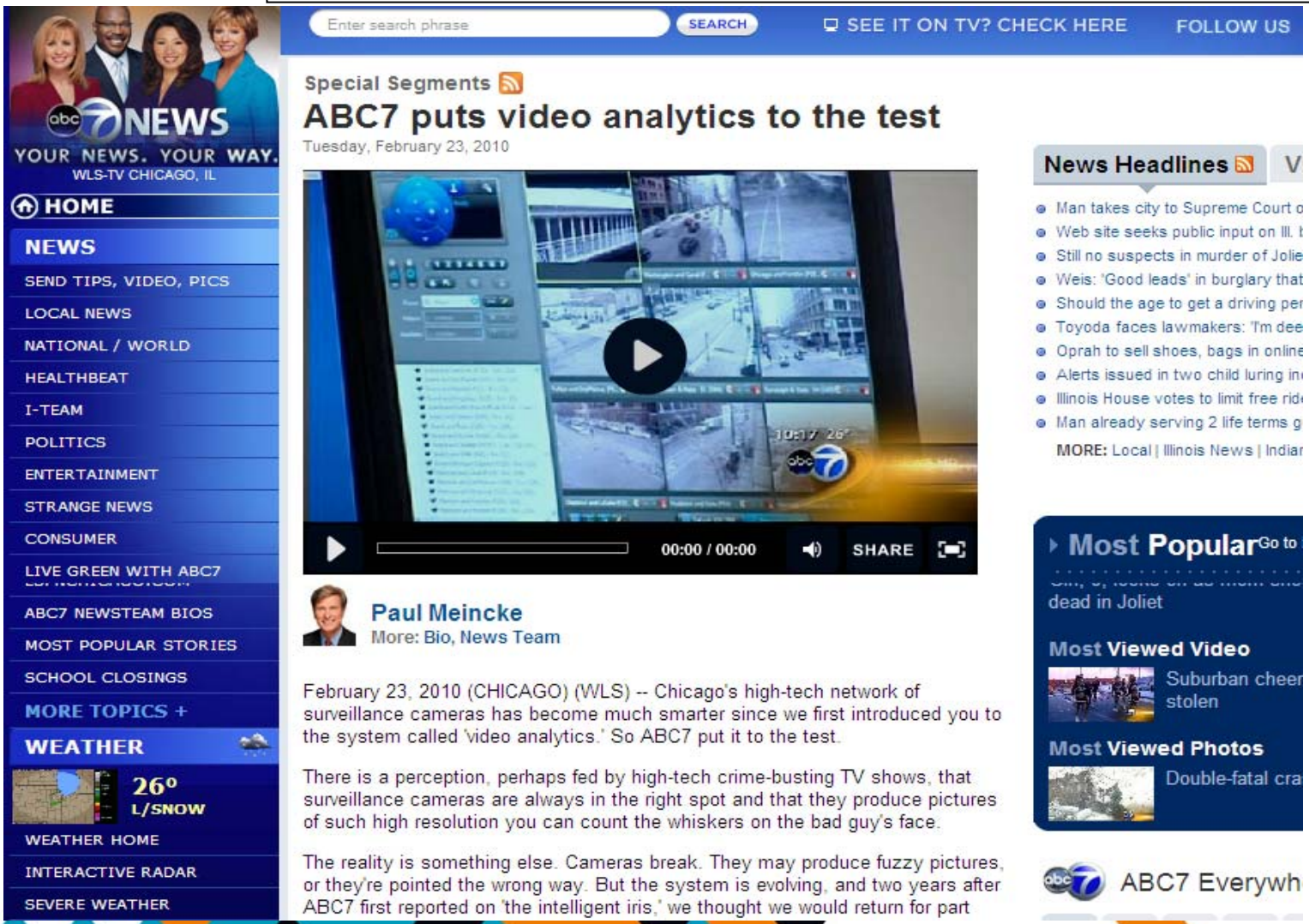
- Improve evidence accuracy and credibility
- Reduce crime via real-time information

Business Partner Examples

ESRI · amatra · ARCHAIO · GoPro · UnifiedEdge · ERUCES Data Security · virtualagility · EIM

IBM Physical Security Smart Vision on ABC news

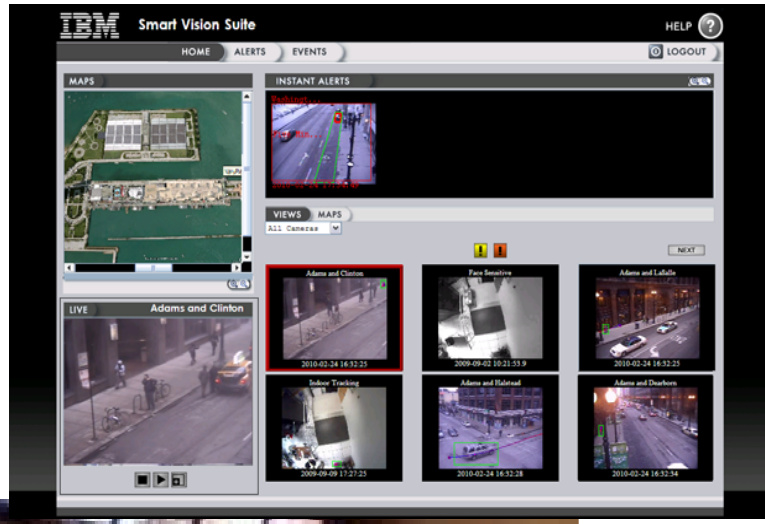
link ➔ http://abclocal.go.com/wls/story?section=news/special_segments&id=7294108

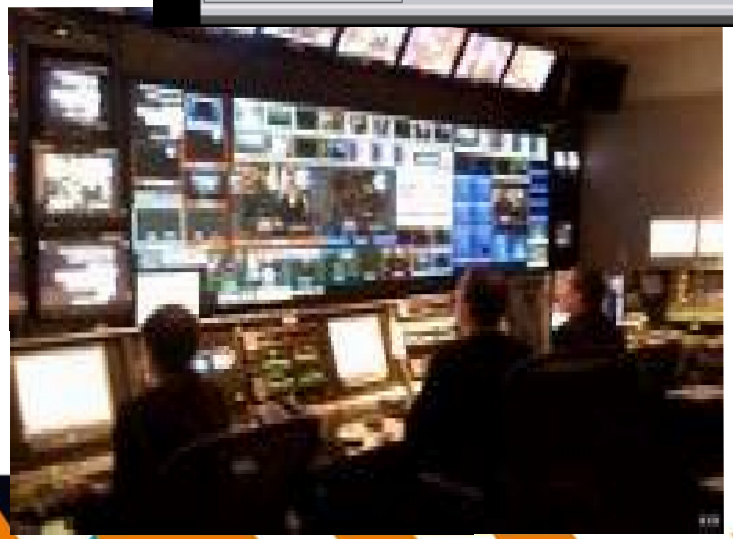


Securing A Smarter Planet – City by City

Our focus for Physical Security is on making cities and public transportation safer

- **City security and safety**
  - Counter terrorism
  - Forensic crime analysis
  - Crime prevention
  - Protection of high value targets
  - Emergency management and response
- **Public Transportation**
  - Security and security solution for
    - Track access
    - Stations
    - Tunnels
    - Maintenance sites
    - Power sites





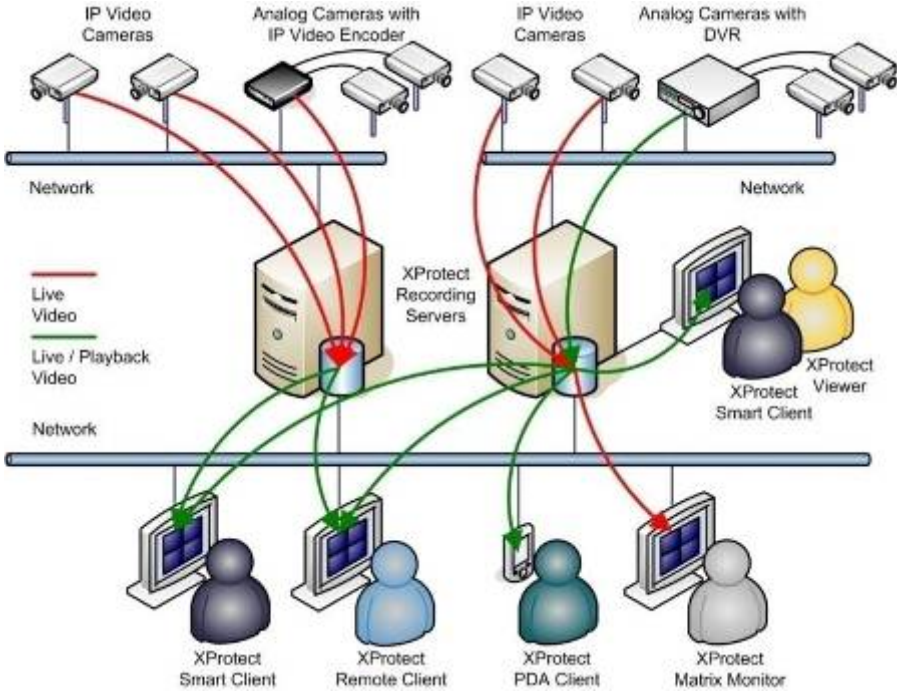
Basics on Digital Video Surveillance

Technology

- Cameras (analog+encoder or IP)
- Network, Routers, Switches, Wireless – design and build out of video feed network and data center network
- Video Management System – Software from a few key vendors
- Video+Data Servers, Storage, Middleware – a major element in selling standard IT plumbing in a new market
- User Interface:
  - Live+Recorded Viewing,
  - Archieve play back
  - Evidence Mgmt – typically a core element of the VMS
- with limited or no automated video analytics
- with little or no support for video wall, emergency response center

Turning it into a Solution by an Integrator

- A broad set of Services IP & Methodologies
- Customization and Integration Labor
- Both for DVS specific services and main stream ITS SPL portfolio



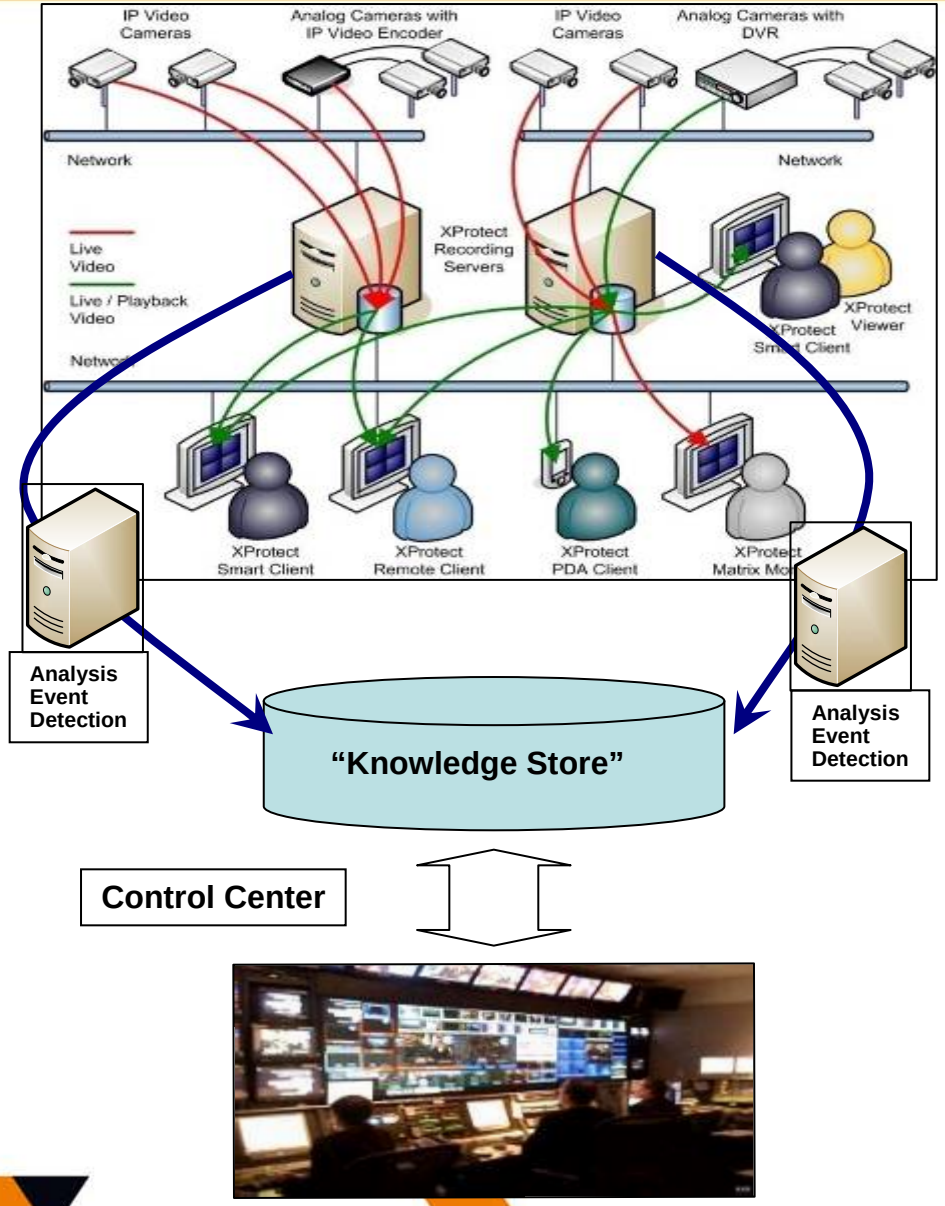
Intelligent Digital Video Surveillance

Technology and IPAssets

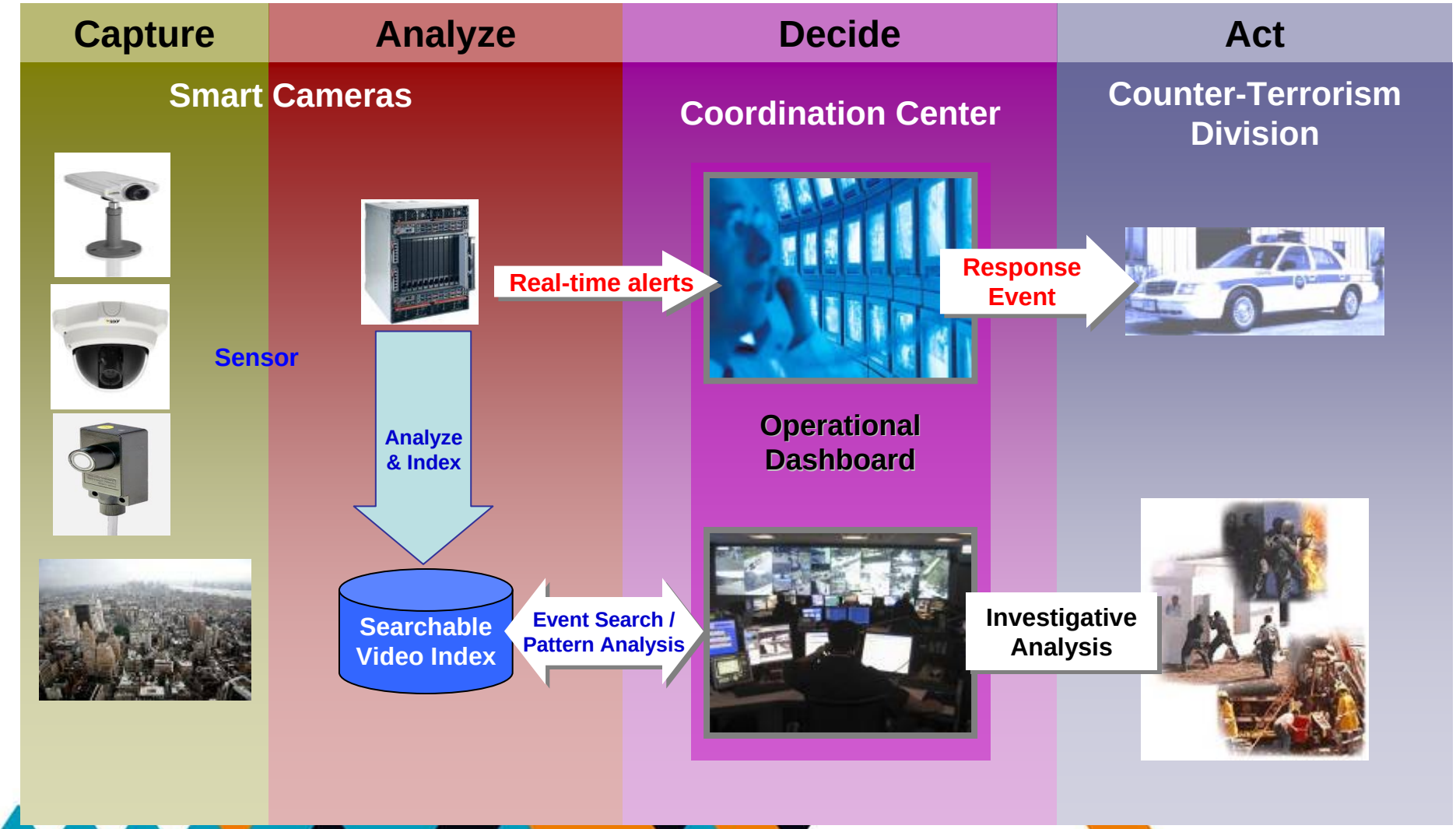
- Cameras (analog+encoder or IP)
- Network, Routers, Switches, Wireless
- Video Management System – SW from a few key vendors
- Video+Data Servers, Storage, Middleware
- User Interface:
  - Live+Recorded Viewing, Archieve play back, Evidence Mgmt
- Realtime analysis of video (**most competition**)
  - Defined behavior detection (**Alerts**)
  - Detection of activity (**Events**) (**IBM Specialty**)
- Consolidation of Events and Alerts (**IBM and 1 other**)
  - Ability to consolidate events + alerts into knowledge store
  - Integration
- Integration with other IT and Phy Security Intelligence. Extensible schema, allows for: (**IBM**)
  - Integration of other sensor information
  - IT and transactional information
  - Comprehensive understanding of an event
- Scalability (**IBM**)
  - Ability to handle over 24Mil Events per day

Turning it into a Solution by an Integrator

- A broad set of Services IP & Methodologies
- Customization and Integration Labor
- **Add'l Services** for sophisticated Tuning and Data Correlation



IBM Smart Vision Suite Application to Urban Environments



Challenges with City Surveillance

- **Volumetric Scalability**
  - Numerous high traffic cameras in use
  - Each High Traffic Video Camera can generate hundreds of thousands of events per day.
  - Hundreds of high traffic Cameras can be deployed at the same time:
    - Tens of Millions of summarized events per day
    - Hundreds of millions of trajectory events per day
- **Application availability**
  - There can be no downtime in the application. (System is up 24 by 7)
  - Access to the informational data store must occur at the same time new metadata is ingested.
  - Access to relevant information needs to be easily and quickly accessible, regardless of the volume of metadata being ingested.
  - Maintenance to the application must be both quick and non-invasive
- **Content Management**
  - Aged data must be purged from the system in a timely fashion.
  - The data purge process must not impact new metadata from being ingested.
  - The data purge process can not impact the online availability of the application.
  - Hundreds of millions of event metadata must be quickly and easily purged without causing application contention
- **Fast access to informational data**
  - Indexing of specific categories of metadata information
  - Response to searches, millions of events can be searched in seconds

Large City Expected Volumes

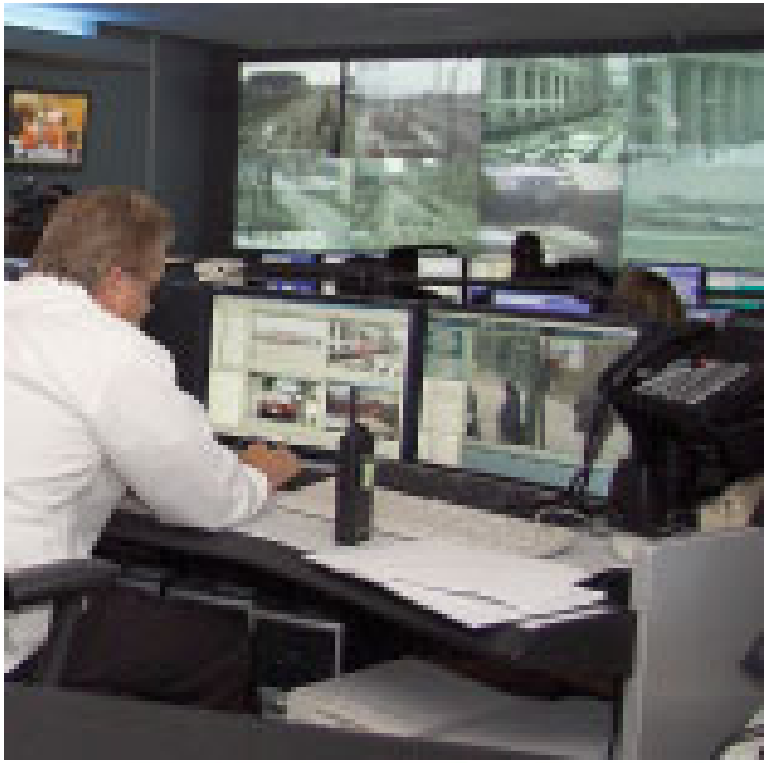
For 500 city camera's we predict:
~ 24 Million events/day
~ 500GB storage/day

Assuming the data will be retained for five weeks:
~ 840 Million events total
~ 16TB storage total

Note: Events are not Alerts!!! Alert volumes cannot be estimated until all alerting scenarios have been finalized.

Video Analytics Changes a Person's Role and Improves Operator Effectiveness

Analytics is a tool for public safety personnel, helping them sift through volumes of video data for the important bits.



Without Analytics

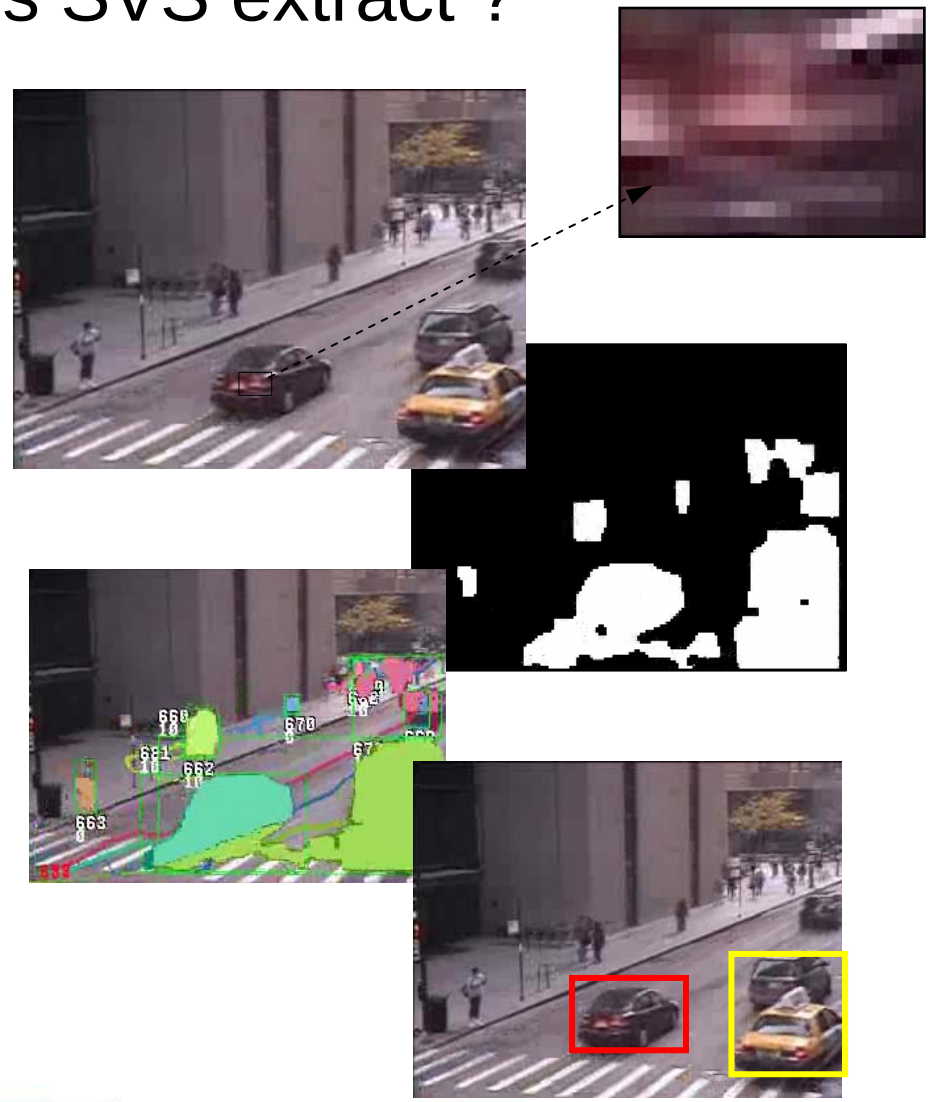
- **Operators monitor video cameras continuously or in response to developing situations reported thru 911 / radio**
- **Operators view archived video to aid in investigation**

With Analytics

- **Operators use video to evaluate real-time alerts and determine appropriate response**
- **Operators evaluate results returned from search of archived video.**
- **Operators observe summaries and patterns found in archived video.**
- **Activities people are good at !**

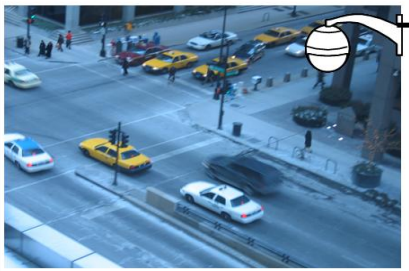
What kind of metadata does SVS extract ?

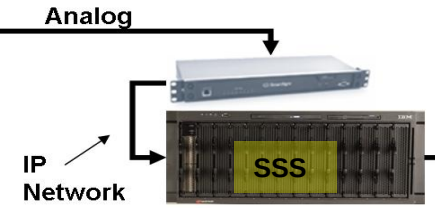
- **Information about each moving object**
  - **Appearance**
    - **Color, size, time**
  - **Motion**
    - **Track Summary (Speed, Distance, Duration)**
    - **Full Track (optional)**
  - **Classification (optional)**
    - **Person, Vehicle, Other**
    - **Based on size and location**
  - **Thumbnail showing object and track**
  - **Pointer to video**
- **Categories of behaviors SSS can monitor:**
  - **Object Counting**
  - **Object Monitoring**
  - **Person Activity**
  - **Perimeter Protection**
  - **Gate and door monitoring**
  - **Vehicle Activity**
  - **Face Capture**
  - **Search**



IBM Smart Vision Suite – *turning video into Intelligence*

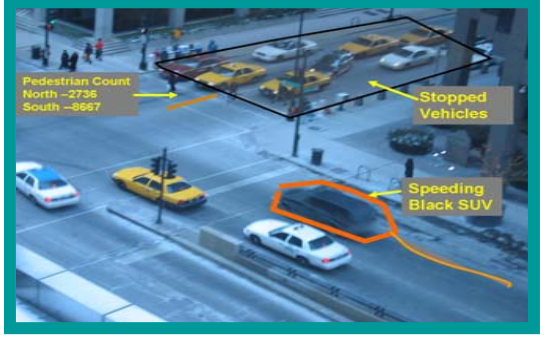
Governments are installing 1000's of cameras to counter terrorism -- who watches these cameras?
Retail stores have 100s of cameras. How can they use them more effectively to reduce loss?





Servers for video storage, analysis and indexing

Command center receives alerts and can launch rapid investigations



Understand traffic patterns in the store.
How many people came in, where did they spend time?

Technology

Video Analysis, Computer Vision and Pattern Recognition, Multi-media Indexing, Scalable Data Management

Differentiation

SSS uses unique video indexing technology to make surveillance video searchable. Indexing allows the user to look at patterns of activity across large numbers of cameras, allowing both rapid investigation and predictive security. SSS also provides the standard real-time alerting functionality

Solution

Cameras monitored by software capable of
- Behavior Analysis
- License Plate Recognition
- Face Analysis

Benefits

- Automatically monitor 1000's of cameras for threats – **"Truck parked in front of high value target"**
- Search thru 1000's of hours of video in minutes –"**Find suspect Red Van**"

Applications

Homeland Security
- Counter Terrorism
- City Surveillance

Retail Applications
- Loss Prevention,
- Marketing
- **Financial Sector**

Customers

City of Chicago
Airport in India
Banks in Asia
Train systems, Italy
Large Cities – Counter Terrorism

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Business Partner Examples

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A platform for rallying and recruiting business partners

Johannesburg, South Africa prepares for the 2010 FIFA World Cup with a state of the art Disaster Management and Emergency Operations Centre

Client Challenges

- Protect citizens against disasters
- Improve preparedness of emergency services

Solution

- Government Industry Framework: Triton SOA Accelerator, Virtual Operations Center from business partner Virtual Agility
- Create Provincial Disaster Management and Emergency Operations Center with a real-time Common Operating Picture and interoperability across metro emergency management operations and public safety departments
- Monitor and evaluates the state of preparedness
- Implement and test response plans

virtualagility

Ensure the safety and security of **8 million** people!

Smarter Business Outcomes

- Comply with the Disaster Management Act in 2004
- Improve planning capabilities and training
- Ensure effective preparedness of emergency services from all sectors
- Develop capacity to deal with disasters that may occur during the 2010 World Cup

The New York City Police Department at a Glance

- **The New York City Police Department (NYPD) established in 1845 is the largest police force in the United States with primary responsibilities in law enforcement and investigation within the five boroughs of New York City.**

- **The Critical Objectives of the NYPD are to:**
  - Reduce the incident of Crime
  - Develop and implement counterterrorism strategies
  - Address quality-of-life violations
  - Reduce injuries and fatalities from aggressive driving and other hazardous violations
  - Ensure that police services are provided in a professional and timely manner

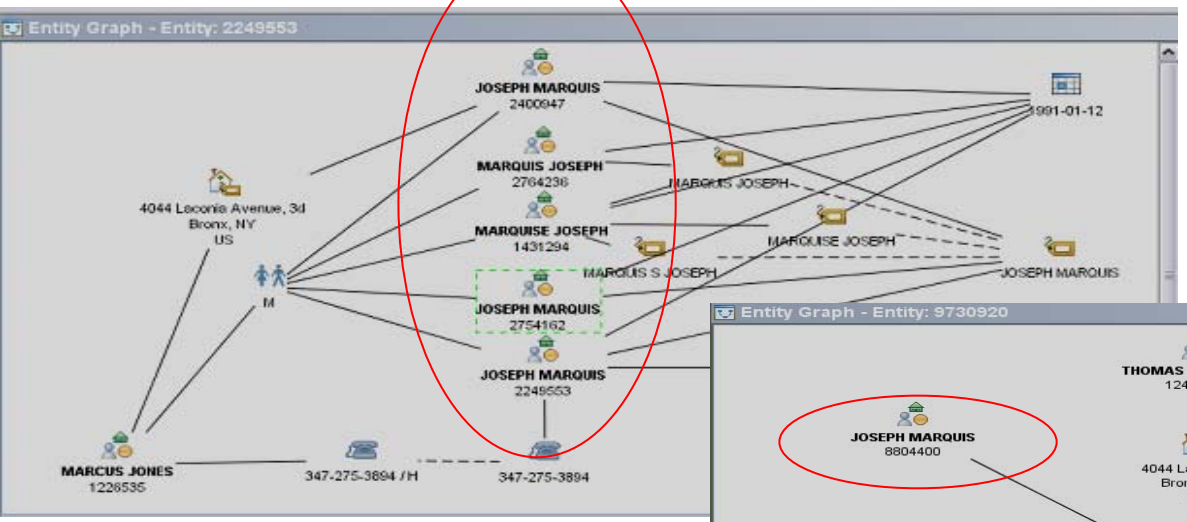
- **The Scope of Agency Operations includes:**
  - 35,408 Uniformed Officers and 16,572 Civilians
  - Jurisdiction is 468.7 square miles serving a population of 8.3M residents
  - 76 Precincts, 12 Transit Districts, 9 Housing Service Areas
  - 8,839 Police Cars, 27 Police boats, 7 Helicopters, 120 horses, 34 Dogs
  - 2009 Fiscal Budget - $7.651B
  - 14 Million 911 calls per year

Background – Real-time Crime Center

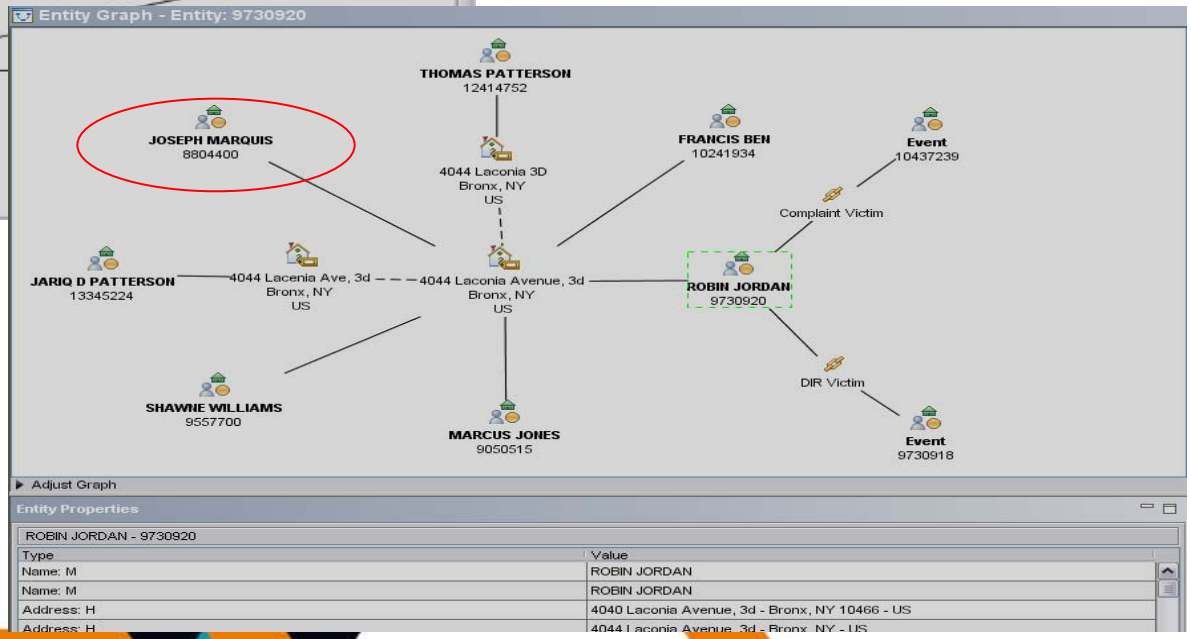
- **RTCC is a centralized crime information center for the NYPD initiated by PC Kelly**
- **It is staffed 24x7 by 45+ experienced police investigators**
- **RTCC is a field support unit; it provides investigative support to field officers to enhance and accelerate an investigation for the purpose of solving crime**
- **IBM GBS won a 6 year Systems Integration and Support contract in 2007**
- **Key technical capabilities include:**
  - **Crime Data Warehouse**
  - **Geographical Analysis**
  - **Flexible Searching – Patterns, People, Location, Phone #, Text**
  - **Linkage Analysis**
  - **Alerts and Patterns**

Correlation of data warehouses to create intelligence– Allows us to get a single view of perpetrators and their associates

Before view of Mr. Marquis



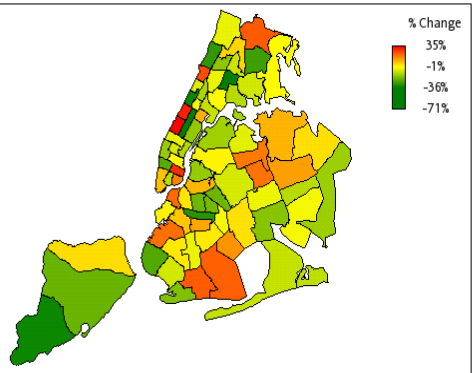
After resolved view



Dashboards for Police Commissioner– Major Crimes

Total Complaints - Seven Major Crimes

For the 28-Day Period Oct 13, 2008 to Nov 9, 2008



Citywide

Current Year	Prior Year	Difference	% Change
9,521	9,968	-447	-4.48%

Precincts with Greatest Percent Increase

Precinct	Current Year	Prior Year	Difference	% Change
020	124	92	32	34.78%
024	113	87	26	29.89%
009	151	118	33	27.97%
033	78	63	15	23.81%
047	174	143	31	21.68%

Precincts with Greatest Percent Decrease

Precinct	Current Year	Prior Year	Difference	% Change
022	2	7	-5	-71.43%
042	83	131	-48	-36.64%
026	50	76	-26	-34.21%
123	37	56	-19	-33.93%
077	108	155	-47	-30.32%

Seven Major Crimes Year to Date, Weekly Compstat Totals

Crime	Current Year	Prior Year	Difference	% Change
Murder	446	424	22	5.19%
Rape	1,157	1,166	-9	-0.77%
Robbery	18,792	18,445	347	1.88%
Felony Assault	14,049	15,240	-1,191	-7.81%
Burglary	17,387	18,574	-1,187	-6.39%
Grand Larceny	37,462	38,002	-540	-1.42%
Grand Larceny Auto (G.L.A.)	10,823	11,284	-461	-4.09%

Current 911 Call Total

Current Total

13,243

Last Update: Nov 14, 2008 1:30:00 PM

Daily SPRINT Total

Today	Prior Year
8,520	***6,838***

Multi-Year Homicide Comparison

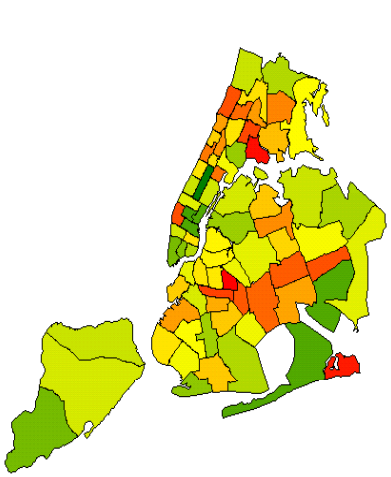
Year to Date, Shootings and Homicides Database

Year	Total Homicides	Difference from Current Year	% Change
2008	450	--	--
2007	428	22	5.14%
2006	504	-54	-10.71%
2005	469	-19	-4.05%
2004	502	-52	-10.36%
2003	521	-71	-13.63%

Dashboards for PC Kelly and City Hall – Quality of Life

Total Quality of Life Issues

For the 28-Day Period Nov 3, 2008 to Nov 30, 2008



Citywide

Current Year	Prior Year	Difference	% Change
25,355	23,678	1,677	7.08%

Precincts with Greatest Percent Increase

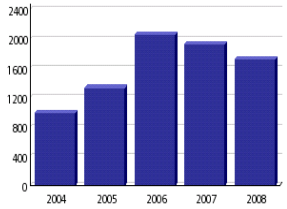
Precinct	Current Year	Prior Year	Difference	% Change
081	192	136	56	41.18%
041	207	149	58	38.93%
101	126	92	34	36.96%
077	343	261	82	31.42%
042	328	251	77	30.68%

Precincts with Greatest Percent Decrease

Precinct	Current Year	Prior Year	Difference	% Change
022	1	3	-2	-66.67%
014	146	185	-39	-21.08%
013	211	263	-52	-19.77%
100	50	62	-12	-19.35%
113	159	197	-38	-19.29%

Graffiti

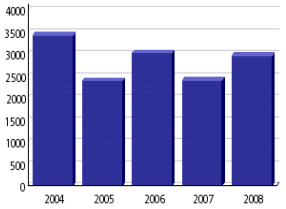
Year to Date



Year	Total Calls	Diff. from Current Year	% Change
2008	1,723	--	--
2007	1,925	-202	-10.49%
2006	2,058	-335	-16.28%
2005	1,330	393	29.55%
2004	983	740	75.28%

Homeless

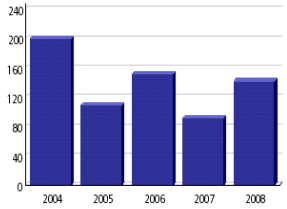
Year to Date



Year	Total Calls	Diff. from Current Year	% Change
2008	2,954	--	--
2007	2,381	573	24.07%
2006	2,997	-43	-1.43%
2005	2,385	569	23.86%
2004	3,417	-463	-13.55%

Panhandling

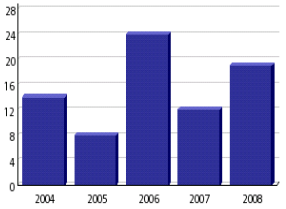
Year to Date



Year	Total Calls	Diff. from Current Year	% Change
2008	142	--	--
2007	91	51	56.04%
2006	151	-9	-5.96%
2005	109	33	30.28%
2004	200	-58	-29.00%

Squeegee

Year to Date



Year	Total Calls	Diff. from Current Year	% Change
2008	19	--	--
2007	12	7	58.33%
2006	24	-5	-20.83%
2005	8	11	137.50%
2004	14	5	35.71%

Physical Security References

South African Police Services

Client Challenges

- Manual processing for identity verification, workflow
- Distributed operations increases opportunity for ineffective operations
- No system for instant verification for criminal record and history

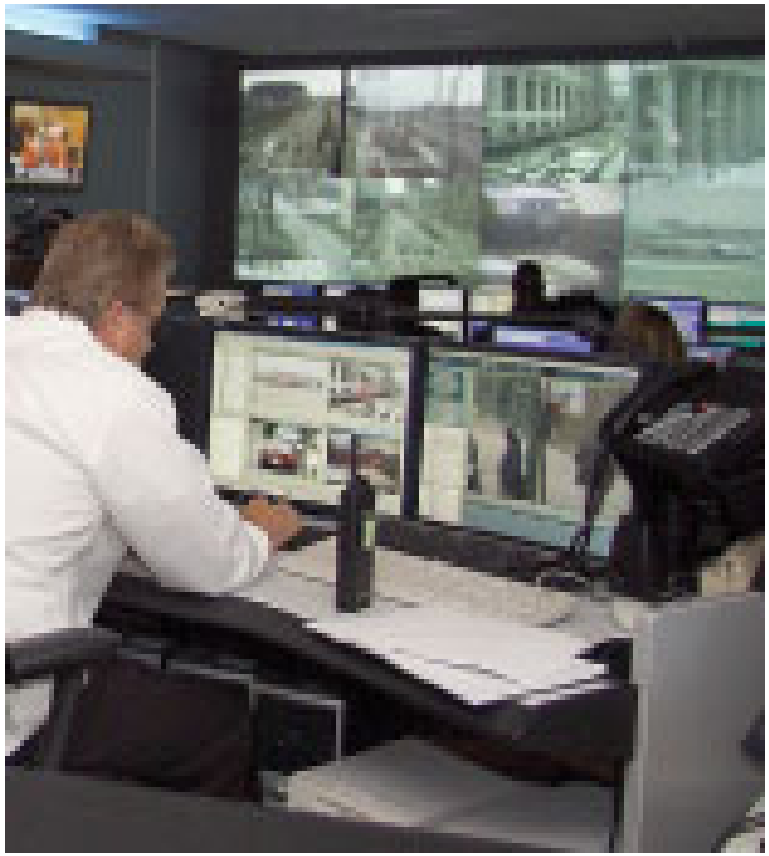
Solution

- Government Industry Framework
  - Single view capabilities
  - 'Triton' SOA Accelerator
- Strategic win for future inter-departmental integration standards

Smarter Business Outcomes

- Reducing the cost of the criminal justice systems
- Providing information on criminals and crime where and when it is needed
- Identifying persons with histories of prior criminal activity quickly and reliably

Urban Surveillance in Chicago



Chicago Office of Emergency Management and Communication (OEMC)

- IBM contracted to create an integrated video surveillance system in the City of Chicago
- OEMC Integrates communications for:
  - Chicago Police Department
  - Chicago Fire Department
  - Homeland Security
  - 911 Call center
  - Federal Bureau of Investigation
- The OEMC, needed both infrastructure to create a video ready network as well as capabilities to feed video, voice into a centralized control center.
- As well is react to emergency management for critical events

Note: Details on number of cameras location of cameras and expenditures is strictly confidential in the contract and can not even be released internal to IBM without express written permission from the client.

Operation Virtual Shield: Chicago

- Operation Virtual Shield, OVS, is a Safer City project. In partnership with the City of Chicago, IBM has deployed Infrastructure as well as advanced surveillance technology to protect critical assets and reduce crime in the City as well as improve the time it takes to investigate crimes and suspicious behavior.

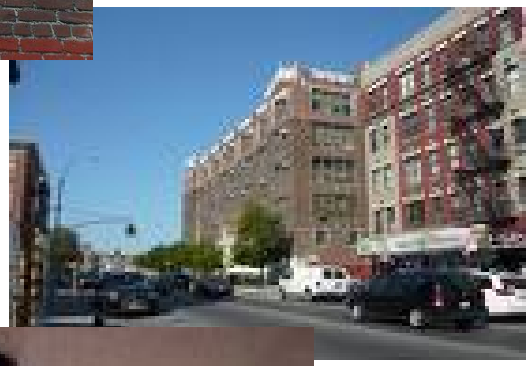
- Design, implementation and deployment of a large scale overlapping wireless grid designed for video transport.

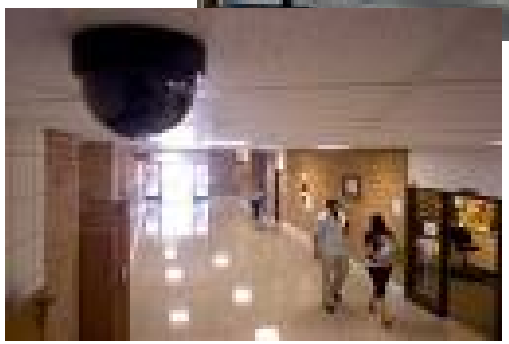
- Deployment of IBM GTS designed "Pod" which is a wireless set of packaged components which create a Surveillance optimized infrastructure. Each pod includes a camera, encoder, access point, power source, expansion slots for on board analytics, and other sensor devices. All are contained in an environmentally durable enclosure.
  - Pod is a solution asset allowing implementation of DVS enabled network and intrastructure
- Deployment of video management hardware and software into a central location
- OVS is a centralized deployment with all video feeds being consolidated into the main office of emergency management in the city of Chicago.

New York City Department of Education – NY DOE

DOE created a “safe” environment across the New York school system in order to protect students and staff and deter malicious behavior as well as expedite investigations.

- Over 9500 cameras deployed
- Distributed server and storage model
- Analog and IP cameras in an IP network
- Interconnected through a federated design
- Central control center for monitoring and investigation





Incheon Free Economic Zone-Korea

- IFEZ, located in Incheon, South Korea, area of 51,739 acres (209.38 km2).
- The goal of IFEZ: transform area into hubs for logistics, international business, leisure, and tourism for the Northeast Asian region.
- Incheon's FEZ, the first in Korea, was officially designated by the Korean government in August of 2003. IFEZ is planned to be a self-contained living and business district featuring air and sea transportation, a logistics complex, an international business center, financial services, residences, schools and hospitals, and shopping and entertainment centers.
- Physical Security project for these areas based on Smart Vision Suite Solution

Italian Railway Infrastructure – RFI

Description

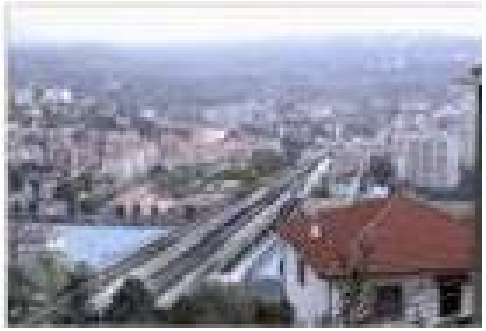
- The subsidiary of Ferrovie Dello Stato which owns the majority of the rail infrastructure in Italy
- Providing protection and intelligence to better manage railway stations, tunnels, bridges power stations and maintenance stations
- Analytics are being used to manage the security and operation of stations from regional control centers
- Contract was awarded to consortium, led by Thales

Technologies Used

- IBM 3650 Server platform
- Network design and implementation within the stations
- Smart Vision Suite
- IBM middleware: WebSphere, MQSeries, DB2
- ACTi Video Management and cameras
- Interconnectivity to regional control centers

Types of Service Provided

- Project management
- Network system architecture and design
- Security system architecture
- Delivery services, Installation & configuration
- Customization services
- Analytics configuration and tuning
- Technology recommendation



Chaoyang – IBM Smart Vision Suite Solution

Description

- Beijing Chaoyang District Government (BCDG) in China
- Street surveillance leveraging IBM Analytics Surveillance Solution
- IBMs analytics technologies reduce manpower requirement to monitor activities on the streets of ChaoYang
- Use Case scenarios: Detection of illegal street hawking, loitering, trespassing and etc.

Technology Used

- IBM 3650 Server platform
- Network design and implementation within the stations
- Smart Surveillance Solution
- IBM middleware: WebSphere, MQSeries, DB2

Project Scope

- Client is the Chaoyang District Government and not the Olympic Organizing Committee
- Project is meant to provide Vehicular and Human traffic monitoring at street level
- Implementation is only for Chao Yang district (an embassy district and also where IBM Beijing is located)
- Not specifically for 2008 Olympics though completion target date is before Games start

Italy, Automotive industry - Centralized Security System

Client requirements

- Client has been looking to a solution to increase the security level within the plant areas and a centralized system in Turin monitoring all plants.

Solution

- Centralized video surveillance and access control system for 3 plants in France
- Video Surveillance for 8 plants in Italy
- Maintenance and support of this security solution for 3 years

Benefits

- Improves the security of the site and customers' people access with expertly designed, proactive facility access controls
- Single point of control
- Standardization of system management procedure across the plants network

Industry: Industrial

Profile: Client is a European truck, bus, and diesel engine manufacturer, based in Turin, Italy. Produces around 200,000 commercial vehicles and 460,000 diesel engines annually. It employs 32,000 people and runs 49 production units in 19 Countries in the world. Besides Europe, the company operates in China, Russia,

Italy, FedEx – Integrated physical security solution

Client requirements

- Reduce risks of fraud and the ongoing costs for the monitoring activity

Solution

- Centralized physical security system, including access control, video surveillance, anti-intrusion;
- The solution is replicated in 13 sites in Italy and other countries in Europe;
- Automated alarm monitoring

Benefits

- Reduction of security management costs;
- Frauds reduction;
- Increase brand reputation;

Industry: Travel & Transportation

Profile: FedEx and its business units FedEx Express, FedEx Ground, FedEx Freight and FedEx Kinko's offer an extensive portfolio of transportation, e-commerce and business services to consumers and enterprises around the world. A leading Fortune 50 services corporation, Fed Ex's annual revenues exceed US$26 billion

Large Bank- branches office's security system

Client requirements

The Bank has been looking to upgrade their current branches security system. They are looking to IBM to roll-out fully integrated Digital Video Surveillance and Security solution in the first 350 branches (total bank's branches >9.000).

Solution

IBM is providing end to end service that includes analysis, design, planning and delivery of the solution to guarantee a homogenous increase of functionality and the number of branches .

Each branch will consist of a monitoring system with 16 cameras integrated with other sensors, branch control center with multiple screens and integration with Central Control Room. System will be available 24 hours, will have independent activation mode, uses motion detection or specified custom events to activate cameras and must be accessible by the central control room.

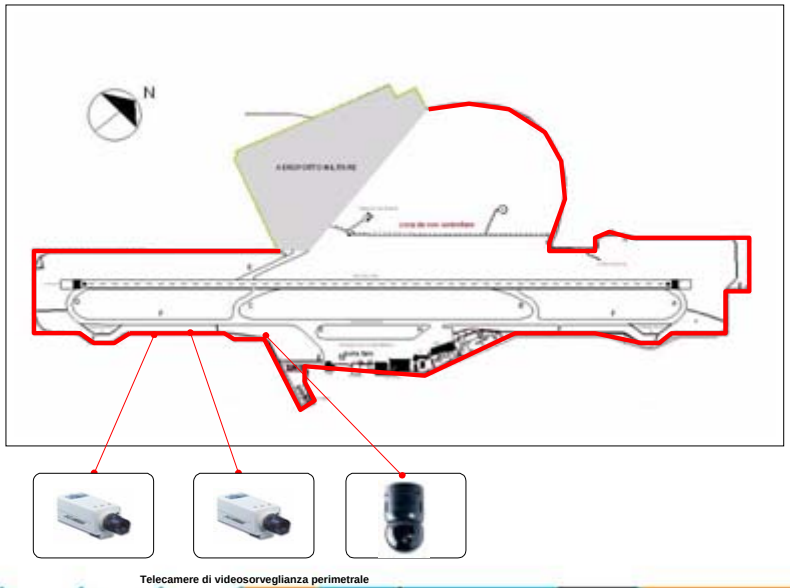
Benefits

- Loss prevention
- Improves the security of the branches
- Reduce the cost of the monitoring activity

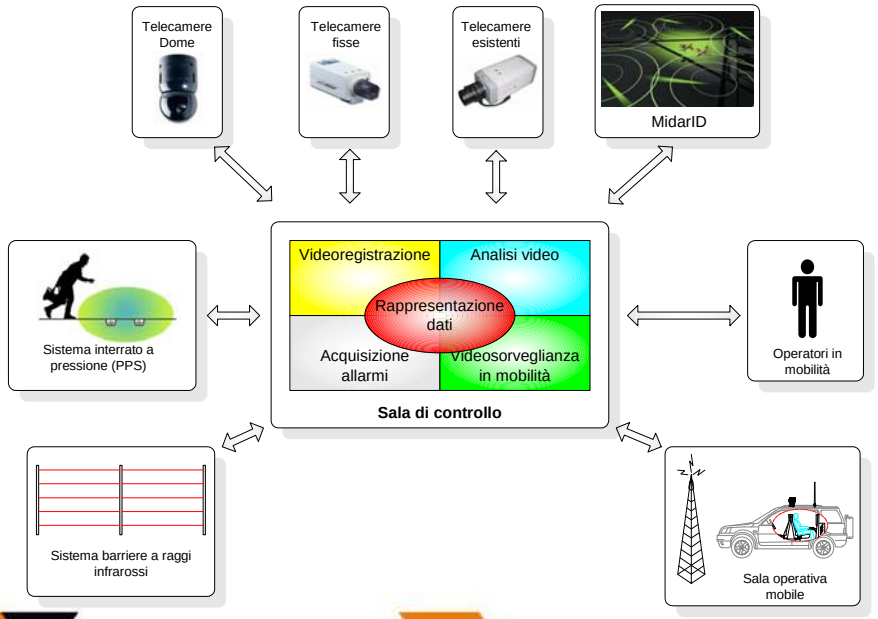
Industry: *Finance*
Profile: *one of the largest banking and financial services organisations in Europe with a network of 9,000 branches and strong local roots in 20 countries. In Europe is one of the leaders in terms of business size and can leverage on a unique strategic positioning.*

Italy, International Airport - Integrated Physical Security System

- Security control room – integration and GUI
- Mobile security control room – local GUI
- Surveillance and video analysis
- Underground intrusion detection
- Infrared intrusion detection
- Field radar & thermal intrusion detection
- Face reconition access control
- Rfid access control



Telecamere di videosorveglianza perimetrale



Gioia Tauro Port - Integrated Security System

Client requirements

- Ensure the security of the company's gates access control, integrated with the digital video surveillance:
  - Tender I – Perimeter Security
  - Tender II – Control Room

Solution

- Enhance/complement pedestrian and truck access, facility access control and intrusion detection system
- Integrate Digital Video Surveillance
- Maintenance and support of this security solution
- Security and Privacy Services, Site and Facility Services, Maintenance and Technical Support Services

Benefits

- Improves the security of the site and customers' people access with expertly designed, proactive facility access controls
- Facilitates this integration of new security technologies
- Capitalizes on Services support and maintenance

Industry: Travel & Transportation
Profile: A container-handling company that manages container transfer between ships and the railway network

Italy, Government Institution – Integrated Physical Security System

Client requirements:

- *Protect people and assets of one most important italian institution;*
- *Single system to manage and control the physical security of its 13 critical buildings the most of it located in the historical centre of Rome.*

Major characteristics:

- *13 Buildings*
- *3 Control Rooms*
- *6 Subsystems:*
  - Antintrusion;
  - Access Control - Biometric;
  - Fire alarm;
  - Videosurveillance;
  - Radiocommunication - TETRA;
  - Dedicated networks WAN/LAN.
- *1 Command & Control System*

Italy, Government Institution – Integrated Physical Security System

The purpose of the system is to ensure that only authorised users enter secure zones, but without obliging these users to cooperate in any way.

The entry point constitutes an ideal, practical and secure solution for controlling access to highly protected sites in which only a brief period of transit is required.

The facial recognition algorithm employed analyses no fewer than 40 distinguishing traits of the face, guaranteeing a high degree of accuracy even in critical situations, such as scarce lighting, different facial expressions or backdrops that are in movement or complex. The system also utilises the revolutionary SKIN technology, the first in the world able to analyse an individual's epidermis.

Thanks to this technology, the accuracy with which individuals can be identified has been increased by 20-25%.
The characteristics observed on the face and the skin of the individual that appears before the system for identification are compared with those previously acquired and filed in the central database, or on the smart card in the possession of the individual, with the evaluation taking less than a second.

Hands-Free Biometric Gate

Thank
You