In the spotlight...

Maryland CCTV Streaming Solution

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CCTV Streaming Video Sharing and Distribution in Maryland and the National Capital Region

Presented By:
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Maryland Intelligent CCTV

We all have the same problem
Roadway Project Installs some cameras
Then some more
Pretty soon we are chock full of cameras.
But they meet our traffic management needs... especially when we respond during crisis

Missile-Laden Truck Flips Over in Md.; Munitions Lacked Warheads but Had Fuel; Some Frederick Residents Evacuated

The Washington Post | October 6, 2001
What happens when something like that happens here?
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The call comes in to the Baltimore County 911 PSAP...

...Who pass it along to Baltimore County Fire and MSP JFK Barracks
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You know we will have a camera there!
We have always shared with our partner agencies… but all of the video receivers above must use the exact same equipment to view the video.
As CCTV Systems proliferated in Maryland, we needed a better technology for interoperability.
The MDOT Intelligent CCTV Project prototyped:

- the appliance to transcode between multiple formats
- secure points of entry for data and video into the MDOT network
- a secure connection between MDOT and Network Maryland
- a secure internet connection between MDOT and the Internet
I-CCTV Mission

A statewide group was formed to create a statewide Intelligent Closed Circuit TeleVision (I-CCTV) system by identifying and cataloging regional, state, local, municipal, and private cameras and their capabilities, networking those cameras, and providing an interface so that necessary video can be disseminated where it is needed.
I-CCTV Goals

• To create a robust and interconnected CCTV network for Maryland and surrounding regions to secure critical infrastructure and facilitate the real time monitoring of events
• To transcode the source video in real time to a common format
• To securely share the video from multiple organizations across multiple jurisdictions where it is needed and to whom it is needed:
  – in almost all applications
  – over almost all networks
  – and viewable on almost any device
Basic Building Blocks of Video Interoperability

• Two steps are typically required to make video streams interoperable
  – Transcoding
  – Streaming
Basic Building Blocks of Video Interoperability

• Transcoding
  – Converts video streams from their native format/compression algorithm to the common sharing format H.264
    • MJPEG, MPEG 2, MPEG 4, etc. to H.264
  – Resizes video streams from their native bandwidth (5Mbps, 3Mbps, 2.5Mbps, etc.) to a bandwidth that is more appropriate for sharing over limited bandwidth with regional partners
    • 192Kbps tends to be a good balance between quality and size of video
Basic Building Blocks of Video Interoperability

• Streaming
  – Streaming appliances pull video from the transcoders
  – Streaming appliances add multiple protocols to the transcoded video to make it easily consumable by almost any device
  – Protocols include:
    • RTMP (Real Time Media Protocol)
    • RTSP (Real Time Streaming Protocol)
    • HTTP Live Streaming
Basic Building Blocks of Video Interoperability

• Streaming
  – The streaming appliances serve as the point of distribution for video
    • protects the source camera or video management system from being overloaded
  – The streaming appliance also moves the point of distribution from inside the agency’s network to a DMZ hanging off their firewall
    • enables agency’s to securely share their video streams
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Basics Building Blocks for Video Interoperability

Sample agency with video cameras they want to share with their regional partners.
Basics Building Blocks for Video Interoperability

Sample agency with video cameras they want to share with their regional partners

Sample agency utilizes transcoders to normalize their video to H.264 at 192Kbps (output bandwidth can be any bandwidth as long as it is divisible by 84).
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Application Layer
- MCAC
- OSPREY
- RITIS
- CHART
- CAPWIN
- Vidsys
- Other

Basics Building Blocks for Video Interoperability

- Sample agency with video cameras they want to share with their regional partners.
- Sample agency utilizes transcoders to normalize their video to H.264 at 192Kbps (output bandwidth can be any bandwidth as long as it is divisible by 64).
- Transcoders pull video from video management systems or cameras.

Integration Layer
- SwGI
- NCRnet
- Dcnet, etc.

Regional Security Zone

Internet

Internet Security Zone

Data Layer
- Video Management Server (e.g. citiWatch)
  - Sony E.g. citiWatch
  - Cortec E.g. CHART
  - Impath E.g. MdTA
  - Sony E.g. MTA

Transcoding Appliances
  - Internet Network
Basics Building Blocks for Video Interoperability

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Transcoders pull video from video management systems or cameras

Streaming appliance installed on the agency DMZ support regional network (i.e., network/Maryland SwGl)
Basics Building Blocks for Video Interoperability

Sample agency with video cameras they want to share with their regional partners.

Sample agency utilizes transcoders to normalize their video to H.264 at 192Kbps (output bandwidth can be any bandwidth as long as it is divisible by 64).

Transcoders pull video from video management systems or cameras.

Streaming appliance installed on the agency DMZ support regional network (e.g., networkMaryland SwGI).

Streaming appliance pulls H.264 video streams from transcoders. One stream per camera.
Basics Building Blocks for Video Interoperability

- Sample agency with video cameras they want to share with their regional partners
- Sample agency utilizes transcoders to normalize their video to H.264 at 192Kbps (output bandwidth can be any bandwidth as long as it is divisible by 64)
- Transcoders pull video from video management systems or cameras
- Streaming appliance installed on the agency DMZ support regional network (i.e., network/Maryland SwGl)
- Streaming appliance pulls H.264 video streams from transcoders. One stream per camera.
- The Streaming appliance wraps the H.264 video from the Transcoders in multiple protocols (RTSP, RTMP, HTTP Live Streaming, etc.) and makes the video compatible with almost any viewing device
- Applications in the region have links to the video streams provided by the Streaming appliances
MDOT SHA developed the technology
Maryland Dept of IT made sure the specifications were
made available to their statewide hardware vendors
And the Maryland Coordination and Analysis Center took the responsibility of receiving and publishing of video to individual 1st responders that are authorized access.

MCAC has connectivity to SwGI
MCAC has connectivity to Internet
MCAC has MD Video Portal published to both SwGI and the Internet
MCAC has 4 streaming appliances to restream video from organizations that are only publishing to SwGI

Users with permission to access the MD Video Portal can access the page via SwGI or the Internet.
Because of this division of labor, The Regional Interoperable Video Sharing Solution in Maryland, MView, is designed to be a secure web-based portal for 1st responders and public safety personnel in viewing live regional video and providing situational awareness from most anywhere via desktops, laptops, tablets, and smartphones.

Organizations throughout the region (Maryland, DC, Virginia, Delaware, Pennsylvania) have spent many years creating agency specific video surveillance systems, MView is the catalyst that brings these separate, yet complementary, video systems onto one video sharing platform. The ability to share the same information in real-time better enables 1st responders and public safety personnel to react quickly to emerging safety and crisis situation while supporting interoperable communication across jurisdictional lines.

As of June 2019, video available to share day-to-day and for incident support in MView has increased from 847 in 2013 to over 13,000 from 65 organizations and include Police, Fire, EM, Parks, Schools, Universities, Learning Institutions, Hospitals, Rail, Transit, Transportation & mobile, portable, aerial, and marine video. There are 3200+ users in MView from over 195 local, state, regional, federal, and approved private organizations. Each user is allowed to see only video they have been authorized to view.
Question and Answer Session

- Please use the chat window in the lower-left corner for any questions.

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