



Imagine a city where surveillance cameras are unified and available at any time to Public Safety responders. Expand this vision to include businesses and communities who need to participate in order to improve their response time during critical incidents. Realizing the vision begins with municipal leadership and the foundation is the network, more specifically a *Peer-to-Peer IP Surveillance Architecture*, patented by LEVERAGE Information Systems.

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(54) **PEER TO PEER SURVEILLANCE
ARCHITECTURE**

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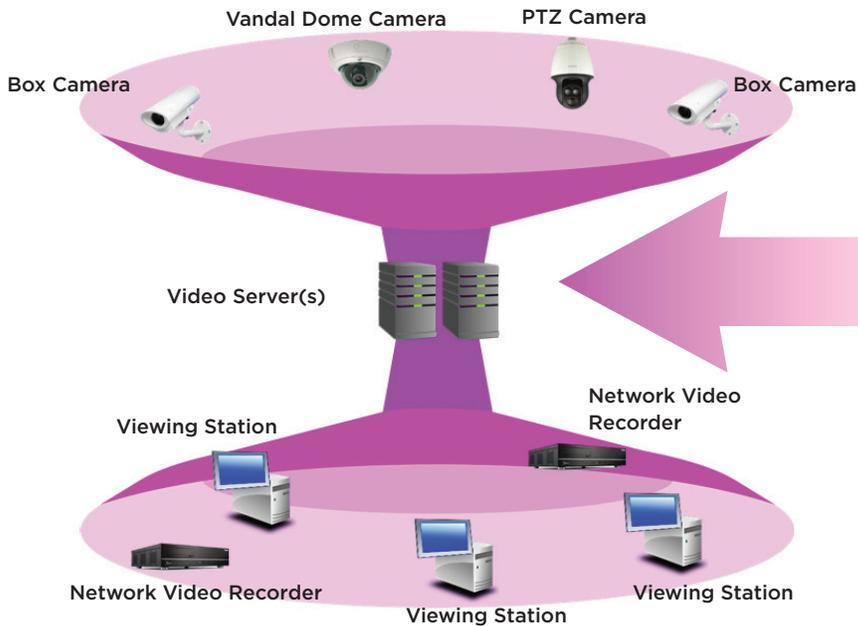
(57) **ABSTRACT**

A peer to peer surveillance architecture comprising a plurality of independent nodes for capturing, analyzing, storing, and viewing surveillance information is disclosed. The surveillance architecture has no central controller or single point of failure because of the peer to peer or independent relationship between its nodes. Generally, surveillance information of various types is captured by one or more capture nodes and transmitted to or one or more viewing, content storage, or server nodes for display, analysis, storage, or a combination thereof. Server nodes may provide authentication services to validate user or device credentials prior to granting access to surveillance information. In one or more embodiments, specialized video compression hardware is provided to allow high quality video surveillance information to be transmitted across low bandwidth connections. Compression may also be performed on other types of surveillance information.



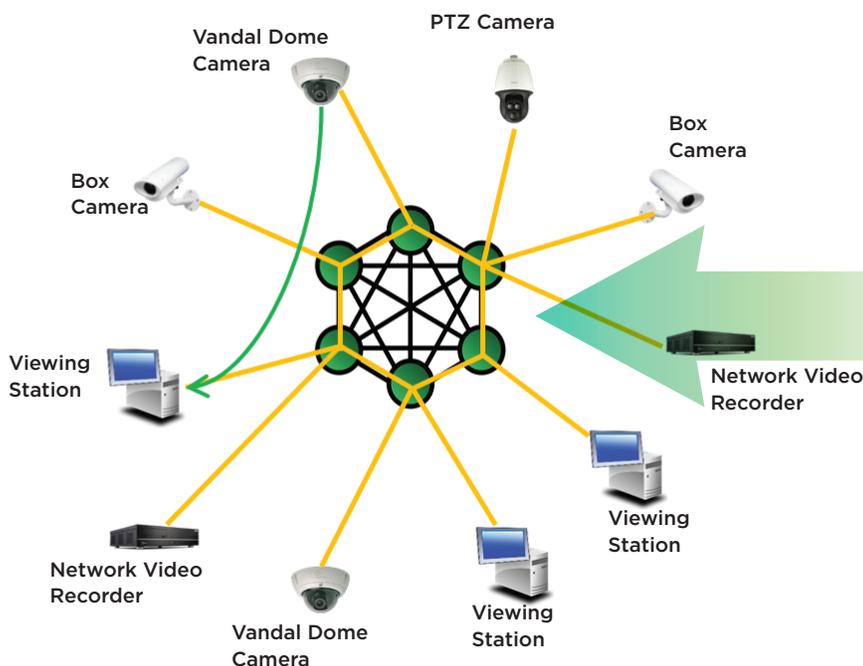
IP Networks that support surveillance cameras must support the movement of large amounts of time-sensitive data. Unlike data or voice networks, the flow of information in an IP network is not only time-sensitive but also continuous. Even in a video-only surveillance network, spikes in the flow of video occur due to the method of compression (bursts of data called I-Frames), random requests for recorded video, and other network operations.

As camera resolution improves, more demand is placed upon IP Surveillance Networks. Network architecture must take into account variations caused by scaling the network for additional users, cameras, NVRs, and use cases. The proper architecture and management of the network become the foundation of a successful system. Consider the differences between Client-Server and Peer-to-Peer network topologies.



Client-Server Network Topology.

A Municipality covers a large geographic area, which requires an IP Network that is flexible and scalable. A client-server network restricts traffic flow and scalability is limited. Management of the network becomes increasingly complex. Increased complexity reduces reliability, while single points of failure can cause multiple device failures simultaneously. Inherent system latency precludes a proactive response capability.

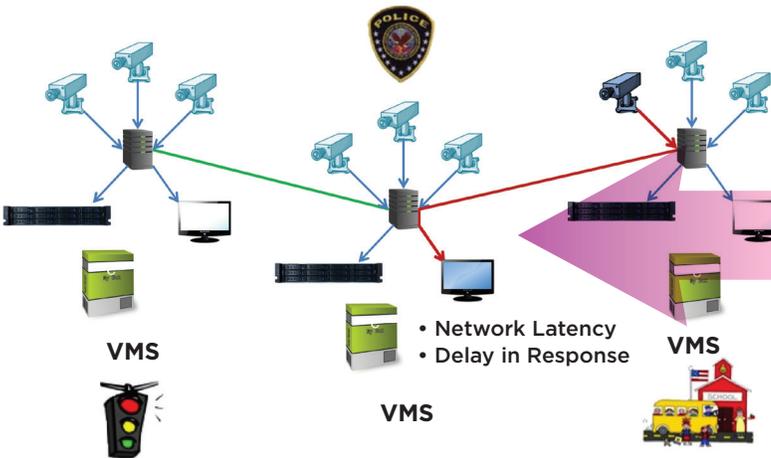


Peer-to-Peer Network Topology.

High uptime and availability are necessary when video surveillance is interwoven with a Municipality's everyday processes. There are simply less moving parts with a peer-to-peer IP surveillance network; a camera is directly connected to a viewing station. Real-time situational awareness assists the traffic engineer, as well as a first responder.

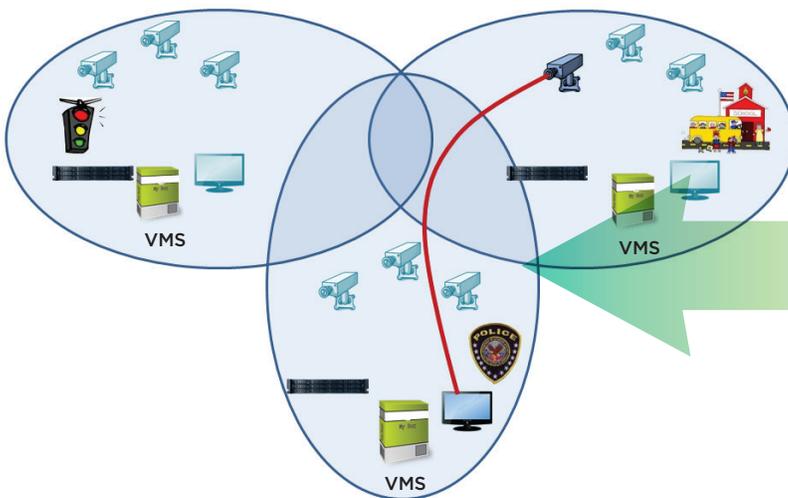


The surveillance requirements for a Municipality are unique. Departments within a Municipality are tasked with providing services in overlapping venues or geography where visual awareness could enhance the response or improve process efficiencies. In some cases disparate video surveillance systems are deployed. Over time these systems become difficult to support and maintain. “Where are our cameras located, and how do I gain access to them or their recorded video?” Shared assets in a Municipal-wide IP camera system is the answer!



Client-Server Network Topology.

Viewing of a camera shared by the school district and the Police Department could occur a number of ways within a client-server architecture, but in all cases there are many elements and network paths. The result in many cases is either no video or latent video, which is not acceptable for first responders.



Peer-to-Peer Network Topology.

The data path for a school district camera to the Police Department viewing station is simplified in a peer-to-peer surveillance architecture. Many law enforcement agencies use outbound audio to intervene in nuisance and criminal activity.

A peer-to-peer network establishes the foundation for a Municipal-wide IP surveillance system with virtually unlimited scalability. LEVERAGE provides a full suite of software designed for Municipal surveillance.

LEVERAGE DETECT® consists of five elements. LEVERAGE’s Video Management Software (DETECT **VMS**) is a comprehensive suite based upon LEVERAGE’s Peer-to-Peer Surveillance Architecture, providing near real-time situational awareness. The Video Surveillance System (DETECT **VSS**) consists of hardware and software architected for Municipal surveillance. High uptime and availability are assured by a comprehensive System Monitoring And Reporting Technology (DETECT **SMART**) and predictive analysis capability through DETECT Enterprise Surveillance Protector (DETECT **ESP**). Continuous scalability is made simple with DETECT Surveillance System Manager (DETECT **SSM**).

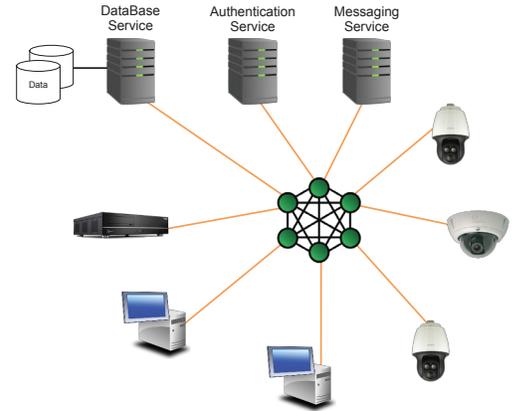




Video Surveillance System

DETECT Video Surveillance System (VSS)

is a highly reliable monitoring and proactive intervention system designed for Municipalities based upon IP surveillance technology. The foundation of DETECT VSS is the LEVERAGE patented Peer-to-Peer Surveillance Architecture, which provides near-zero latency. A highly robust network infrastructure provides high uptime and availability critical to first responders and public safety, ensuring citizen safety and quality of life.



Video Management Suite

DETECT Video Management Suite (VMS)

is a standards-based Windows software platform designed to operate on Leverage's Patented Peer-to-Peer Surveillance Architecture. The features and functionality of DETECT VMS specifically address Municipal surveillance requirements.



System Surveillance Manager

DETECT System Surveillance Manager (SSM)

is a Video Surveillance System Management and Life Cycle Solution. DETECT SSM provides unified Municipal-Wide surveillance system process control that ensures successful scalability and long-term support. Cloud-based configuration data backup and restore, and system health monitoring assure continuity.



System Monitoring And Resolution Technology

DETECT System Monitoring and Resolution Technology (SMART)

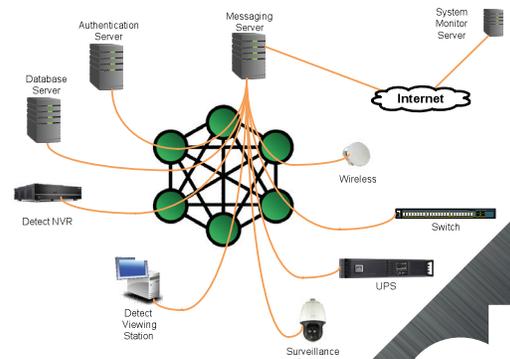
collects environmental and performance information for devices within a DETECT Video Surveillance System (VSS), based upon configuration information within the DETECT Surveillance System Manager (SSM).



Enterprise System Perfector

DETECT Enterprise System Perfector (ESP)

is an analysis tool that works in conjunction with DETECT SSM for configuration data, including potential new projects, and DETECT SMART, which provides actual environmental and performance information. DETECT ESP provides predictive failure analysis and guidance for system expansion.



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