What are the lessons learned from municipalities that have successfully deployed Municipal-wide surveillance? That is the leading question we hear from those considering deploying their own. The answer is infrastructure, which is dependent upon requirements. Requirements can generally be determined by auditing the existing camera systems deployed within a municipality, then vetting the wish lists of City departments. Of course, scalability must be considered.

Most municipalities have surveillance capabilities. Surveillance cameras are deployed throughout a municipality by various departments. Each camera has a specific purpose, but it may also provide information that may be of interest to other departments. What generally occurs over time is that multiple disparate surveillance systems are deployed. Over time, with employee turnover and other factors, the systems are not maintained and become inoperative or surveillance footage is hard to obtain. Even knowing the location of cameras becomes difficult. If you're involved with a municipality, do you know where every camera is deployed? And if so, is it operational?

Developing an infrastructure for a municipal surveillance system is a collaborative process from a technology focused group that is provided with current and potential future requirements. Considerations of a Video Surveillance System (VSS) Collaboration Group include departmental IT resources with an understanding of existing systems and end user needs, and technology experts that ensure an infrastructure that will support current and future needs.
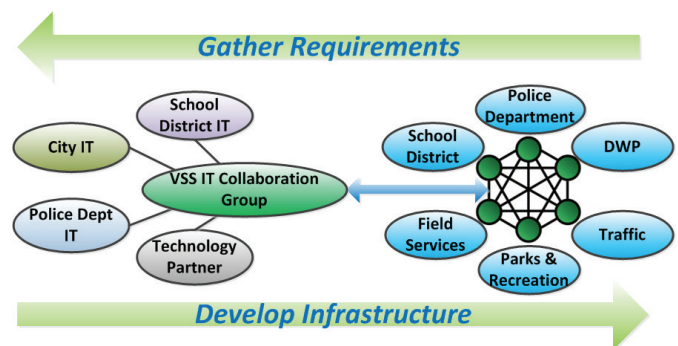

The VSS Collaboration group is tasked with developing requirements based upon interaction with Municipal-wide surveillance system users from all departments. An infrastructure will include **(See Peer-to-Peer Surveillance Architecture):**

- *Mission Essential Operation. High Uptime and Reliability.*
- *Efficient Scalability. Anticipating Future Needs Beyond the Current Requirements.*
- *Low latency. First Responders Require Real-Time Response Capability.*
- *Efficient Operation. Predictable Operation Verifiable via Health Monitoring.*
- *Secure. Network Security, User Authentication, End User Audit Logging.*
- *Ease of Use.*
- *Resource Sharing.*

A successful Municipal-wide surveillance system must include the management of multiple planned expansion projects simultaneously and determine the operational readiness of the infrastructure as these expansions are considered. Simulation of expansion projects need to project additional requirements against current performance and environmental criteria.

Most IT professionals are familiar with a denial of service attack upon their network. The nature of a surveillance network lends itself to a self-inflicted wound that resembles denial of service. It happens all too often, not to mention the impact of a "rogue" camera upon an IP network. Surveillance cameras are high-performance computing devices throttled by their configuration to meet the needs of a surveillance system. The three things can happen to an IP camera to cause it to overwhelm the IP Network are: it is not configured properly, there are Environmental changes to the monitored scene, or device failure.
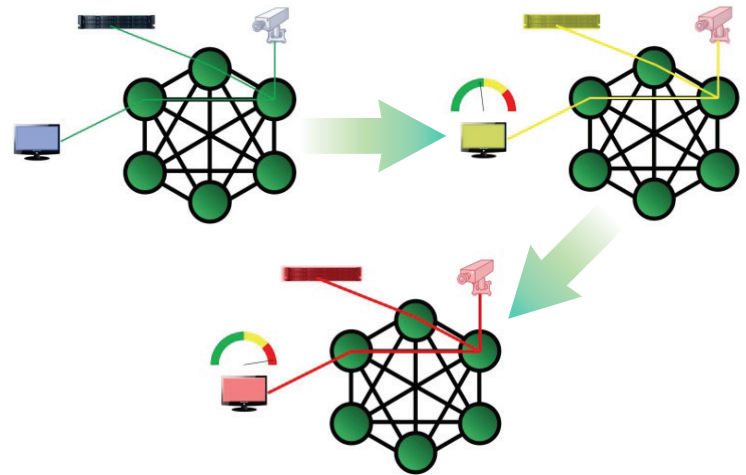
The impact of a "rogue" camera on a surveillance network makes identifying and remediating it critical. Finding a rogue camera without a health monitoring system is like trying to find a needle in a haystack. The impact is severe and impacts the surveillance system network devices, viewing resources, and recording capabilities.

Recorded Video:
- Storage Utilization Increased
- Retention Period of Other Cameras Impacted

Live Video:
- Impacts Viewing Station Resources
- Limits Viewing Station Capability
- Help Desk Gets a Call

Network Resource:
- Router/Switch Resources Impacted
- Bandwidth Impact
- May Result in Unnecessary Network Upgrade

- **Example #1**
  - 74 Cameras Recording to an NVR with a Retention Period of 365 days
  - NVR Usage: 202TB
  - 1 Camera Consuming 37TB or 18% of Storage

- **Example #2**
  - 86 Cameras Recording to Two NVRs with a Retention Periods of 30 and 365 Days
  - NVR Usage: 129TB
  - 2 Cameras Consuming 28TB or 22% of NVR

A high uptime Municipal-wide surveillance system will include a predicative failure analysis capability powered by a health monitoring system covering all active devices within the system. Performance and environmental monitoring will reveal potential failures prior to loss of service. A pervasive health monitoring system includes industry standards such as SNMP along with health monitoring applications to extract key parameters. Behavioral analysis and trending provide a predictive system capability to ensure high uptime and availability.

DETECT SSM, ESP, and SMART in a DETECT VSS environment provide the foundation for a successful Municipal-wide IP Surveillance System.