Overview

This traffic management organization requires multiple facilities to properly monitor, support, and manage metropolitan traffic. The centerpiece in the control center is a videowall system, which is supplied with inputs from surveillance video decoders, and data and graphic screens. Secondary command centers and other public safety agencies do not have access to the same visual information available at the Traffic Management Center, and replicating this equipment would be cost-prohibitive. The unique video/graphic imagery created on the videowall is streamed over an IP network to enable the secondary command centers and collaborative public safety agencies to operate with the required overview information.

Solution Needs Assessment

Source Inputs	The primary control room contains a videowall system for presenting large numbers of video inputs from surveillance cameras as well as high resolution computer data and graphic screens with resolutions of 1280x1024. This videowall creates a unique visualization of the traffic conditions built up with the video/graphic inputs and helps the operators manage the traffic system. This equipment cannot be duplicated at other locations.
Displays Near End	An array of projection cubes is supplied with a DVI input from the videowall processing system. One screen on the videowall is defined to be a “share screen” which will present imagery that is to be streamed to other facilities.
Geography	The secondary facility for managing the traffic system is located 2 km away from the primary control center. Other public agencies may be located even farther away.
Network	A private network with Layer 3 switching and a bandwidth that supports delivery of a 25 Mbps data stream to multiple endpoints is required.
Image Presented at Far End	The imagery presented at the far location must maintain the same 1400x1050 computer resolution supplied to the projection cube, along with the 30 fps video motion presented on the share screen in the videowall system.
Control System and Encoder Control	The streaming solution must allow the bandwidth to be set at a fixed ceiling of 25 Mbps that is not exceeded.
Displays Far End	The imagery is presented on a large, widescreen flat panel display with 1920x1080 resolution. It must also be displayable on PCs.

System Design Solution

Streaming Encoders

An Extron **VN-Matrix® 225** codec employing the **PURE3®** codec is located at the primary traffic management center. This unit is interfaced to one of the DVI outputs from a 12-screen Quantum Elite videowall processor. The input is encoded rapidly in 35 ms at the original 1400x1050 resolution, maintaining 4:4:4 color resolution and ensuring that the single pixel detail of small font, lines, and detail from computer graphic inputs will be preserved. The video motion of surveillance video windows will also be preserved.

Network

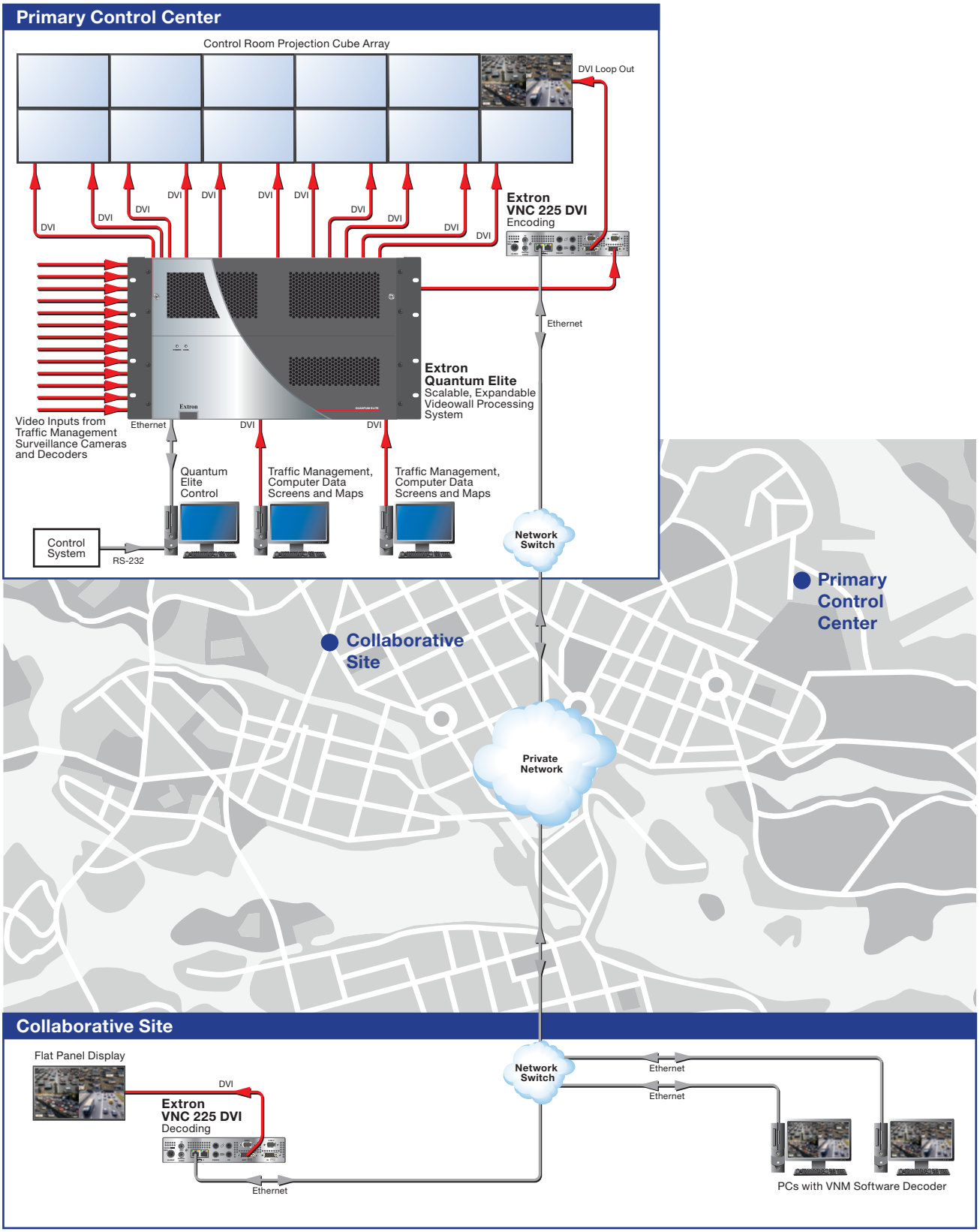
Network switches with Layer 3 switching and routing capabilities and 100/1000BaseT network connections are interfaced to the VN-Matrix encoder and decoder units in the two buildings. A firewall exists at each location providing network security. The private network supports IGMP multicast traffic and IGMP snooping.

Decoding

An Extron VN-Matrix 225 unit decodes the video/graphic stream with a 35 ms decode process, and outputs to a flat-panel display. An error concealment system in the PURE3 codec preserves a reliable, stable picture even when bit errors, jitter, or lost packets are experienced. The video delivery between the two locations is well below 100 ms. This ensures that individuals located in both locations can speak and interact with each other with the knowledge they are looking at identical visual data. The Extron **VNM Software Decoder** has been installed on many PCs in the Collaborative site and a license supporting up to 10 simultaneous viewers has been purchased. An Extron **VNM Enterprise Controller** would be required to support management of more than 10 active software decodes.

Control

VN-Matrix encoding and decoding units are configured using a Web browser, and left to operate in a fixed configuration. The control room staff can login to the VN-Matrix unit configured as a controller to monitor the system operation, network performance, and the bit rate management settings. A variety of compression and bit rate management tools allows the streaming bandwidth to be optimized for the type of content the traffic center operations intends to view.


Primary Control Center
Control Room Projection Cube Array
DVI Loop Out
DVI
Extron
VNC 225 DVI
Encoding
Ethernet
Extron
Quantum Elite
Scalable, Expandable
Videowall Processing
System
Video Inputs from
Traffic Management
Surveillance Cameras
and Decoders
Ethernet
DVI
Quantum
Elite
Control
Traffic Management,
Computer Data
Screens and Maps
Traffic Management,
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Center
Collaborative
Site
Private
Network
Collaborative Site
Flat Panel Display
Extron
VNC 225 DVI
Decoding
Network
Switch
Ethernet
PCs with VNM Software Decoder