



North Lanarkshire Council

Highly efficient IP-based CCTV systems from Veracity exceed expectations

The client

North Lanarkshire Council (NLC) is one of 32 unitary authorities which make up Scotland. Despite being one of the smallest authorities in the country by geographical area (covering 184 square miles), it is the fourth most populous with 330,000 residents and has the third highest population density (674 per square kilometre) behind only Glasgow and Edinburgh. It is also the largest council housing authority in Scotland.

North Lanarkshire sits in the middle of Scotland's central belt, bordering the City of Glasgow to the west as well as Stirling, Falkirk, East Dunbartonshire, West Lothian and South Lanarkshire. The authority's largest towns are Cumbernauld, Coatbridge, Airdrie, Motherwell, Bellshill, Wishaw and Kilsyth.

Town Centre Activities (TCA) Ltd administers and manages NLC's CCTV public space network with its primary focus being to provide 24/7 monitoring services in support of community safety and crime reduction.

The challenge

After over five years of operation the NLC's Central Monitoring Unit (CMU) platform needed to be upgraded. Any new solution needed to use the very latest IP-based technologies to enable rapid expansion of NLC's public space CCTV system while helping to reduce the CMU's running costs.

Technology partners selected needed to offer direct access to IT manufacturers to help eliminate any integration challenges between existing legacy CCTV and new networking equipment. It was also

important to eliminate recurring licence fees while using standard 'off the shelf' software to reduce maintenance overheads.

New front-end systems also needed to be intuitive and easy for CMU operators to use. Cameras had to be easy to find in directory trees using intuitive naming conventions and groupings. Emphasis was also placed on ensuring there was no latency between the operator's joy stick and PTZ camera control across the whole system.

Emma Walker, Company Manager, TCA, explained: "It's critical that the police on the ground making rapid decisions about whom to arrest, after a street brawl for example, get the right person. Our monitoring staff cannot afford to miss the key details during an incident because the surveillance camera could not keep up with the action."

Emma Walker summarised the requirement for any new system: "We want to deliver safe communities for North Lanarkshire and great value for money for council tax payers. This meant applying the latest technology where it showed clear benefits for the council quickly and also being prepared to explore options to expand the system."

NLC's maintenance term contractor Scotshield was tasked with specifying and installing a suitable solution.

The specification

Scotshield commissioned a total of 23 Instek NVR32-2U 32-channel network video recorders offering a maximum capacity



for 736 cameras. It also installed a total of 20 Veracity COLDSTORE central storage units each with 20Tb x 10 hard disk drives (HDD) providing a total of 400Tb of capacity with options to more than double this by using all 15 HDDs slots and swapping 2Tb for 4Tb HDDs in the future.

For converting existing analogue camera signals to IP, Scotshield deployed 18 Instek VS-16F 16 channel video encoders with H.264 compression. A further 16 Instek VS-8F 8 channel video encoders with H.264 compression were installed enabling the networking of all 280 original analogue cameras and providing some spare capacity.

Eight Instek nCCTV-4 16-channel display processors and two nCCTV 2-channel display processors, both with dual monitor output for the operator's desk, were installed to drive a total of 16 display monitors across the monitor wall which is now more than 30 feet across and extends onto a side wall. They also drive displays in the Emergency Response Centre. Instek MV-CC5404-QX Command Centre client software was used at each of eight workstations in the CMU. Each workstation was fitted with three Neovo SC-19 19-inch LCD colour display monitors and Axis 295 USB Joystick controllers.

Multi-level mapping functionality within the Instek Command Centre software proved immediately useful. It enabled operators to see on maps where a camera is and what area it covers and then click on it to view live images. Scotshield worked very hard to make sure the naming conventions on each camera were easily accessible by operators. Cameras now sit in groups in a directory tree much like the familiar Microsoft Explorer view. Searches can be

run to reach camera groups quickly.

All cameras in a group can be selected and displayed on the split screen and specific cameras that need closer analysis can be simply dragged and dropped onto a second screen to the right hand side of the operator. CMU operators can view 16 cameras per video wall monitor. A total of 12 65-inch monitors cover one side of the room.

A total of 27 tower blocks that were added to the system included two external PTZ cameras and a total of six IP colour/mono vandal resistant fixed dome cameras to cover the foyer, entrance, exit and two lifts per tower. Two-way audio and alarm input modules were fitted into the cameras that were installed in the lifts. Each tower had eight cameras installed. A further four 50-inch screens were added in the CMU to view all cameras coming from the tower blocks.

Instek nCCTV Network video monitor decoder was deployed to convert digital to analogue signals for CCTV display in the caretaker's offices on a 22-inch LCD colour monitor. A central 12Y 19-inch lockable wall rack houses a 24-port Power over Ethernet network switch which supplies power and network connectivity to each IP cameras via a CAT 5e cable. Local power supplies were installed on top of each lift car for the lift camera only. 100 Mbps connectivity to the CMU is provided by Virgin Media Business.

The existing dual-ring 2Gb metro Ethernet fibre V-LAN together with 100 Mbps local links to all sites provided by Virgin Media Business gave the system the bandwidth and resilience to stream



live and real-time 25 frames per second, multi-megapixel HD images back to the central control room for recording, analysis and onward transmission when necessary.

The Solution: Use of Veracity COLDSTORE cuts CMU running costs by at least 55% despite rapid expansion

Once the contract was secured Scotshield had just three weeks to complete the changeover of the front-end to the new IP-based system. As well as configuring and installing all the new equipment in the server room, fitting out eight monitoring positions in the CMU, increasing the number of video wall monitors and training operatives on the new system, network connections had to be established and tested to 280 existing analogue cameras in public spaces, all while maintaining the existing operation of the CMU.

Graham Thomson, Scotshield explained: "A successful switchover had to be planned carefully. We set up the new Instek-based system on the existing Virgin V-LAN which ran in tandem with the existing live system while training of the CMU operators was completed. We then switched over, site by site with down time per site averaging under four hours for smaller sites and under eight hours on the larger sites."

Veracity worked closely with Instek Digital to complete integration both with CCTV cameras and a range of other control equipment. Network connectivity issues were resolved and tested ready for go live on 5th December 2011, the day the contract with the previous

technology provider expired. Scotshield was able to deliver the switchover on time and on budget.

What is more, very significant system power savings flowed from using the Veracity COLDSTORE video surveillance storage solution. COLDSTORE's hardware and firmware designs are a triumph of low-power electronics. The entire array, even filled to capacity, uses only 40 watts. In a large installation, this can save many kilowatts and significantly reduce the carbon footprint. At NLC's CMU deployment of COLDSTOREs deployment has made it possible to turn off two industrial sized air conditioning units which were together consuming more than 15 kilowatts of power per month before the upgrade. Overall running costs for all CCTV equipment at the CMU have fallen by over 55% when compared to the previous RAID-based storage system.

Graham Thomson, Technical Director, Scotshield, added: "We took the view, in discussion with Veracity, that for North Lanarkshire Council we needed to move away from PC-based technology like RAID-5 where we had seen very high disk failure rates in video surveillance systems.

"RAID was never designed for the 24/7 rigours of video surveillance recording and is even less able to handle the increasing data intensity that comes with multi-megapixel and HD image recording and management. The results are already plain to see: North Lanarkshire has already seen a 55-60% fall in power consumption from the CMU since Veracity's COLDSTOREs went in

and that's despite doubling the size of the system."

Emma Walker, TCA, added: "The system's stability and effectiveness impressed us straightaway. We were also able to detect immediate savings in running costs following the switchover. The contract with Scotshield, Instek and Veracity was then extended so that we could expand the system rapidly to provide surveillance and lift alarms in 27 residential tower blocks in the Motherwell area for the Council's housing department, all now monitored by the CMU."

A total of 216 cameras and 54 lift alarms were networked back into the CMU. Cameras were sited in the corridors, stairwells, lifts and reception areas of each block. The project had a specific brief of promoting community safety and tackling anti-social behaviour which was a concern of residents in many of the multi-storey blocks.

Fixed cameras with two-way audio were fitted into each of the 54 lifts serving all the blocks of flats. All IP cameras were installed in each tower and networked back into the control room within a month.

Emma Walker explains the value of two-way audio in the tower blocks' lifts: "Within a few weeks of the lift audio and surveillance system going in we had an incident. A young girl got caught in a lift which had stopped moving between floors. If that wasn't bad enough it was on the morning of an important exam. She pressed the alarm. Our monitoring team here were able to answer her call immediately and use the two-way audio communication link to calm her down.

"We were able to phone her school and tell them she was going to be late. Simultaneously the alert went out to the lift maintenance team who freed her within 18 minutes. She was even allowed extra time for the exam. This incident proves that the value of the system now goes well beyond standard CCTV systems to providing a valued service to residents."

The Results

NLC has also been able to improve cleanliness in the tower blocks. An ever-present problem of people urinating in the lifts or stairwells can now be tackled in two ways. Those that do this regularly can be easily identified via the new cameras. In the short-term CMU staff can ask the block's cleaning team to go to a specified location and clean it up, instantly making the blocks a much more pleasant place to live.

Once the system was extended successfully into the tower blocks it became clear that centralised management of CCTV and increased capacity of the system has enabled NLC to put surveillance images to work to solve other problems and bring in vital additional revenue.

The CMU now has a specific brief of monitoring

incidents of fly tipping and littering. All 75 CCTV cameras deployed in the region's eight recycling centres are also now centrally monitored, improving efficiency at these sites and reducing theft.

Alick Irvine, Superintendent from Strathclyde Police sums up the value of the new IP CCTV system: "By developing innovative CCTV approaches to tackling crime, North Lanarkshire Council and TCA have undoubtedly improved community safety and reduced crime within North Lanarkshire's communities. The expanding public space network in North Lanarkshire now provides an invaluable policing tool enabling live real-time intelligence and informing a rapid and appropriate response."

Emma Walker summed up: "The new IP-based CCTV system has exceeded expectations. We've been able to build a really strong partnership with Scotshield and Veracity. They've enabled us to build a highly efficient best of breed centralised IP-based CCTV system which is already attracting the interest of many councils elsewhere in the UK."

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