

## **Case Study - Implementation of DVMS by York Regional District School Board (YRDSB) Represents by i³DVR International Inc.**

### **Introduction:**

Situated in the northern part of Greater Toronto Area, the YRDSB has more than 109,000 students and a total of 88 schools. YRDSB is the third largest school board in the province of Ontario, Canada and one of the fastest growing boards. YRDSB's students arrive to schools from the suburb, small towns and rural areas. Some of these schools are also located in these geographic areas as well.

To improve their existing camera security infrastructure in early 2006, the YRDSB invited a number of digital video manufactures to introduce the functions, advantages and benefits of their systems. Working with a consulting company known as the IBI Group, the YRDSB opted for i³DVR International Inc. as the company and product of their choice.

This case study was written with the help of the YRDSB and its purpose is to understand the overall scope of the project, and how it applied to both organizations. This project has been on-going for the past two years. There were many challenges, both technically and administratively. Our main focus is to understand how the YRDSB and i³DVR resolved major issues? This case study addresses unexpected issues that were brought about and the experience gained from the project. Finally, and most importantly, we hope other institutions can learn from our experience and transfer this knowledge to existing or future projects.

### **Traditional security system:**

In August of 2006, the YRDSB installed their first i³DVR Digital Video Management System. Before, it operated a variety of traditional recording devices such as VHS tapes, Embedded DVRs, and simple DVRs. After a detailed need-analysis and some reflection, the YRDSB took the strategic decision to adopt a unique type of DVR giving the board a technological advantage; better manageability of their security technologies.

### **The requirements:**

i³DVR offered the YRDSB three types of products under one umbrella of technology:

1. SRX-Pro 24024 Rack Mount
2. SRX-Pro 48032 Rack Mount
3. Annexus 104/204

### **The criteria for these products are as followed:**

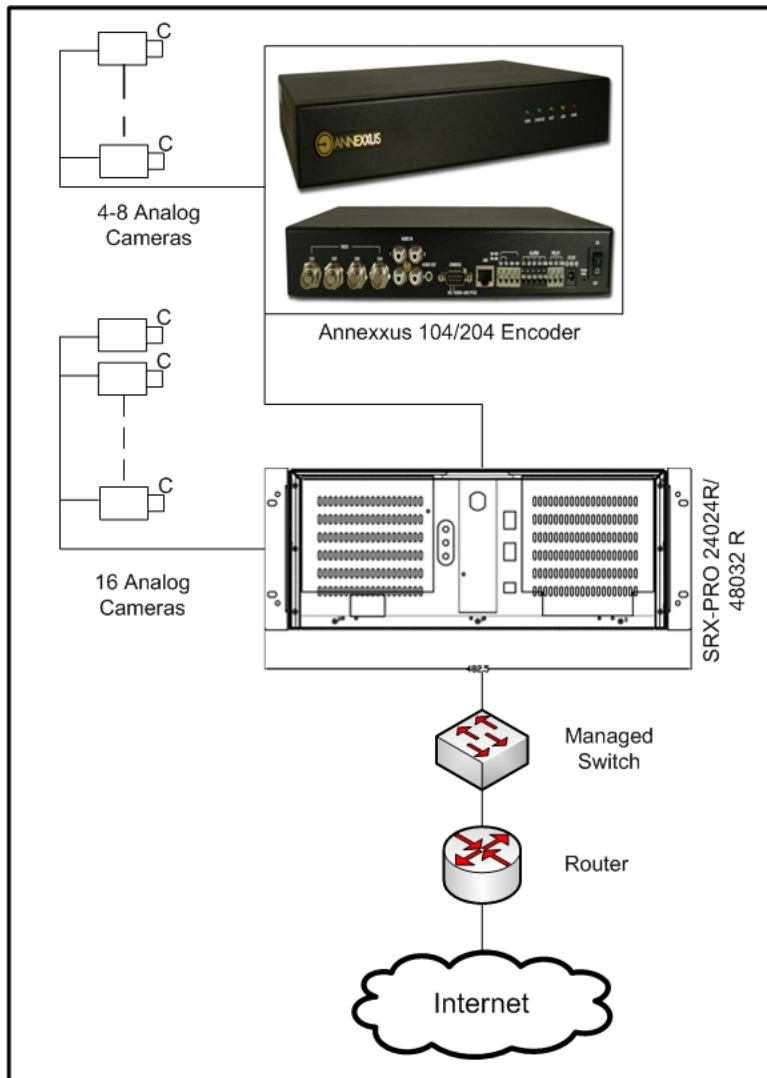
1. Ease of usage for end-user with limited amount of functions
2. Managing user access
3. Remote viewing for multiple users from LAN and WAN
4. Expansion capability – allowing the system to integrate with IP technology giving more video channels
5. Large hard drive storage such as RAID 5 for redundancy
6. Software and hardware upgrade with little cost

### Challenges of the first roll out:

The initial roll out was 45 units throughout the York Regional Secondary Schools and Elementary Schools. Most of the schools housed two of the SRX-Pro 24024 R. This DVMS has a total of 240 frames per second (fps) and 8 IP cameras making it a 24 channel system. During this period, i3DVR did not have the 32 channel SRX-Pro 48032 unit. To compensate for these missing 8 channels, schools often purchased two 24-channels SRX-Pro 24024 units giving them between 24 to 48 channels. The SRX-Pro 24024R has the capability to integrate analog and IP cameras, a huge technological advantage. By adding 8 IP cameras to their existing 24 channel DVMS, it cost less than buying another SRX-Pro 24024R.

### Technical challenges:

Several technical issues existed when the project began. Among the first is the integration of IP cameras onto the existing YRDSB network. Imagine a 10 MB/sec bandwidth and a combination of 25 locations, the result is a 250 MB/sec transfer rate which would considerably slow down the YRDSB network.



The solution was to have up to 8 analog camera signals converted to 8 IP signals via two Annexus decoders to a Managed Switch. The Managed Switch has the ability to transfer both the IP cameras to the local server and the LAN. In this setup, the IP video signals are sent to the local server. The head office, if needed, can pull the IP video signals to another server to be recorded on another Network Video Recorder (NVR). This SRX-Pro 24024R had to be customized with 2 network cards; one for the remote connection and the other for the IP cameras. The figure demonstrates this network configuration.

To adjust from a traditional system to the new DVMS meant that only some of the existing cameras needed be replaced to make the system fully compatible. The Annexus 104 was a cost saving solution for using the existing cameras and converting them to IP signals. It serves two purposes:

1. ability to fully utilize both the new analog and IP technologies
2. continue to use existing cameras without incurring additional costs

Other issues that we ran into were integrating the existing PTZ cameras into the new platform. The introduction of coaxatron code converter enabled the new SRX-Pro 24024R to decode PELCO and Panasonic PTZ (pan-tilt-zoom) camera protocols.

The challenge with this project is the integration of an existing infrastructure to a new platform. The introduction of coaxatron code converters meant that our SRX-Pro 24024R software had to be rewritten to conform to and accept Panasonic and Pelco PTZ cameras. Therefore, consistent communication and strong relationship with the manufacture were needed. Secondly, third party hardware such as the uninterruptible power supply (UPS) also needed to be integrated with the SRX-Pro 24024R software, allowing the DVR to safely shutdown when there is no power. It took the UPS manufacture over a year to upgrade their firmware to have proper shutdown and finally by September 2007, it was finalized. Currently, the UPS is still being upgraded in the field.

Other technical issues arose with third party hardware when using remote connection via a notebook. SRX-Pro 24024R Remote software limitation prevented remote viewing. The technical problem originated from the type of graphic card used by the end-user. There were two graphic modes settings: Direct-X and RGB. Some notebooks made it seamless to have both modes while others can only have one setting. Rewriting the SRX-Pro 24024R remote software and/or configuring the notebook computer solved the existing problems.

Up until now, there were no major issues with the SRX-Pro 24024 R hardware. A minor issue in the hardware was with the RAID 5 LED lights and the constant beeping of the alarm. This was caused by the resistor malfunctioning, however, it was still operating normally. ROHS stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment", it is a standard that is followed by our company and doing so at time compromises the quality of some of i3DVR's component. Sometimes older technologies are not earth friendly but do have better life-time quality.

Logistics and geography became important factors at the very beginning of this project. The coordination of UPS delivery and installation did not occur simultaneously as installation companies were not available to service the YRDSB when needed. By the time the actual project started, it was the beginning of the school year. From the time of the implementation phase within the 25 schools, geography was a big challenge for the both manufacture and YRDSB. Our technical support personnel had to travel to each location which took time and because of traffic conditions that meant we could only serve 3 schools per day. In addition, schools only opened until 16:30 and that restricted us even more.

#### **Administrative challenges:**

Administrative challenges were the most important part of this project cause without people, there was no project. From the start, we established strict installation standards, configured the software, and trained all employees.

Installations were done by different dealers and all of them were executed professionally. Cables were neatly run to a centralized location following international standards. With the help of IBI, the consultant company, specifications were not only met but surpassed. One problem that remained and acknowledged by all parties is the room temperature. Since SRX-Pro 24024R needs to be in a clean, ventilated, and consistent temperature of 20-25 degrees Celsius, this had not resolved yet.

Software configuration was met according to YRDSB's specification. This greatly improved administrative ease and prevented many other unexpected technical issues. Each of the 45 systems in the field is no different than the other except for the IP address and camera names. The process became easier when each of the 45 systems can be remotely controlled via VNC. Every system is monitored closely and to fit these strict standards. Any change is reported and added to our standard checklist. From the manufacture perspective, a team established and monitored all the systems in the field for any discrepancies and communicated regularly with the YRDSB's administrative team. For example, complete instructions and guidelines are on a FTP site for reference and shared by all parties that are involved in the project.

Training was also provided by the manufacture. Two groups participated: the installation personnel and the end-users. Installation companies had to write and pass the Technician Certification exam. At the beginning, training end-users was done on a one-on-one basis; however, this was very ineffective. With the help of the YRDSB, classes were established for one full day, spread out during 3 different times. An interactive CD was also created for those who missed the training. End-users who were highly educated and with a strong background in computer technology made it easy.

#### **Software challenges:**

Perhaps one of the biggest problems is the software upgrade. There were a total of seven software upgrades since the development of SRX-Pro 24024R: version 1.0, 1.085, 1.10, 1.25, 1.3, 1.401, and 1.404. This didn't mean that YRDSB had to upgrade seven times. In actuality, they only had to upgrade 3 times, and all were done by i<sup>3</sup>DVR technical support team. The majority of the upgrades were to tweak the software for improvements. Software updates did not affect YRDSB. These changes were related to the retail industry whereas the YRDSB is education-based. Software upgrades became easier for the manufacturer when most of the systems in the field were connected to a VNC. YRDSB allowed the manufacturer to connect to the board's virtual private network and this was extremely helpful. The YRDSB's IT team also stepped in to assist and support the manufacturer at times making the corrective process seamless. The only constraint was upgrading the remote software on end-user notebooks. This was difficult because of time-constraints which demanded a lot of collaboration.

#### **Hardware upgrades:**

Constant monitoring of the systems in the field resulted in minor changes in the setup of the software. The introduction of SRX-Pro 48032 R, a 32 channel DVMS with analog video, to the YRDSB in August of 2007 was done smoothly. Some of the 16 channel systems, the SRX-Pro 24016, were brought back to the manufacturer to be upgraded to 32 channel systems. This was a simple process because the software is very similar to the 16 channel system. The only difference is in the number of channels (from 16 to 32) and no IP channels on the 32 channel system. This also marked the second phase of YRDSB's project. Another eleven schools were added to the 25 schools.

#### **Conclusion:**

The experience gained from working with YRDSB was very positive. Working closely with YRDSB and responding to their needs was critical to the overall success of the project. There were definite technical and logistical problems; however, all of them were addressed over time by both parties. Good planning and quality standards were upheld by both parties as the key conditions to the success of the project. Many challenges mentioned in this case study are resolved. The biggest challenge to the manufacturer was software upgrade. There were no

hardware related problems. By the end of 2007, there are a total of 33 schools which house i³DVR products and software.

The next step in this project is the maintenance of the DVMS. As more schools install i³DVR products and software, it becomes a mammoth task for the YRDSB. Technical issues will always occur such as hard-drive failure, video loss caused by camera malfunctions, and etc. In December of 2007, i³DVR introduced a Central Monitoring Software (CMS) to the board. It is currently being tested by both parties and marks this final phase of our project.

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