The Changing Landscape of the Surveillance Industry

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The DVR Evolution

The last couple of years have seen a proliferation of Digital Video Recorders (DRVs) in the market. This demand is fueled by the increase in the number of enterprises stepping up their security/surveillance measures after the 9/ 11 incident. According a survey video surveillance is considered as the most effective technology with 24 percent of security experts viewing video surveillance as the solution which will create the greatest impact in securing their facilities (See figure 1).
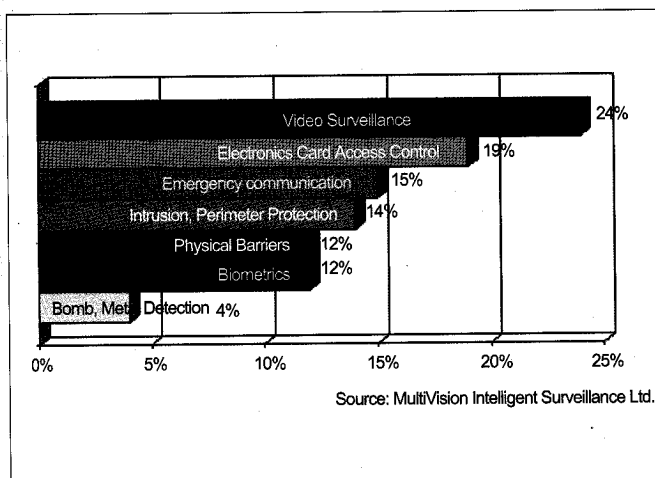

Source: MultiVision Intelligent Surveillance Ltd.

Figure 1. More Effective Security Technology

Emerging Players

Of late, many new companies have surfaced in the surveillance/security industry. These are IT companies on the hunt for their next killer application after the burst of the internet bubble. The smaller IT companies have channeled their efforts into developing DVRs or surveillance applications. The IT giants like Intel and Microsoft are also rooting for this industry by trying to influence the security/surveillance vendors to adopt their solutions as the platform of choice. The network vendors are endorsing initiatives which will help consume the excess bandwidth left behind by the lower internet traffic volume.

The telephone companies are not to be left out of the race. Many of us may have noticed telecom operators providing surveillance services which are bundled with their broadband offerings for the home users. Mobile handset manufacturers and Personal Digital Assistant (PDA) vendors are also providing plug-ins and services for the display of images and video clips transmitted via the network.

The latest announcement came from IBM which unveiled video surveillance services as part of its total service offering to large enterprises. Security services will be more fiercely competed amongst the traditional security services provider like Tyco/ADT with new entries of the like of large IT companies such as IBM. With the influx of the above mentioned big IT brand names, it is a clear indication that the surveillance industry is the next big wave and that substantial growth can be expected.

The new digital world has no doubt opened up the market to new players. As the deployment of digital video surveillance services impact the enterprises' infrastructure, it remains to be seen whether it will be the traditional security services providers transitioning to the digital world or the IT companies penetrating the security market which will emerge as the eventual winners in this race.

The Analog to Digital Migration

End users are really looking beyond just merely converting from using video tapes to the hard disk as the storage media to sharing/transmitting video images amongst various end users via the local area networks/wide area networks. The digital video surveillance solutions are to offer higher compression ratios, require smaller storage capacities and provide value-added capabilities. These requirements are in turn incorporated into the new products of today where digital video recording solutions (which form the core component of the digital video surveillance solutions) are seen to come with motion detection applications, offer pan/tilt/zoom control and remote monitoring via the internet with the easy transmission of video and data.

Numerous criteria are scrutinized in the purchase of a digital video surveillance solution. The digital video recording technology which is the engine of the digital video surveillance solution is the most closely scrutinized component and of late, the topic of the compression technologies deployed in the DVRs has also been vehemently debated.

Focus on Compression Technologies

Compression technologies have come a long way, evolving from single-channel hardware compression to software-based compression solutions to multi-channel hardware-based ones. The compression technology adopted in the DVR system is important as it directly impacts the quality of the video images recorded, the storage capacity required, the bandwidth needed for data transfer via the LAN or WAN. For example, huge video file sizes may result in limitations in data sharing and data loss where some data could be dropped during the transmission process. In some cases, transmission of the data within the LAN or through the internet may not be viable.

Compression standards such as the Motion Joint Photographic Experts Group (Motion JPEG) and the H.261 format offer end users intra-frame compression capabilities. However, these technologies have been developed for specific applications. The H.261 format, for example, is designed for video conferencing and is not able to provide high video quality images which are required for most surveillance applications. Motion JPEG, on the other hand, produces large image files which are not suitable for transmission.

The Motion Picture Experts Group (MPEG) algorithm was developed to address audio and video delivery. Instead of storing entire frames, MPEG stores only the changes from one frame to another frame. The first range of applications designed for MPEG1 was not widely accepted because of the low image quality. There were also integration issues and in many cases, customization was required for the system to work with other applications or systems. While subsequent technology developments using MPEG2 compression have resulted in much better image quality, they are extremely taxing on the system's CPU power. On top of that, transmission of the video images via the internet is not possible due to the high bandwidth requirement.

MPEG4 compression algorithm strikes the balance between image quality, processor power requirement and compressed video file size. It can provide high compression ratios and is capable of offering high resolution audio and video images in file sizes/formats which are suitable for transmission. Also, with the current processor power of a PC and the bandwidth of the PCI bus, up to 8 real-time video channels can be displayed without requiring extra hardware resources.

Moving away from software-based technologies, the last few months have seen hardware MPEG compression chipsets emerging in the market. This technology is able to overcome the drawbacks of software-based compression solutions, requiring less CPU processing power and smaller PCI bus bandwidth to process the video signals than the latter.

Compression when carried out in the hardware frees up the processor to engage in other applications. By not taxing the CPU of the system, real-time display, recording and playback can be carried out simultaneously and image transmission is faster and more effective. The excess processor power freed up by the hardware compression technique can be redeployed in improving motion detection algorithms, integration with security applications such as biometrics, access control etc.

Choice of OS Key to Integration

Digital recording systems have moved away from being just pure recording platforms. As customers demand for complimentary applications, the choice of the platform used for the recording solution becomes crucial in ensuring integration with other applications. The selection of a wrong OS can result in limited expansion capability in the future.

Linux has earned itself substantial fanfare since its foray into the OS market. Touted as an open source, it has been deemed as an attractive platform for application developers to build new applications on. While the solution has been favorably looked upon, it remains nascent to judge. Linux built to perform specific functions and has been designed for the traditional IT applications has yet to prove to be a platform well optimized for digital video recording and integration with the diverse security devices like the alarms and PTZ control applications. Tests on other platforms have yielded the same results.

The Windows OS is the platform of choice for digital video recording. The Windows OS triumphs over the other platforms due to its ubiquity and pervasiveness as a desktop OS. It has over the years proven to integrate well with the other desktop applications and has evolved to provide multimedia applications support.

Blurring Lines

As the line between infocomm and surveillance security blurs, some vendors have successfully touted IP cameras as the path to future proofing organizations' surveillance solutions. This new darling in offering users the ability to leverage their existing cabling infrastructure has been able to put across a lower total cost of ownership propositions to users.

Before jumping onto the IP camera bandwagon, organizations have to evaluate the features and capabilities of the camera, taking into consideration the resolution of the images the camera can capture and its interoperability with the total surveillance system. This is because the quality of images captured by the camera directly affects the image recording which in turn limits the applications that can be applied accordingly. On the interoperability front, users will have to ensure that the integration of the video feeds from the IP cameras is well executed, as there is a constant need for the remote site to interface with the main host site.

Applications as Differentiator

Moving forward, Korea, Taiwan and China will no doubt lead in producing low cost digital video capture boards and chipsets. Japan will continue to dominate the surveillance appliance market with the production of DVRs replacing VCRs in the home entertainment and SOHO markets.

However, it will be the applications that drive the digital video surveillance market and set the organizations apart. End users aside from requesting for better viewing/ display and recording resolutions and price-performance ratios will be looking to adopt vertical solutions which can meet their specific needs. Existing DVR companies need to provide additional value-add in their equipment for integration with security devices in order to survive.

Migration and upgrading options will also be a huge cause for concern. And it is the solutions which are based on industry standards which will prove to be able to better cater for these requirements. MultiVision's range of solutions in integrating seamlessly with the analog solutions takes away the cost of having to reinvest huge amounts of money into new equipment and software purchase and training on the new systems.