



Open Architecture Networked Digital CCTV Systems

by *Olly D'Souza*

Introduction

The proliferation of Digital Systems will see many manufacturers trying to sell into the huge replacement market for VCR's. There are several reasons for this trend to digital. Firstly the perception that digital is better at providing quality images. Secondly the hype about the ability to send images anywhere, anytime, look in remotely, etc, are ideas that are promoted in customers minds to sell something new into an industry by using the old security industry paradigm. However, if we look at the whole digital game using concepts derived from an IT industry, the security industry would need a paradigm shift to truly harness the capabilities of the digital platform for integration of all security technologies.

In this article a successful implementation of an open architecture networked digital environment for CCTV is presented. Ideas on integration of Access and Intruder Detection security technology is proposed using the high bandwidth real time aspects of video to redefine the operation of alarms and access control systems.

The Open Architecture Concept

It would not be difficult for an IT person to visualise a system that was made up of modular components, located on a high speed fail safe network backbone. If each of them communicated with each other, shared operational information

stored in data repositories located somewhere on the network and where each module has its own specific integrated task.

With the common interfaces, standardisation of data and network protocols, software and hardware architectures designed to enable "high speed networking", it is possible to establish all security related activity on a Virtual Private Network using the same IT high speed network backbone.

The existence of no common interface or exchange protocol standard and modular components for security are probably the real hindrance to achieving a true open architecture system in the security world.

However using existing IT TCP/IP backbones and establishing modular component interfaces, will enable most security devices to use the TCP/IP backbones available.

The Networked Digital CCTV System

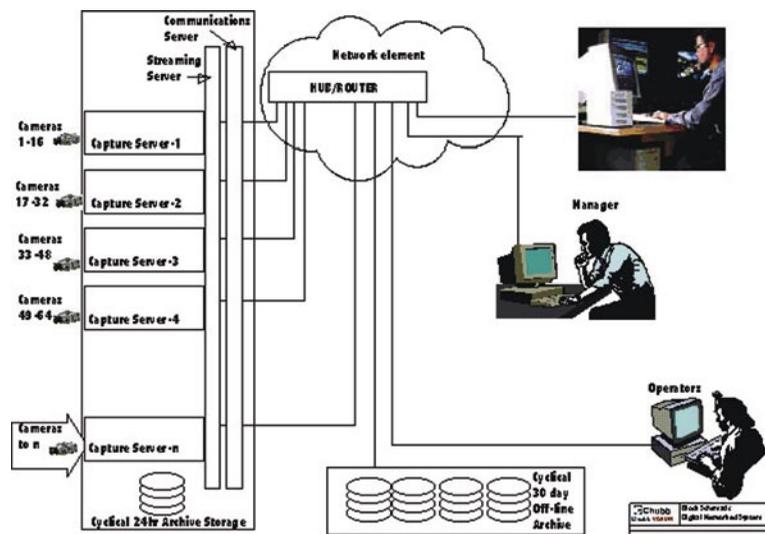
If the concept of a matrix switcher, video multiplexer, sequential switcher and digital recorder/player were implemented using an IT paradigm it would eliminate several

independent boxes to be wired together. And if all this were achieved using a TCP/IP backbone and carried as digital data anywhere, anytime and at any speed it would be a boom indeed.

A team of software hardware engineers at Chubb Vision have come up with a system that operates not dissimilar to the concept above.

The block schematic shows video capture servers that perform as multiplexers and file servers and can be anywhere. The common thread that ties the video capture servers together is the communication smart software modules that allow multicasting and streaming to occur.

Client or operator consoles are shown that deliver different operational functionality. Operators would be concerned with quickly going to a particular camera and setting up the cameras on their monitors that help them do their task better. On the other hand the Manager would only like to view the camera of concern and probably record it on their local machine to analyse it. Administrators of the system would like to make sure that all systems are operating making sure that fail safe measures are put into place to make things happen.



Modular components:

The system's modularity is achieved by using a client server configuration to separate the multiplexing/recording function and the remote viewing/management function. Each function such as recording, playback, search, backup are implemented using software engines that operate as virtual machines sharing control and management information between each other.

The Multiplexing/Recording function is setup as an independent "node" that can look after 16 cameras, record them continuously, or on an alarm trigger setup via a low level contact input or a video motion detection setting. The smart capture software engine manages the recording function.

The smart search software engine is the portal to the recorded information on the server

The client is the portal to the Information stored on the "network" allowing at a glance viewing of the whole configuration, all cameras attached and all days stored.

Standards and interoperability

The necessity that all the modular components work on standard operating systems using state of the art software, hardware components

and on networks is apparent in this changing environment.

All digital images created use the software compression engine; hence the standards used are JPEG, MPEG and in future Wavelet. Where hardware assisted compression is required, the optional compression hardware add-on is modular enough to be part of the multiplexing software driven field/frame switch.

The virtual engines sit atop a standard operating system like WINDOWS 98 which is capable of functionality that writes directly to video image memory using techniques such as Direct-X.

The viewing engine uses technology such as Multicasting and streaming that manage data from a "transmitter" to several "receivers" that are on the network. A receiver could act as a "reflector" and manage the distribution of this signal down the line. This technique makes the estimation of load and management of network bandwidth possible.

Conclusion

In a world that is Internet aware and that feeds off every development in the area of multimedia connectivity, we are overseeing the inevitable demise of the analogue CCTV paradigm, where every camera must come to a central box and then be distributed to operators who are stuck at a single

location, on media that is sequentially recorded so that it cannot effectively use "search" technology that the world is getting used to.

The ability for an authorised person to view the images, record them, search for images, analyse them, catalogue them, archive them and then manage the final stages of the presentation material to enable successful prosecution is paramount.

The platform based on well tried out IT topologies using state of the art technologies will become a significant component in tomorrow's secure world because it lends itself to integration of all security and safety techniques on a unified backbone.

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