Extending IP Video Systems over the Public Internet

As IP Security & Surveillance becomes commonplace on corporate IT networks, the ability to extend a system's reach beyond the company boundary to include off-site cameras and remote viewing clients becomes more and more appealing and can often help sell such systems.

The recent emergence of consumer broadband makes the Internet seem like the natural choice, especially when you consider that a 2Mbps ADSL connection can cost 10 times less than a leased line. However, the solution is not quite so simple.

Bandwidth

The first factor to consider is the actual bandwidth of a broadband connection. Both ADSL and cable broadband are generally promoted using the downstream bandwidth. While this can vary between 512Kbps and 2Mbps, due to the asymmetrical nature of the technology, it is rare to get an upstream bandwidth above 256Kbps.

Although this has little effect on every day tasks such as web browsing and email, connecting an off-site IP Camera over such a connection will always be subject to this upstream limit, as will remote access to the surveillance system.

Data Loss

Fundamentally the Internet is unreliable; on any day between 5% and 20% of data can be lost. This is unnoticeable during typical use such as web browsing and email, as lost data is resent causing at most a slight delay.

However, where real-time data (audio/video) is concerned, data loss has a greater impact. It can cause video 'blocking', distorted audio, latency, dropped frames and in extreme cases connection loss.

Compression Technology

The choice of codec used across the Internet seriously affects the system's performance. While frame-based video codecs such as JPEG and wavelet may appear to perform well under data loss, their bandwidth-hungry nature can cause network overload leading to latency and dropped frames. This is also true of Mpeg2 which, although stream-based, also has a high data-rate.

Other stream-based codecs, including Mpeg4 and H.264, have been designed to cope with data loss and can perform much better across the Internet consuming less bandwidth, whilst providing higher frame-rate video.

◼ Transmission

Internet transmission technology plays a large part in the perceived quality of an IP Video system. TCP and UDP are the key transmission protocols here, TCP provides a lossless reliable connection but with high latency, UDP provides expedited delivery but with no guarantees. UDP is great for transmitting Mpeg 4 while JPEG is best sent using a reliable TCP connection.

When transmitting data over the Internet, there is the added complication of firewalls. Every broadband connection to the Internet should be behind a firewall to prevent unauthorised access. However, it is very hard for UDP streams to cross firewalls successfully. TCP can also be blocked by some firewalls and there are no hard and fast rules to follow.

◼ Conclusion

As we have shown, transmitting live media over the Internet is an appealing goal but one which needs a lot of consideration. Dealing with compression technology, streaming protocols and wide area network topologies can cause many projects to falter at the first hurdle.

The simplest and most flexible solution is to provide a server to arbitrate between the high quality media transmitted effortlessly across the corporate LAN and the much more difficult task of Internet transmission.

Quorum Stream has been specifically designed to address all of the issues of Internet broadcast. Built using internet standard protocols such as RTSP, HTTP and RTP, Quorum Stream allows seamless intermixing of high quality LAN based media with low bandwidth WAN based media.

Our customers benefit from much faster time-to-market, reduced knowledge requirements and the many years experience of the Codestuff Team.

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