

SightSpeed Video Messenger

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SightSpeed Video messenger is a video codec primarily targeted for video conferencing (person to person). The advantages touted by the product on its web site are high compression ratio (90:1) and low latency (11 ms). These figures for latency assume a high speed internet connection. The core technology explained below and a high speed network connection allow SightSpeed to send 30 frames a second at latencies which are well below the human threshold.

The idea behind the compression technology which also helps reduce the latency, originated from Cornell's Laboratory for Digital signal Compression and Video Encoding Research (DISCOVER). This technology exploits the fact that the brain is capable of interpolating missing information with the information received in the previous frames. So for example, in a moving picture, only the edges are enhanced and the inner details are degraded. The brain is able to interpolate the information and hence the quality is maintained. Also, there is a lot of data that the eye is unable to perceive even though it is sent as part of the original video image. The new technology permits not to send this redundant data and thus results in lower bit rate and higher compression. This is called the psycho-visual model and includes techniques such as chromatic adaptation, spatial/temporal filtration, contrast sensitivity and perception enhancement.

The approach is different from the normal data compression algorithms which look for patterns within the data. This allows further reduction in the amount of data to be processed and sent over the network. It is claimed that this also reduces the amount of server processing and also the bandwidth required over the network.

The software establishes a peer to peer connection once the end points are identified so that the overhead of going through the directory server is minimized. Video data passes directly between the end points once the identities and path are established using the directory server.

Transport:

SightSpeed has its own proprietary protocol for encapsulating the video packets. These packets are then packed into UDP packets to be transported over the internet. (Information about their proprietary protocol was denied access). Since the kind of compression etc is customized, it is touted to be more efficient because both the client and the server can decipher the actual content. This may however constrain scalability as the video stream cannot be used by any other client software.

Rate adaptation for congestion control, dynamic bandwidth sensing and error correction/resilience are a part of SightSpeed proprietary protocol.

Use of UDP required only the UDP port to be accessed. This means that firewalls can be configured to include SightSpeed by modifying the rule set and without exposing any other ports for communication.

Security:

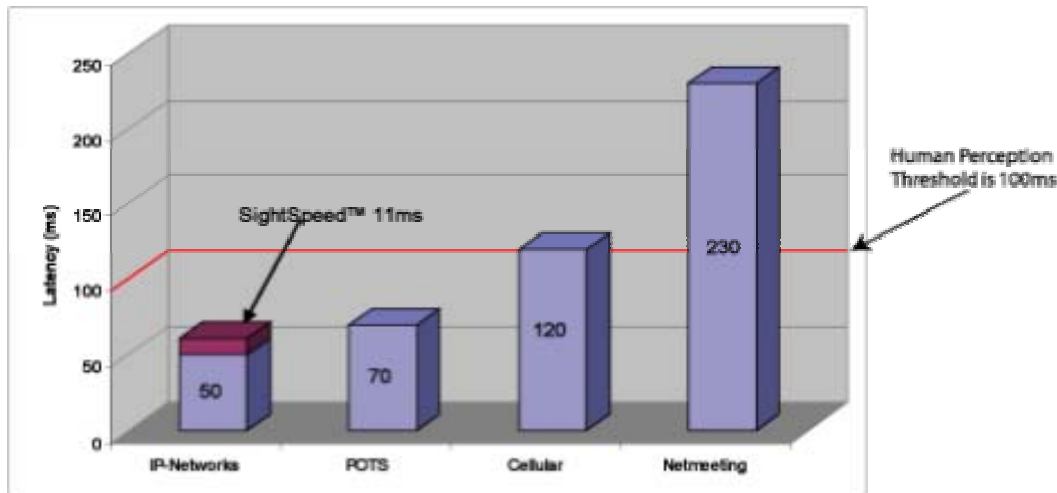
The connections with the directory server are encrypted using 128 bit SSL. The eventual peer to peer connections for actual video communication are secure because the protocol used for transport is proprietary. Also, another layer of security is added by requiring that the decoding layer needs “change frames”. The concept of change frames means that previously sent packets are needed for decompression. Thus to compromise the security, an eavesdropper would have to capture the entire data stream.

The peer to peer stream can also be encrypted using, algorithm such as triple DES or AES with 128-256 bit security. However, this encryption and decryption requires more bandwidth and processing power thus possibly increasing latency.

The following are some comparisons **gathered from www.sightspeed.com**.

| | CUSeeMe - Click to Meet | Netmeeting | SightSpeed |
|-------------|-------------------------|------------|-------------------|
| Compression | 2:1 | 15:1 | 90:1 |
| Latency | 450 ms | 250 ms | 11 ms |

Latency is the lag between the event and its perception. As shown below, SightSpeed has superior latency figures:



SightSpeed was designed for high speed networks and systems with modern day computing capabilities. It is not suitable for dial up networks.

We tried to contact the support and sales staff at SightSpeed, but they declined to provide any information that was not available on the web site.

Some improvements cited have been support for multi party conferencing and a lower quality (but not jerky) video for dial up connections using scalability etc. Also it is not known if the technology uses Object based encoding or not. The compression ratio could be further increased by using sprite coding etc.