Introduction:

NetStreams' vision for distributed video is one that consistently distributes high definition video (up to 1080p) in an all digital format over TCP/IP on an Ethernet network. By distributing video over TCP/IP, drastic improvements in flexibility, scalability, and price / performance are achieved over traditional video distribution methods. In addition, the incorporation of a distributed architecture and distributed intelligence allows for flexibility and easy expansion, since A/V sources can be located at head end (as in traditional systems), or can be located anywhere on the network. Another advantage easily realized is the reduction of installation and maintenance costs, since an IP-Based distributed entertainment system can be integrated into a segmented section of a standard network.

Of course, since TCP/IP was primarily developed for data transmission across a network, there are some fundamental challenges with using that protocol to distribute video. Network bandwidth can become a constraint to quality, packets can be lost if the network is not managed correctly, synchronization of signal distribution can be a challenge, and backwards / forwards compatibility with legacy and new sources also presents an issue.

Only *NetStreams* has been able to solve all of these issues and distribute the highest quality (1080p), uncompressed video, point to point and point to multipoint over a TCP/IP on an Ethernet network. This whitepaper explains *NetStreams*' proprietary *PixelPerfect* technology and how it contributes to *NetStreams'* ability to consistently deliver the best video signals to multiple displays across a TCP/IP network.

What is Packet Loss and why does it occur?

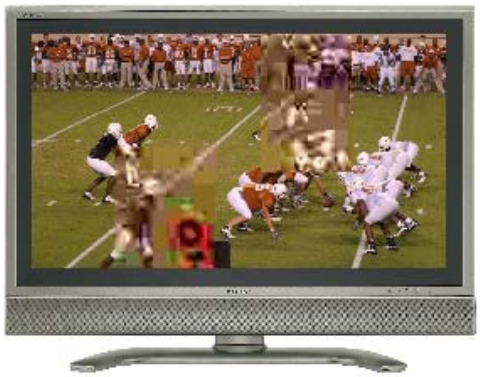
When data is distributed over TCP/IP, the data is first chopped up into packets for distribution over the network. These packets are sent out sequentially. However, due to the architecture of the network, they may not all arrive in the same sequence. In fact, sometimes they may not arrive at the intended destination at all. Packet loss can be caused by a number of factors, including signal degradation over the network medium, oversaturated network links, corrupted packets rejected in-transit or faulty networking hardware.

Performance issues caused by Packet Loss

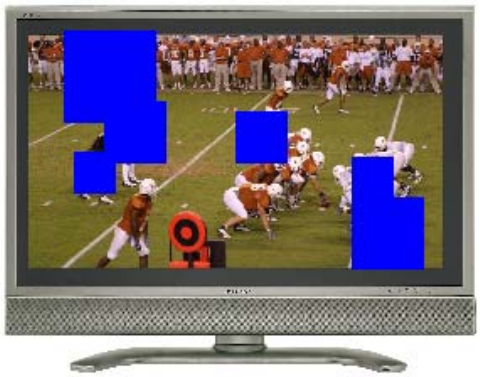
Lost or dropped packets can result in highly noticeable performance issues or jitter with streaming technologies, including video. Packet loss can occur when distributing a video signal (even a compressed one) over an Ethernet network, causing the picture to appear blotchy, color to be lost, or chunks of the picture to be gone all together (as depicted in the graphics on the next page).

NetStreams PerfectPixel Technology insures faithful video reproduction over the *DigiLin*X Network

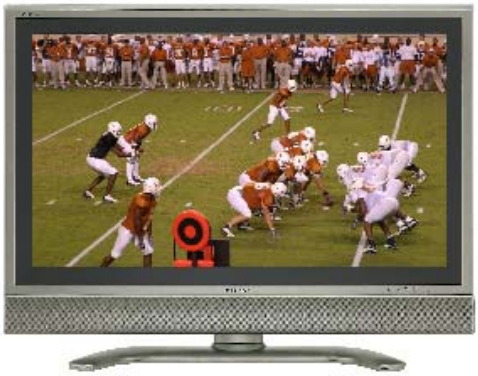
NetStreams' *PerfectPixel* technology solves this issue with both compressed and uncompressed signals over the network. *PerfectPixel* is a combination of *NetStreams*' proprietary algorithms for packet delivery optimization and error concealment algorithm, insuring reliable delivery of video data and eliminating dropped content across the network. The result is pixel-for-pixel, high definition video distribution with consistency of high quality images across the network, regardless of distance.



Packet Loss with a compressed signal being distributed over the network, causes blurry areas in the picture.



Packet Loss (with an uncompressed signal being distributed over the network), causes color blotches.



NetStreams' *PerfectPixel* technology optimizes pack delivery, insuring no lost content of uncompressed or compressed video over the network.