



## NOVIX VIDEO STREAMING TECHNOLOGY HELPS CLIENT LAUNCH e-LEARNING MANAGEMENT SYSTEM

### ***The Client***

The client, a SEI CMM Level 5 certified organization, is end to end information technology services & solutions company with an expertise in a wide range of business applications including high end mission critical applications requiring near real-time processing speeds.

### ***The Challenge***

One of the company's flagship products is an electronic Learning Management System (e-LMS) that enables users to deliver and manage learning resources efficiently and cost effectively on the internet, intranet or extranet.

In its quest to launch the best possible interactive user experience in its e-LMS product, the client faced the following challenges:

1. Need for an end-to-end solution that can capture audio and video from the sound device and camera respectively, encode these using suitable codecs, and then transmit over VSAT networks.
2. Need for real-time transmission of video and audio and maintaining lip-sync between the video and audio at all times and under all network conditions.
3. Minimize latency in video streaming for real time experience.
4. Correct reproduction of chroma (true colors) after encoding-decoding and processing.
5. Allow a range of options (varying and controlled bit rate, dynamic post processing of video, quarter pixel motion estimation, Multicast IP, TTL, etc) that allow them full control over various session parameters.
6. Enable video streaming over a wide range of bit rates starting from 96 kbps to 1024 kbps.

7. Need for a picture-in-picture solution wherein a student video (who is perhaps asking a question) can be inserted in to right hand bottom corner in a bigger instructor video so as to show two different videos simultaneously to all the participants. This “combining” of videos is to be done without degrading video quality or increasing bandwidth requirements.
8. Integrate such a technology into their e-LMS product seamlessly, since their product development was already underway.

## ***The Solution***

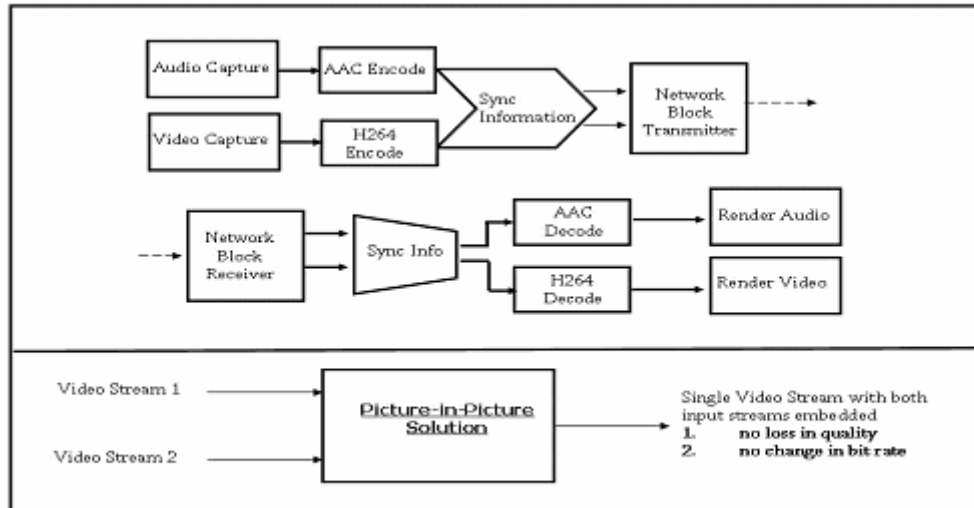
As a part of NOVIX's video streaming technology, NOVIX offers the complete software technology suite that can be integrated with ease into the user's application to give a ready-to-deploy video streaming system.

NOVIX observed that the client had begun developing their e-LMS system with Java Media Framework (JMF) acting as their streaming architecture. However due to the host of problems associated with JMF, most important among them being poor synchronization between audio and video and low quality videos because of the H.263 codec used in JMF, the client was looking for an alternative solution.

With the above points in mind, NOVIX proposed and implemented the following solution, successfully meeting all the requirements:

1. Keeping in mind requirement of extremely low bit rates and high video quality, NOVIX proposed usage of its H.264 / MPEG4-AVC video codec implementation. NOVIX's H.264 video codec implementation offers extremely low bit rates while retaining excellent video quality.
2. NOVIX suggested use of UDP (User Datagram protocol) coupled with RTP (Real time Protocol) over multicast network. The combination of UDP and RTP is suitable for real-time streaming of multimedia data.
3. NOVIX offered all the modules, including video encoding – decoding, MPEG4 AAC audio encoding – decoding, RTP packetization and de-packetization so as to deliver comprehensive streaming solution. (see diagram below)
4. All the qualitative requirements with respect to video quality, low bit rate, low latency, true color reproduction, etc were obtained maintaining correct synchronization between audio and video frames.

5. NOVIX's technology components were delivered as DirectShow blocks (multimedia streaming architecture from Microsoft) to allow easy integration.
6. NOVIX developed a Picture-In-Picture (PiP) solution, without compromising on the video quality and while maintaining sync info between audio and video of each of the video streams.
7. NOVIX demonstrated the system's qualitative and quantitative parameters by deploying the solution on a Live VSAT network.



**NOVIX Video Streaming Architecture**

### **Solution highlights include**

- ✚ Use of NOVIX's high performance H.264 video encoder and AAC audio encoder enabled transmission of high quality audio and video at extremely low bit rates.
- ✚ Use of NOVIX Real-time Network Server and Client blocks ensured that video and audio are always transmitted in real-time and remain in-sync with each other.
- ✚ Complete support to the client's product development team to ensure that the integration of NOVIX technology into the clients system is flawless and makes the product a success.
- ✚ Rigorous testing of the integrated system in various network conditions and varying bandwidth demonstrated the error- resiliency of the delivered technology.

## ***The Benefits***

The technology delivered by NOVIX made possible the timely completion of the client's product while meeting all the specified criteria. The client was able to focus on their core competencies without having to worry about the underlying technology.

### ***For a live demonstration contact***

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## **About NOVIX:**

NOVIX Technologies is focused on providing highly optimized video and audio streaming and compression solutions for a variety of applications including entertainment, distance education and security surveillance. We have expertise in implementing video, audio and speech codecs on a variety of platforms including ARM9, Texas Instruments DSP processors and Media processors. We provide extensive technical support to the client to ensure that our technology gels well with the client's end-application.

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