Military Application Deployment Based on Aculab

The client is one of the largest PFI contractors providing defence and security systems to defence and ministry agencies around the world.

Their involvement drives forward the development of integrated system solutions to meet the new challenges confronting today's armed forces. As a leading systems integrator, they are acknowledged experts in the areas of information systems and networks, secure end-to-end communications solutions, and battlespace management systems.

Military application deployment
based on Aculab

The challenge

The client was in the midst of a project to develop a voice and data gateway solution with secure interoperability features to offer into the defence market. Once embarked on the project, it became clear that their traditional suppliers were having difficulty meeting the stringent demands placed upon them. Furthermore, the client felt that, even given more time, the incumbent suppliers were not going to be able to match the specifications needed for the product to meet its unique selling point criteria.

Time was running out if they were going to meet their market delivery deadlines and introduce an optimal product. Requirements for operating system support, military standard voice codecs and data communications modem functionality were understood and to a large extent available. However, the crucial factor that needed to be overcome was related to the channel density required from the small form factor gateway.

Voice compression and transcoding are DSP-intensive tasks and warrant a degree of flexibility not often found in a component- off-the-shelf (COTS) product line. The challenge was to be able to provide a guaranteed channel count performance, regardless of the combination of codecs in use. Or to put it another way, the client required sufficient DSP processing power to support 120 channels of all supported codecs in any configuration.

The requirements

The planned gateway was designed from the perspective of network connectivity, providing 120 channels of secure, high grade voice and data in a small form factor. It was intended to allow the use of many existing compliant devices to achieve end-to-end encrypted speech and data services and interconnects to existing secure speech networks. Two models were to be produced; for so called red and black network enclaves.

The client needed an enabling technology solution that would allow it to offer the first such compliant gateway devices in the United Kingdom.

Support for both commercial and military standard voice codecs was listed in a procurement specification provided to Aculab. Additional requirements included a V.32 data communications modem and
Q.931-based ISDN signalling protocols, Q.SIG and EuroISDN (a.k.a. ETS300). Timescales already committed to meant that Aculab were asked to develop the necessary capabilities in a just a few short months.

The requirements for the codecs were as stated above, namely that sufficient DSP processing power to support 120 channels of all supported codecs in any configuration was needed. Rigorous demands for data rates, latency (delay), mean opinion score (MOS) quality assessments, and throughput performance were also stipulated as was the need for the resultant software and APIs to run on the QNX operating system.

The client insisted on a single card CompactPCI (cPCI) form factor solution in order to be able to convert speech or modem data from ISDN to RTP/UDP/IP packet data in the small form factor package they set out to manufacture. Network interfaces and termination were to be standard E1/T1 presented via RJ45 connectors on RoHS and standards compliant hardware.

The solution

Once the opportunity was presented and the essential requirements understood, Aculab engaged in detailed technical discussions with the client. It was quickly established that Aculab's Prosody X cPCI platform had the necessary capabilities and importantly, the inherent flexibility in design, to be able to cope with the tough demands. Being designed as a media processing platform for IP applications, with IP-to-TDM gateway functionality as a standard option, meant Prosody X was the ideal choice.

The next step became dependent upon time and after careful consideration of priorities and the time period in which it had to operate, Aculab made a commitment to the client. This was based on an agreed specification and statement of compliance against a matrix of requirements. Software, firmware and APIs were developed and tested by Aculab to run on the QNX operating system as desired. Following initial delivery, Aculab happily participated in support of client testing of the resultant software packages.

Apart from porting its regular media processing resources to QNX, Aculab also ported a multi-channel, multi-thread, real-time implementation of the 600/1200/2400 bps MELPe vocoder to its Prosody X DSPs. The U.S. and NATO standard MELPe vocoder (MIL-STD-3005, STANAG 4591) provides complete, state-of-the art, low-rate voice communications.

Military application deployment
based on Aculab

MELPe, G.711 and G.729d codecs were designed to be software selectable on a per call basis and to support 120 channels in any configuration as demanded. In addition, the conventional media processing resources of the Prosody X cPCI card, including recording and playback of G.711 A-law voice data on any channel at any time, were employed.

The payload size and format of the RTP/UDP/IP packets generated by the Prosody X card met the constraints requested by the client in order to minimise the end-to-end delay of the system. Crucially, in order to ensure this was achievable, the jitter buffer is adaptive within 'n' frames and is software selectable. On the ISDN side, the detailed support for Q.SIG and EuroISDN, specifically overlap receiving, was provided from Aculab's standard signalling protocol portfolio.

The conclusion

In this case, it is clear that a responsive commitment to bespoke engineering development sets Aculab apart as a key supplier of specialist, DSP-based media processing and signalling protocol support. Whether for the implementation of specific operating system support and data communications functions to meet client specifications or the development of APIs to support MIL-STD vocoders such as MELPe, Aculab has what it takes to deliver, on time and in full.

About Aculab

Aculab provides deployment proven telephony products to the global communications market

Whether you need telephony resources on a board, on a host server processor or from a cloud-based platform, Aculab ensures that you have the choice. We are an innovative, market leading company that places product quality and support right at the top of our agenda. With over 35 years of experience in helping to drive our customers' success, our technology is used to deliver multimodal voice, data and fax solutions for use within IP, PSTN and mobile networks — with performance levels that are second to none.

For more information

To learn more about Aculab Cloud and Aculab's extensive telephony solutions visit:

www.aculab.com

Contact us

Phone
+44 (0) 1908 273800 (UK)
+1 (781) 352 3550 (USA)

Email
info@aculab.com
sales@aculab.com
support@aculab.com

Social
@aculab
aculab