

case study

E1 line card development

Asidua's client – a major telecom device manufacturer – was involved in a project with a leading communications solutions provider to migrate the delivery of its legacy circuit-switched service offerings to its next-generation network.

This network would allow for multiple services to be delivered simultaneously, from fast Internet access and video-on-demand, to voice and data telephony using VoIP. The communications solutions provider required for business E1 services to be part of their multi-service offering.

□ **technology mix**

Platform

- Montavista Linux running on MIPS

Network Processor

- Wintegra WinPath

E1 based technologies

- Transwitch/Infineon E1 devices

SDH based technologies

- Transwitch SDH devices

Voice based technologies

- Transwitch POSPHY Interface devices
- Zarlink Ethernet Switch
- TI DSP's & VoIP firmware

Interface Bus Architecture

- POSPHY (Wintegra, Transwitch)
- Multi-channel HDLC TDM Bus (Wintegra)
- GMII (Transwitch, Zarlink)
- MII (Zarlink, TI DSP's)

□ **key objectives & specification**

Asidua was tasked to develop the software for the E1 line card sub-system. The principal objectives were:

- Configure and manages 8 customer E1, via electrical E1 interfaces or via an SDH STM-1 Fibre optic connection
- Terminate the ISDN Layer 2 Q.921/DASS2/DPNSS transport protocols
- Facilitate the conversion of E1 bearer channels into VoIP
- Interoperate with existing POTS voice line card sub-systems including reuse of sub-system software components
- Provide consultancy to the telecom manufacturer for ISDN

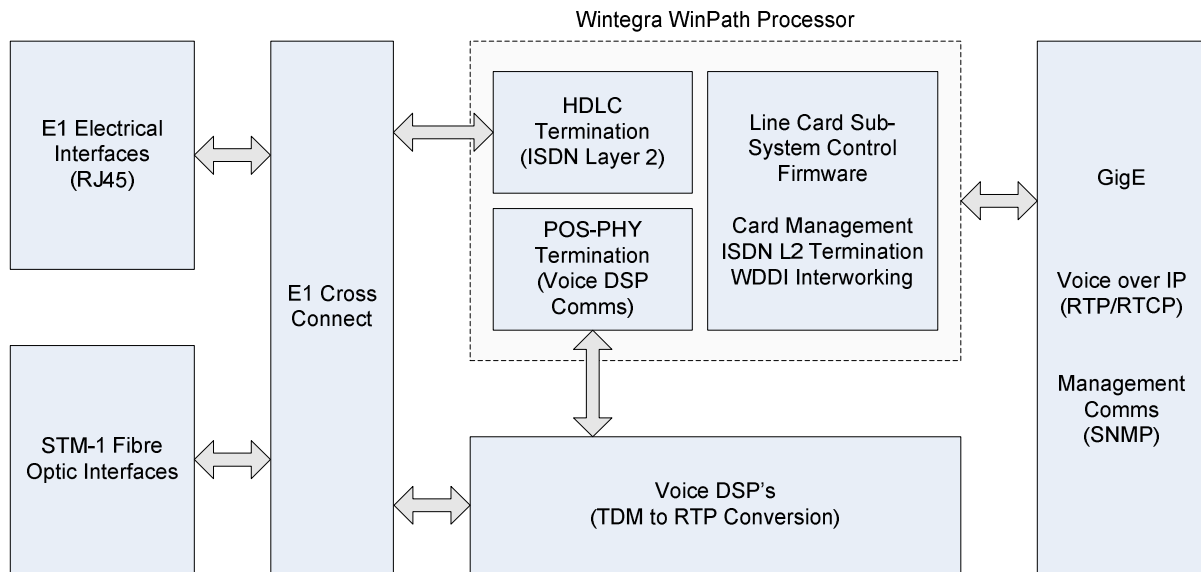
□ **successful outcomes**

1. Development of abstracted sub-system voice component

The Voice DSP's, hardware architecture and firmware used to convert the TDM based voice to RTP (VoIP) were of a new generation from that used on the existing POTS voice line card sub-system. These new components represented a challenge for the reuse of existing software of the POTS line card. The existing POTS voice sub-system was modified to accommodate the new voice architecture whilst maintaining compatibility with the existing POTS architecture.

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□ **successful outcomes**

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2. Development of ETSI compliant SDH sub systems

The hardware architecture utilized a primarily SONET based design. Asidua had to ensure the firmware that managed the hardware facilitated correct operations of ETSI SDH STM-1 operation including:

- ETSI compliant SDH overhead processing and insertion
- ETSI compliant alarm generation and masking
- Interoperability with existing SDH infrastructure

3. Development of concurrent termination of ETSI ISDN and DASS2/DPNSS services

The firmware requirements stated that the E1 line card sub-system must be able to terminate any existing Primary Rate ISDN service, namely ETSI ISDN, DASS2 or DPNSS. Asidua had to adapt existing ISDN Layer 2 protocol stacks to allow them to interoperate concurrently for any customer service.

4. Development of ETSI ISDN and DASS2/DPNSS simulation services

As the line card sub-system terminated only the ISDN transport protocol, Asidua developed a complete ISDN Call Control application in order to allow ISDN calls to be made on the E1 line card sub system. This allowed for the integration testing of all of the major components of the firmware design prior to the final integration into the overall system, saving the customer much time and effort that would otherwise have been required.

5. Consultancy of ISDN to the customer

Asidua has a wealth of engineering experience in E1 and ISDN and has assisted the customer in the requirements capture necessary for the customer to provide a suitable solution to the leading communications solutions provider in the form of ISDN experience and ISDN training. □