



AdvancedTCA platform addresses multimedia applications

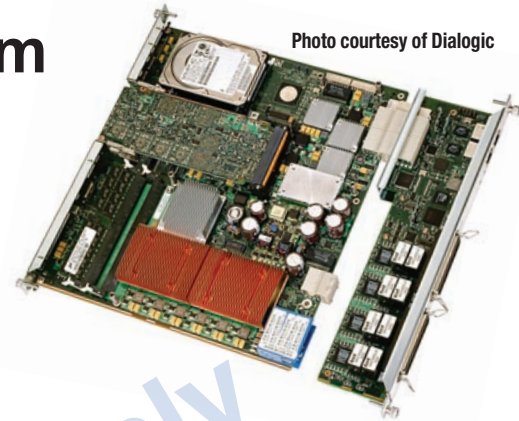


Photo courtesy of Dialogic

A large projected revenue center for AdvancedTCA products and services involves the current and ongoing deployment of wireless and multimedia networks. Large projected revenues associated with providing a combination of voice, video, and Internet services are driving cable, Internet, and wireless service providers to heavily invest in products and services that get them to this end game. Dialogic has recently made available an AdvancedTCA blade with a substantial amount of software capability targeted at precisely this market. I spoke with Alex Mushkin, product manager for the Dialogic Multimedia Blade, to discuss what Dialogic has been doing and get more insight into this AdvancedTCA platform.

A company evolves

Intel purchased the original Dialogic in 1999 and during the period the business was part of Intel, the Dialogic division expanded into a mixed product and technology portfolio targeting enterprise and service providers. Dialogic developed Host Media Processing (HMP) software,

a technology that facilitates network-independent multimedia application programming using standard off-the-shelf computers as opposed to specialized DSP hardware. Since then, Dialogic HMP software has evolved into a powerful media processing product covering a broad range of telephony applications and developers' needs.

The Intel/Dialogic combination generated a significant amount of synergy between telecommunications and HMP. But Alex points out that since the business was purchased by today's Dialogic last year there is far more focus on providing the best product portfolio for enterprise and service provider applications irrespective of the underlying technology.

Dialogic's long-standing expertise and innovation involving telephony, IP, wireless, and video technologies have served it well in the development of this new multimedia platform. HMP has been incorporated into this multimedia platform and provides the overarching framework into which the latest wireless,

wire line, and Internet multimedia protocols and standards have been included.

AdvancedTCA multimedia platform hardware

The Dialogic multimedia platform hardware consists of three AdvancedTCA components, which include a compute blade baseboard, an AdvancedMC plug-in, and an optional Rear Transition Module (RTM). Figure 1 shows the multimedia platform block diagram.

The multimedia platform plugs into a PICMG 3.0 compliant chassis with a shelf management controller installed.

Five years ago, the business delivered HMP-based products with a capacity of 64 channels of voice using the G.711 codec per server unit. Today, the multimedia platform provides 500 ports of

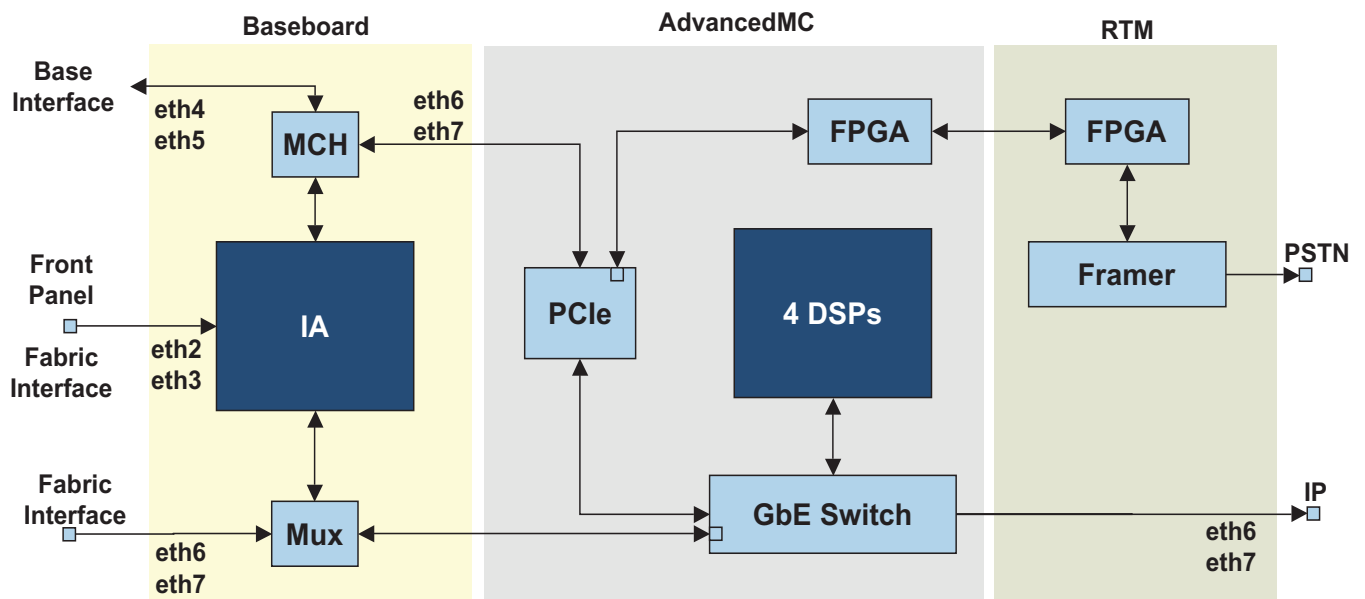


Figure 1

multimedia processing with compressed voice codecs.

A true AdvancedTCA hot swappable compute blade, the baseboard has backplane connections to GbE ports on the base and fabric interface. The front panel has a USB port, serial console port, two Serial Attached SCSI (SAS) ports on one physical connector, and two GbE ports.

The baseboard supports two Intel Xeon LV 2.0 GHz processors and an Intelligent Platform Management Interface (IPMI) subsystem does monitoring, event logging, and recovery control compliant with PICMG 3.0 and IPMI v2.0.

The AdvancedMC that comes with the baseboard provides acceleration in the form of echo cancellation and transcoding hardware. AdvancedMC acceleration conserves significant Xeon CPU cycles and supports a wide variety of codec encoding/decoding schemes. The specifics of the transcoding methods are hidden underneath APIs, so programmers can write generic multimedia processing applications without knowing the underlying codec algorithms or network topology specifics.

Another AdvancedMC card that is available from Dialogic provides Signaling System 7 (SS7) capability and can be used in conjunction with the multimedia blade.

The optional RTM provides 500 ports of IP or 16 DS-1 trunks. The RTM's 2 GbE ports can be connected to an external Ethernet switch, bypassing the backplane if required. Developers find the RTM especially useful in low-density solutions where the application requires 100 ports of IP or less, eliminating the need for an AdvancedTCA switch card in the chassis. Larger systems using more than just a couple of blades need an Ethernet switch card.

Core software/operating systems

The Dialogic multimedia platform software starts with support for Red Hat Enterprise Linux or SUSE Linux. These OSs provide the *load-and-go* support for the additional library and API support provided by Dialogic.

The Dialogic multimedia platform programming interfaces have been designed

from the beginning to be portable. For those that have experience with these APIs porting to a different operating system is straightforward. For example, Dialogic provides a developers' toolkit that uses the APIs on top of Windows or Linux to enable application development on any kind of Windows- or Linux-based PC or laptop using Dialogic HMP.

Managing the platform

The multimedia platform is managed using three interfaces:

IPMI

This is the standard method of communication with the AdvancedTCA shelf manager. Board health, temperature sensing, and hardware diagnostics are all accessible through this interface, which is fully compliant with PICMG standards.

Command Line Interface (CLI)

This method is the easiest for an individual operator to use. Typically the CLI is the first thing the operator uses to configure the system out of the box. The CLI is scriptable and only requires telnet for remote operation. Access to the CLI service allows the operator to set users and passwords, view blade status, configure the blade, and start/stop blade execution.

Simple Network Management Protocol (SNMP) v2/v3

The multimedia blade has a variety of standard and multimedia blade specific Management Information Bases (MIBs). The MIBs make it possible to configure the blade, control execution, and formally manage the device using any standard SNMP manager such as HP OpenView. The SNMP management becomes most useful when managing larger multimedia systems involving multiple multimedia blades.

Software APIs

The robust software libraries available for the multimedia platform support the latest in wireless and Internet multimedia protocols. These libraries are built on the Host Media Processing API, a building block that provides the framework within which all the APIs reside. Dialogic pioneered host media processing and was one of the first companies to release commercially available HMP building blocks back in 2002. The APIs can be used to develop a wide variety of audio/video applications. The currently available libraries are:

- Global Call library for call control. This API provides services for VoIP call control and media content processing. It handles the Session Initiation Protocol (SIP) used for VoIP call control and allows users to implement third-party call control.
- Recently added 3G library, used to control connections established over the 3G-324M interface, required for 3G video solutions.
- IP media library for Real-Time Transport Protocol (RTP) and Real-Time Transport Control Protocol (RTCP). For establishing RTP/RTCP and T.38 sessions, this API enables negotiating RTP session parameters with Global Call or any call control stack.
- Multimedia library for playing and recording audio/video files. Multimedia library services provide video mail, video color ring (different rings or video clips depending on who is calling), video caller ID, and video location-based services.
- Voice library for Dual-Tone Multifrequency (DTMF) detection/generation and other functions. This API provides services for Global Tone Detection (GTD) and generation (GTG) as well as play-and-record functions.
- Conferencing library that supports voice and video (to be added soon) conferencing functionality.
- Device management library. This library provides an API for managing all the configurable components on the multimedia board.
- SDP library that creates and parses Session Description Protocol (SDP) messages.

The multimedia library support for audio codecs and video picture formats is impressive.

Video picture formats include Common Intermediate Format (CIF) picture size (PAL 352 pixels by 288 pixels), Quarter Common Intermediate Format (QCIF) (PAL 176 by 144 pixels), and Sub-QCIF (PAL 128 by 96 pixels at 30, 15, 10, or 6 frames per second for mobile handsets).

Record and play file formats include G.711 u-law and A-law at 46 and 64 Kbps, OKI ADPCM audio at 24 and 32 Kbps, G.726 at 16 and 32 Kbps, and linear PCM audio at 88 or 128 Kbps.

Development and debug capabilities

The multimedia platform library APIs are written in C. As a result, application development for the multimedia platform is typically done in C/C++. Applications have been done in Java using a Java Native Interface (JNI) to the APIs. Also available is an interface based on eXensible Markup Language (XML), used to remotely control the multimedia platform. One of the recent innovations for media control involves putting XML in SIP info messages that are then executed by the receiver of the message. So application development for multimedia applications may also involve some XML programming. The interface specification implemented by Dialogic is the Media Server Markup Language (MSML), a high-level programming interface that simplifies development of distributed multimedia applications. When building applications using these libraries, the developer only needs to use two macros to define the path where the API header files and library sources live.

The multimedia platform software includes a tracing library that facilitates tracking down runtime problems within the implemented application. Alex also mentioned that the platform software includes other diagnostic and debugging tools.

The deployed product is an AdvancedTCA system. However, developers may need a more efficient, readily available environment for fast application development. So Dialogic has developed a software-only emulation environment that runs on Linux or Windows systems. A version of the HMP software is provided so the developer can begin application development within this environment, and then move the unit-tested application to the actual AdvancedTCA platform later. The software development cycle is done in parallel at a smaller up-front cost.

Applications

The multimedia platform is primarily targeted for the service provider space. The AdvancedTCA form factor and Linux-based core software with video support along with support for wireless codecs make it a good fit for service providers. However, HMP for enterprise is

also incorporated into the platform, so the entire product is really a superset of what is needed for enterprise multimedia applications.

The platform is ideally suited for media server applications. It provides a comprehensive set of SIP functions including message parsing, call control, and SDP message processing. The main intended use is for connecting IP endpoints to multimedia services. MSML support makes the product a good fit for remote control of media services through the MSML API. The developer can also use other control interfaces to connect to other streaming media interfaces with their APIs such as RTSP and Media Resource Control Protocol (MRCP), for which Dialogic provides code examples on its website.

Voice application services include ring-back tones, voice mail/messaging, SMS, and voice conferencing. Examples of video services include multimedia ring-back tones, video caller ID, and video location services.

The platform is equally well suited for wireless and wire line networks running IP for 3G wireless as well as for Public Switched Telephone Network (PSTN) and Advanced Intelligent Network (AIN) functions.

The platform is scalable for efficient implementation of smaller voice and multimedia applications to large scale voice-only solutions.

The multimedia programming API document has flow diagrams and source code snippets that illustrate how to use the APIs for voice and video processing, where the SIP protocol (in the Global Call control and SDP APIs) can be used for call control.

Figure 2 shows the flow diagram and API calls used for a video mail application. The application starts by initializing the devices involved for the service. It then gets the media information for the device in order to provide the right SDP information for SIP call setup. Then there are API calls that connect the incoming audio with the right TDM but timeslot for processing of DTMF tones.

Once the initialization is complete, a loop is entered to perform the SIP call control. There are a number of API calls to get the call information from the SIP messages, parsing the SDP to get the proper media information for audio/video processing, and commands to start streaming the audio and looking for dialed digits. Once the SIP call control and RTP routing setup is complete, the application then records the video mes-

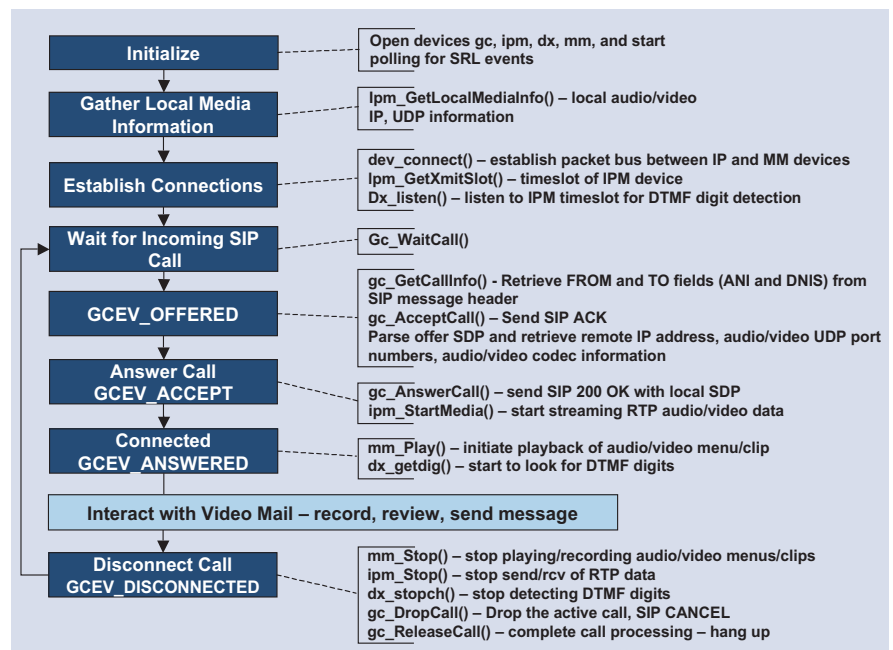


Figure 2

sage or replay/send messages based on user interface input.

When the call is disconnected, API calls to stop the media processing and release the call are made and the application is ready to accept another call. The example in Figure 2 illustrates the depth of the API services available in the Dialogic API that enables the developer to easily deal with call control and media formats while focusing on the *value-add* part of their application.

Documentation and out-of-the-box experience

The extensive set of documentation for the multimedia platform includes technology guide and library reference documents for each API available for the multimedia board.

The baseline set of software includes the OS and basic services. On power-up, the user can connect through a serial port and bring up a telnet session. Using telnet, a CLI can be used to start, stop, and set/get configuration parameters for the board.

Once configured, demonstration programs can be run. Currently, there is an IP multimedia demonstration consisting of voice and video/mail programs that run over IP and TDM network topologies. There is also a video demonstration that can be run over a 3G wireless network topology.

While HMP is incorporated into all the API building blocks, its true power comes with its integration with MSML. These concepts establish the foundation for multimedia application development. An MSML demo is part of the multimedia platform. The demo increases the platform's usefulness in the development of media networks involving remote client control of application servers, such as those handling call control in the form of SIP and multimedia object delivery from multimedia servers to a remote IP endpoint.

Conclusion

The Dialogic multimedia platform illustrates that service providers and network equipment manufacturers alike are continuing to use AdvancedTCA as the form factor of choice for the development

of next-generation network products and services.

Dialogic's multimedia platform has a wealth of development tools and more finished code, a large choice of APIs, an emulation environment, and a built-in set of debug and trace capabilities.

Flexibility and scalability of the platform stems from the modular hardware design and modular sets of software functionality available for both the AdvancedMC and baseboard.

For a complete set of documentation available for the multimedia platform, visit http://www.dialogic.com/products/ip_enabled/MM_ATCA.htm?relatedinfo=1.

For more information on this or any Software Corner, contact Curt at cswaderer@opensystems-publishing.com.