

Application Note

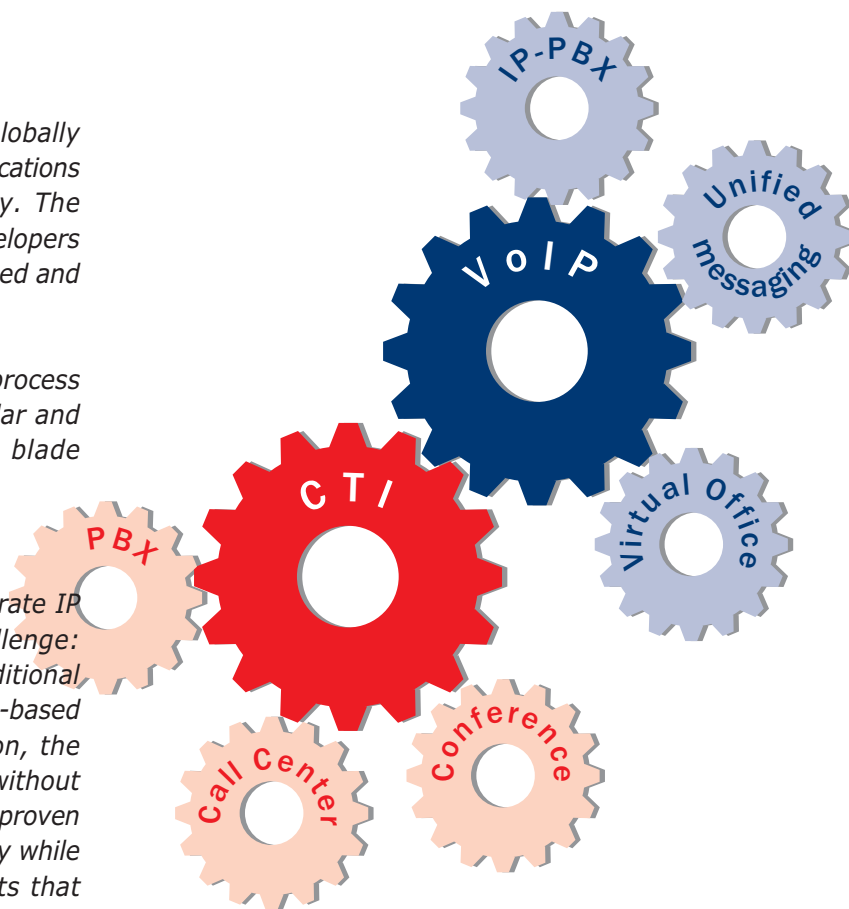
Smooth integration of VoIP into CTI applications

The significant growth of Voice over IP networks globally and the extensive deployment of IP based voice applications indicate this emerging technology is here to stay. The outcome for the CTI and enterprise application developers is clear: the continuous transition from circuit switched and TDM to IP-based networks is inevitable.

This application note demonstrates a step by step process of enabling VoIP into CTI/TDM systems in a modular and simplified approach using AudioCodes' IPmedia blade technology.

The Challenge

Legacy CTI application developers wishing to integrate IP connectivity into their solutions are facing a challenge: implementing advanced IP capabilities in their traditional CTI systems while maintaining the same set of TDM-based services, features and reliability levels. In addition, the migration to the VoIP world should be performed without affecting the design of fully tested modules in a field-proven system. The transition should be conducted smoothly while reusing the same software and hardware elements that handle the TDM part of the system. Therefore, the TDM modules should be left unchanged while enabling advanced VoIP capabilities into the system.



AudioCodes Modular Architecture Solution

AudioCodes' IPmedia blades were designed with the above challenge in mind. IPmedia blades are powerful building blocks which can be smoothly integrated into existing CTI systems, allowing the safeguarding of existing investments. With their minimal footprint, AudioCodes' IPmedia blades can upgrade many legacy TDM systems, by means of a powerful set of IP connectivity, media processing and signaling capabilities.

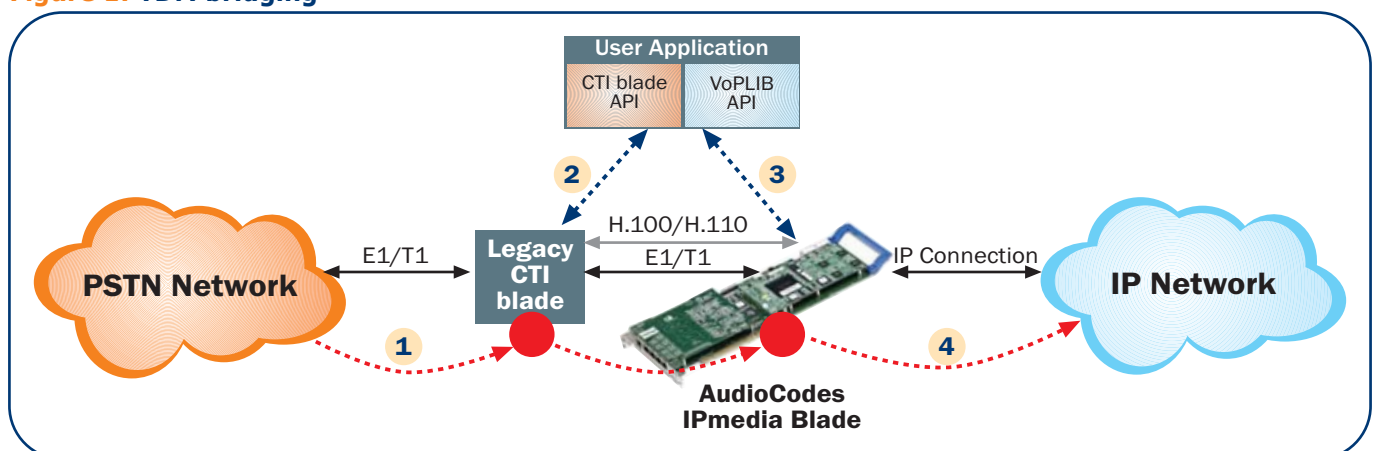
The solution architecture is modular, and designed to enable reuse of existing TDM modules, operating harmoniously with IP enabling blades.

Solution 1: TDM bridging

Using the field-proven H.100/110 bus or E1/T1 interface one can easily create a TDM connection between the CTI and IPmedia blade, transferring voice channels between the two elements. The user application will utilize both existing API along with AudioCodes comprehensive API (VoPLib) for enabling existing CTI features along with new IP capabilities. Such a modular approach has minimal effect on the existing PSTN interface provisioning and performance.

Upon detection of an incoming call from the PSTN interface, the user application determines whether the call will be solely handled by the CTI module, or be bridged to the IP network. In the case of bridging to the IP network is required, the IP media blade is utilized: the incoming call from the PSTN interface is directed over the H.100/110 bus or E1/T1 trunk to the IPmedia blade, and easily connected to any remote media gateway, media servers or IP user over the IP network.

Figure 1: TDM bridging



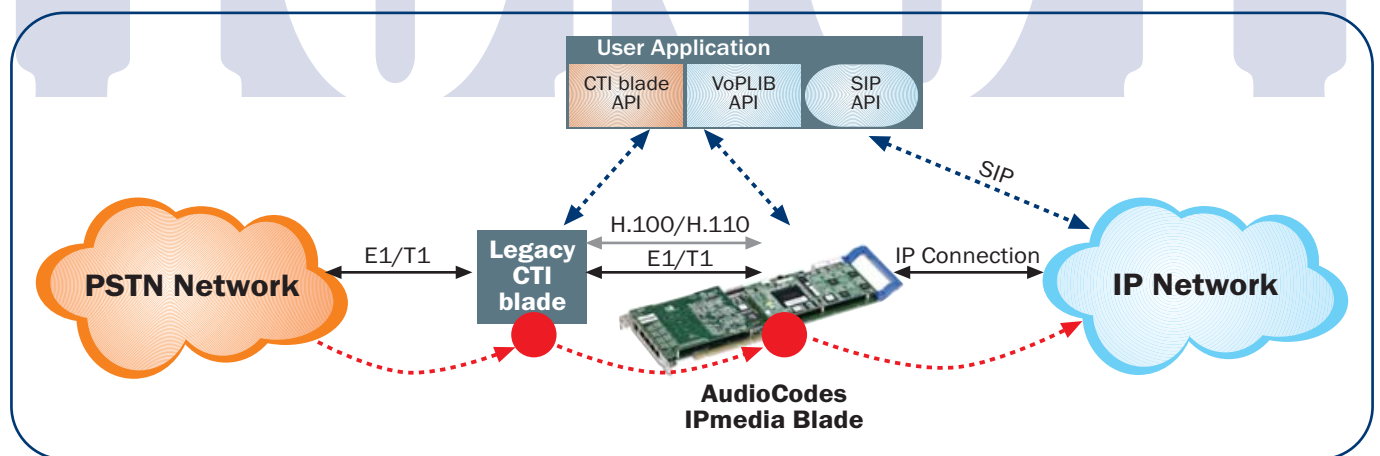
Follow the call setup depicted in Figure 1. The required VoPLib API commands are stated in brackets () in steps 3 and 4 below.

- 1 The CTI module is detecting an incoming call.
- 2 The application bridges the call over the H.100/H.110/E1/T1 to the IPmedia blade.
- 3 The application opens a channel on the IPmedia blade and processes the incoming media from the H.100/H.110/E1/T1. (acOpenChannel)
- 4 IP connection is established with the remote destination and the call is connected. (acActivateRTP_RTCPChannel). At this point full PSTN to IP connectivity is established.

SIP-Enabled solution

To enable SIP gateway capabilities into the solution, AudioCodes offers a software-based SIP API stack which is installed into the application host. AudioCodes' SIP API stack is fully integrated with AudioCodes API (VoPLIB) and provided with a rich set of code examples. SIP API can be implemented either when the H.100/110 bus or the E1/T1 Interfaces are used. See figure 2 for an integrated SIP enabled solution. For more information please refer to the "Enhanced SIP API Solutions" brochure (www.audiocodes.com/Content.aspx?voip=25).

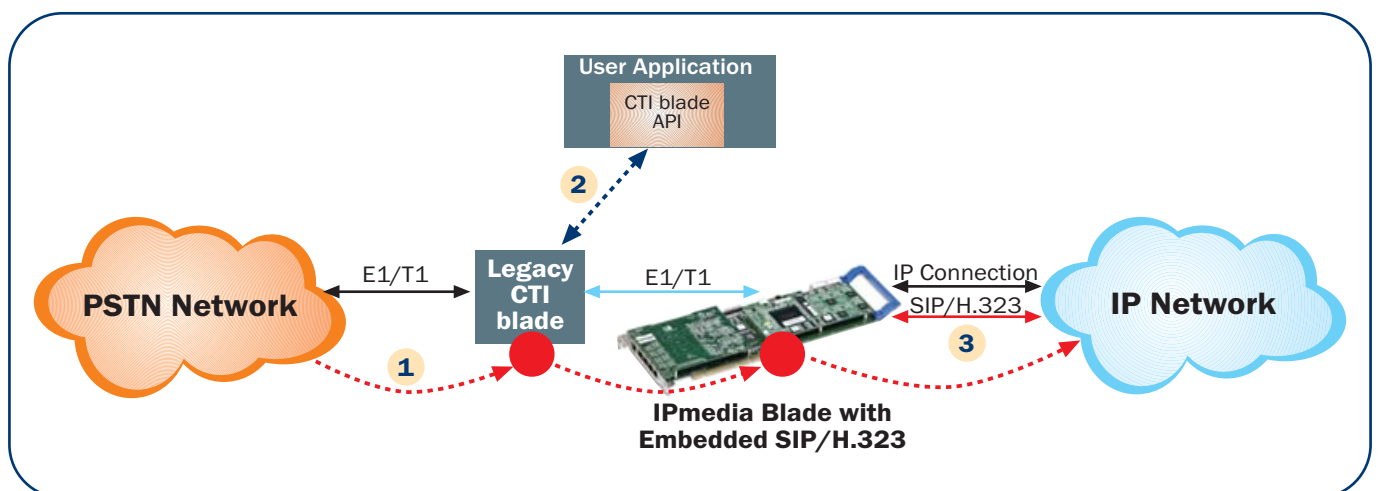
Figure 2: Upgraded VoIP Gateway capabilities using AudioCodes SIP stack



Solution 2 - PSTN bridging with embedded SIP/H.323 capabilities

The simplest way of integrating VoIP into a CTI system is by leveraging on the IPmedia field-proven, embedded SIP/H.323 media gateway capabilities. The CTI blade is connected to the media gateway blade by the E1/T1 interface. By using this method, an incoming PSTN call is handled by the media gateway, utilizing the embedded SIP/H.323 Control Protocol.

Figure 3: PSTN bridging



This solution does not require any software development using AudioCodes' API - only a simple configuration of the media gateway functionality of the blade is needed.

Follow the call setup depicted in figure 3.

- 1 An incoming call is detected by the CTI module.
- 2 If the call is designated to the VoIP Network, the application directs it via the E1/T1 interface towards the IPmedia blade.
- 3 AudioCodes Embedded SIP/H.323 control protocol is used to establish a connection with the remote IP endpoint according to the pre-defined gateway configuration. *At this point there is full PSTN to IP connectivity.*

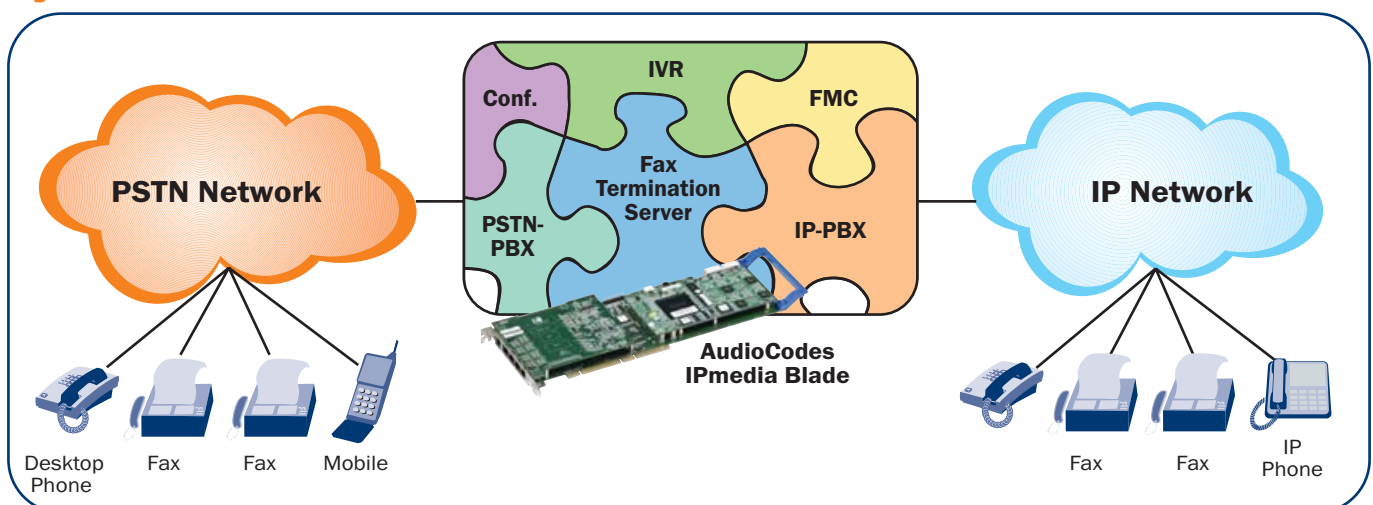
Solution 3 - Integrated solution for converged systems

Once an IPmedia blade is integrated into the system, a wide range of powerful media processing features are instantly available, enabling the development of a variety of applications: voice playback and record, multi-party conferencing, IVR, personal tones, fax termination, auto-speech recognition, trans-coding and many more. This allows a simple upgrade of the CTI system capabilities, either by off-loading media processing from the CTI blade to the IPmedia blade or by introducing new capabilities that are not available in the CTI blade.

The ultimate solution for a new system development is utilizing the full set of the IPmedia blade capabilities which enables all CTI (PSTN) and VoIP functions in one blade.

IPmedia technology is available in a rich set of AudioCodes' award-winning blades, and is provided in PCI, cPCI or ATCA form factors. This one-stop-shop approach ensures a short development cycle, a cost effective and compact solution for advanced media processing application developers.

Figure 4: IPmedia all-in-one architecture



About AudioCodes

AudioCodes Ltd. (NASDAQ: AUDC) enables the new voice infrastructure by providing innovative, reliable and cost-effective Voice over Packet technology and Voice Network products to OEMs, network equipment providers and system integrators. AudioCodes provides its customers and partners with a diverse range of flexible, comprehensive media gateway and media processing technologies, based on VoIPerfect™ – AudioCodes' underlying, best-of-breed, core media gateway architecture. The company is a market leader in voice compression technology and is a key originator of the ITU G.723.1 standard for the emerging Voice over IP market. AudioCodes voice network products feature media gateway and media server platforms for packet-based applications in the converged, wireline, wireless, broadband access, and enhanced voice services markets. AudioCodes enabling technology products include VoIP and CTI communication blades, VoIP media gateway processors and modules, and CPE devices. AudioCodes' headquarters and R&D facilities are located in Israel with an R&D extension in the U.S. Other AudioCodes' offices are located in Europe, the Far East, and Latin America.

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