

Extending IP-Based Media Services to Converged Networks

Cantata Technology provides OEMs, ISVs and Service Providers a broad range of possibilities for delivering media rich enhanced services over PSTN, converged and all IP networks. The SnowShore product family offers a state-of-the-art Media Server for IP-based networks. The IMG 1010 product family offers leading-edge platforms for Voice-over-IP gateways and transcoding that are ideal to enable carriers to deliver enhanced services to both circuit switched and IP-based customers. By combining the overall capabilities of the SnowShore and IMG 1010 products, OEMs, ISVs and carriers can develop a broad range of SIP-based enhanced services and extend the reach of these services to customers on a variety of networks, including wireline, wireless, cable and traditional circuit-based.

This paper will describe two ways in which the capabilities of the SnowShore IP Media Server can be supplemented by working in tandem with an IMG 1010 to deliver the following capabilities:

TDM Enable the SnowShore IP Media Server: By utilizing an IMG 1010 racked and stacked with a SnowShore IP Media Server, implementers can accept calls over circuit based (i.e. time division multiplexed or TDM) trunks and direct calls via SIP to gain access to the rich media services supported by the Media Server when under control of an Application Server.

IP-IP Transcoding: The transcoding capabilities of the IMG 1010 enable solution developers to connect to a broad range of different networks and convert among various audio formats (G.711, G.723.1, G.729 AB, AMR, EVRC, and iLBC) in conjunction with a SnowShore IP Media Server.

In addition, we will also describe other applications and network scenarios where the transcoding capabilities of the IMG 1010 enable OEMs and carriers to extend enhanced services to a variety of networks.

IP Transcoding for General Use: The IMG 1010 can transcode among the compressed voice formats used by various VoIP, wireline, cable and wireless networks even when the SnowShore IP Media Server is not part of the total solution.

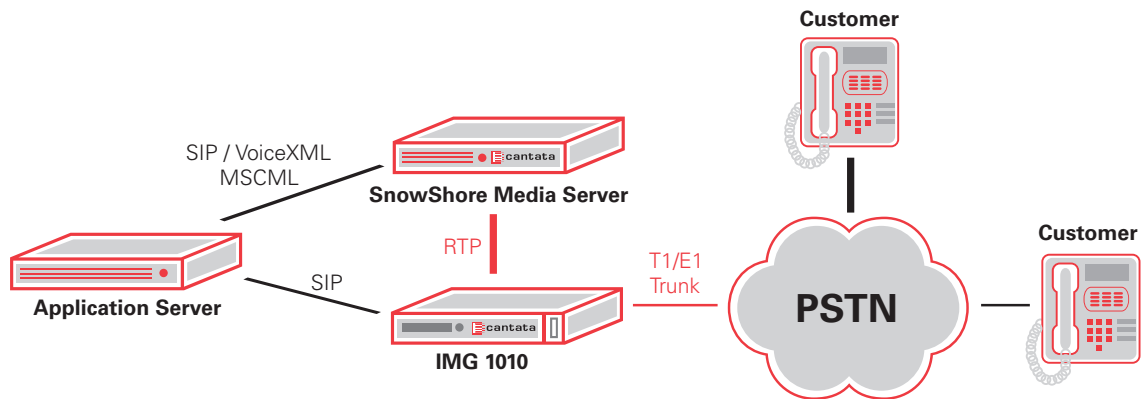
TDM Enabling the SnowShore IP Media Server

The SnowShore IP Media Server offers industry-leading support for rich media services which can be delivered under the control of an application server or Softswitch. The SnowShore IP Media Server relies on the use of open standards which include the Session Initiation Protocol (SIP) for session control, VoiceXML for voice applications and Media Server Control Markup Language (MSCML) for conferencing. The IMG 1010 is a compact 1u high media gateway that supports the conversion of TDM calls into Voice over IP, as well as IP/IP transcoding. An example of how this works is provided in Figure 1.



Extending IP-Based Media Services to Converged Networks

Figure 1: TDM Enabling of SnowShore IP Media Server



In this example, an application server utilizes the SnowShore IP Media Server for announcements. The application server is able to accept incoming calls from customers on the Public Switched Telephone Network (PSTN) by utilizing the gateway features of the IMG 1010. The IMG 1010 is preconfigured via the GateControlEMS to convert circuit switched calls (SS7 or ISDN) to IP calls (SIP or H.323.) In this case, when an incoming call is received on the IMG 1010, the following steps ensue:

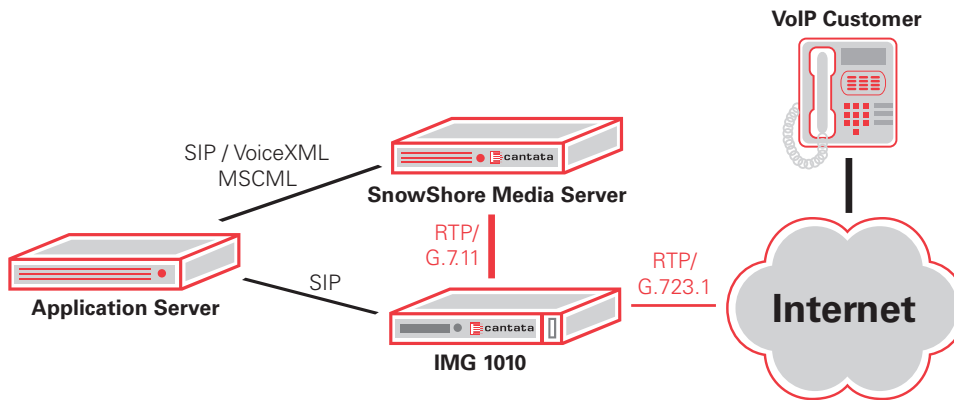
1. The IMG 1010 issues a SIP Invite to the Application Server.
2. The Application Server forwards the SIP Invite to the SnowShore IP Media Server, along with VoiceXML instructions that will identify the announcement to be played.
3. When the SnowShore IP Media Server accepts the SIP Invite, it can respond to the IMG 1010 via SIP.
4. This will cause the incoming voice call to be streamed to the media server from the IMG 1010 utilizing the Real Time transport Protocol (RTP).
5. At this point, the announcement is played from the media server to the incoming caller. From this point the call can be terminated or otherwise handled by the application server.

In summary, the IMG 1010 can be used to enable the SnowShore IP Media Server to meet the needs of circuit switched voice customers, under the control of an Application Server or Softswitch. Configurations of the SnowShore IP Media Server which support this TDM enabled feature are available now.

IP-to-IP Transcoding and the SnowShore IP Media Server

In its native mode, the SnowShore IP Media Server can process incoming packet voice streams that use the uncompressed, G.711 a-law or u-law formats. However, there are times when a carrier will want to provide media services to users on networks that utilize various compressed voice formats. The SnowShore IP Media Server has built-in support for translation or transcoding between G.711 and the G.726 or G.729AB compressed voice format to address such needs. For customers that have needs for transcoding to and from other compressed voice formats, Brooktrout provides a wide range of additional IP to IP transcoding capabilities via the IMG 1010. Thus, the combination of the SnowShore IP Media Server and the IMG 1010 enables the provision of rich media services to users on a wide variety of networks that utilize various compressed voice formats. An example of how this works is provided in Figure 2.

Figure 2: IP-to-IP Transcoding and SnowShore IP Media Server



In this example, an application server utilizes the SnowShore IP Media Server for announcements. The application server is able to accept incoming calls from customers on a Voice over IP network that uses G.723.1 compressed voice by utilizing the transcoding features of the IMG 1010. The IMG 1010 can accept incoming packet voice streams in one format and then transcode them into a different voice format. In this example, when an incoming SIP call is detected on the Application Server, the following steps ensue:

1. A SIP Proxy Server under control of the Application Server detects the incoming SIP call and the Application Server directs the SIP invite to the IMG 1010.
2. Since the Application Server wants to translate the incoming call that uses the G.723.1 voice format into G.711 that can be routed to the media server, the application server (via its SIP proxy server) issues a second SIP invite to the IMG 1010, requesting translation into G.711 based packets and directing the media flow to the Snowshore IP Media Server.
3. The Application Server (via the SIP proxy server) sends another SIP Invite to the SnowShore IP Media Server, along with VoiceXML instructions that will identify the announcement to be played.
4. When the Snowshore IP Media Server accepts the SIP Invite, it can respond to the IMG 1010 via SIP.
5. This will cause the incoming voice call to be streamed to the media server from the IMG 1010 utilizing the Real Time transport Protocol (RTP).
6. At this point, the announcement is played from the media server to the incoming caller. From this point the call can be terminated or otherwise handled by the application server.

In summary, the IP transcoding capabilities of the IMG 1010 can be used to supplement the SnowShore IP Media Server in order to meet the needs of packet voice customers on various networks, under the control of an Application Server or Softswitch. Customers who want to take advantage of this capability can order a SnowShore IP Media Server and separately purchase an IMG 1010 for transcoding purposes. Please see Table 1 for a complete summary of the available voice formats and applicable control methods on the IMG 1010. The list of supported codecs on the IMG 1010 and the SnowShore IP Media Server will evolve over time, so please consult Cantata sales for the latest information.

Extending IP-Based Media Services to Converged Networks

Table 1: Vocoder Support

Vocoder	Support
G.711 AB	YES
G.723.1	YES
G.729 EF	YES
AMR	Q1 2006
EVRC	Q1 2006
iLBC	Q1 2006

IP Voice Transcoding for Multiple Applications and Networks

One of the challenges of the ongoing convergence of voice networks is the variety of technologies that need to be supported and the interoperability challenges that result. In recent years, new product categories such as Media Gateways, Signaling Gateways, Session Border Controllers and Media Firewalls have begun to emerge in order to allow carriers to translate among a myriad of different signaling and media formats. Often, these translations will be done under the control of other network elements such as Application Servers or Softswitches.

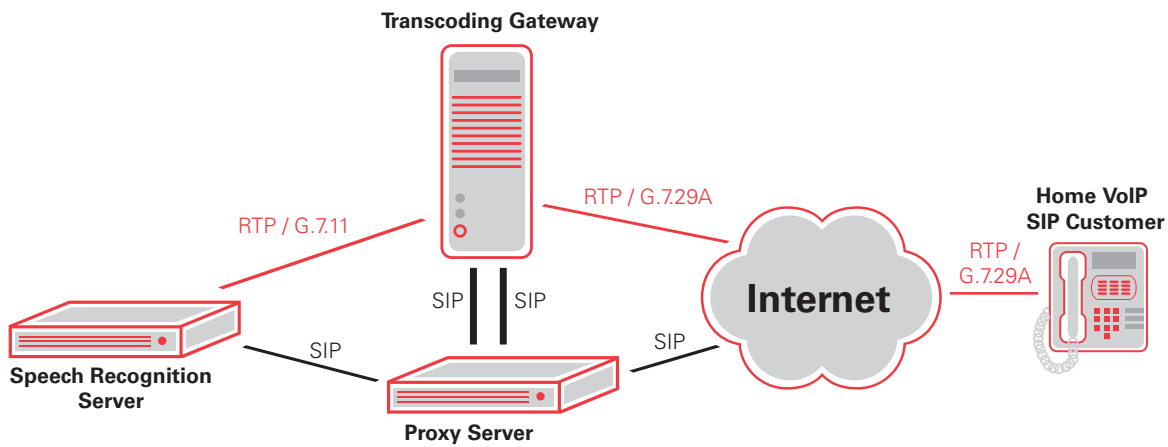
Media Gateways were the first of these conversion tools to be used and have been widely adopted in order to provide media and sometimes signaling translation between the legacy circuit-switched (TDM) network and the emerging IP voice networks. In another trend, many new enhanced services for voice networks are being developed as IP-based network services, where a network element such as an IP-based media server can provide media handling support for multiple applications, potentially spanning across multiple networks. Finally, there is an emergence of non-traditional carriers who are beginning to provide voice services for customers, but again spanning a wide variety of networks.

Ideally, carriers want to develop services in one way and then utilize the IP network to make these services available to customers, regardless of how they connect to the network. For all of these reasons, voice transcoding has taken on renewed significance as an essential capability that carriers will use in order to provide common services to all of their customers.

Cantata's IMG 1010 product is an example of robust enabling technology that can be used to meet many of these challenges. In this section, we will review an example of how the IMG 1010 can be used to provide IP-to-IP transcoding in support of one of the hottest categories of Voice over IP, the emerging Voice over Broadband services for residential customers. An example of how this works is provided in Figure 3.



Figure 3: Transcoding for Voice over Broadband Networks



In this example, a home Voice over IP customer uses a SIP phone over their Broadband IP connection, which may typically be provided by cable or DSL. Often, the home customer will have many applications running and want to be able to make voice calls that use a relatively small amount of the available bandwidth, by using a compressed voice format such as G.729A. The IMG 1010 can accept the incoming SIP call and translate the compressed voice into a G.711 uncompressed voice format, which in turn may be processed by a Speech Recognition server within an IP voice provider's network. The steps are:

1. Customer initiates a SIP based phone call and has set their preferred voice format to G.729A to conserve available bandwidth.
2. A SIP Proxy Server in the network detects that the customer wants to use G.729 and directs the call to a IMG 1010 for transcoding via a SIP invite. It also sends a second SIP invite to the same named resource on the IMG 1010, requesting translation into the uncompressed G.711 format.
3. The Proxy Server sends a SIP invite to the Speech Recognition/ IVR server in the network, requesting that it accept an incoming G.711 call from the IMG 1010.
4. The Speech Recognition Server and IMG 1010 accept the invitations and agree to set up the call. The IMG 1010 transcodes the voice from G.729A to G.711 and transmits the resulting G.711 voice packets to the Speech Recognition server.
5. The Speech Recognition server processes the incoming voice packets and responds to the customer's verbal request.

In summary, the IP transcoding capabilities of the IMG 1010 can be used to supplement the other elements that make up the carrier's network and provide connectivity between the internal network services and customers that use a variety of diverse endpoints and voice compression formats. This can help carriers to provide rich media services to wireline, cable, and wireless networks. A summary of the vocoders that are supported under each control method was shown earlier in Table 1.

Extending IP-Based Media Services to Converged Networks

Summary

The newly available converged networks present both opportunities and challenges for Carriers, Network Equipment Vendors and Independent Software Vendors. Cantata's SnowShore and IMG 1010 products offer enabling technology that can help carriers, OEMs and ISVs meet many of these challenges.

The SnowShore family of products offers a state-of-the-art Media Server for IP-based networks. The IMG 1010 product family offers leading edge board-based platforms for Voice over IP gateways and IP-to-IP transcoding processing. By combining the overall capabilities of the SnowShore IP Media Server and IMG 1010 series products, OEMs, ISVs and carriers can develop a broad range of SIP-based enhanced services and extend the reach of these services to customers on a variety of networks.



Corporate Headquarters: 410 First Avenue, Needham, MA 02494, USA
Tel: +1 (781) 449-4100 • **Fax:** +1 (781) 449-9009 • **Email:** info@cantata.com • **Web:** www.cantata.com
Cantata Technology maintains multiple locations worldwide in North America, Asia and Europe.