

White Paper

Paving the Way to Next Generation Media and Signaling VoIP Gateways

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Executive Summary

This white paper examines how the rapid adoption of SIP and the distribution of network elements are moving VoIP to a new distributed model. It also discusses several factors for evaluating how media gateways, and specifically the Dialogic® IMG 1010 Integrated Media Gateway, can support this new model, such as SS7 interconnectivity, IP peering, and fax support, which can impact the success of service providers' and OEMs' applications and services.

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VoIP Networks: Architectural Shift

VoIP is changing quickly with the rapid adoption of SIP and the distribution of network elements. As VoIP evolves, connectivity between different signaling protocols, conversion between voice compression protocols, and peering between IP networks are poised to be the next great challenges in network design. VoIP networks are experiencing explosive growth around the globe. According to an analyst at Dell'Oro Group, "IP Telephony Carrier market revenues are forecasted to grow from \$1.6 billion in 2004 to \$4.7 billion in 2010" [Dell'Oro].

As these VoIP networks grow and mature, characteristic changes in the architecture and products are revealed. First generation VoIP networks consisted of islands of transport connected via TDM cross connects. These networks traditionally used ISDN (Integrated Service Digital Network) for TDM connectivity and H.323 for VoIP signaling and generally used a large Class 4 TDM switch for routing and billing calls, as shown in Figure 1.

In actuality, the VoIP gateways, such as the Dialogic® IMG 1010 Integrated Media Gateway, in such networks were used for long haul transport and the enhanced services were handled in traditional TDM-based platforms. SS7 connectivity was also made available through connectivity to existing Class 4 TDM switches.

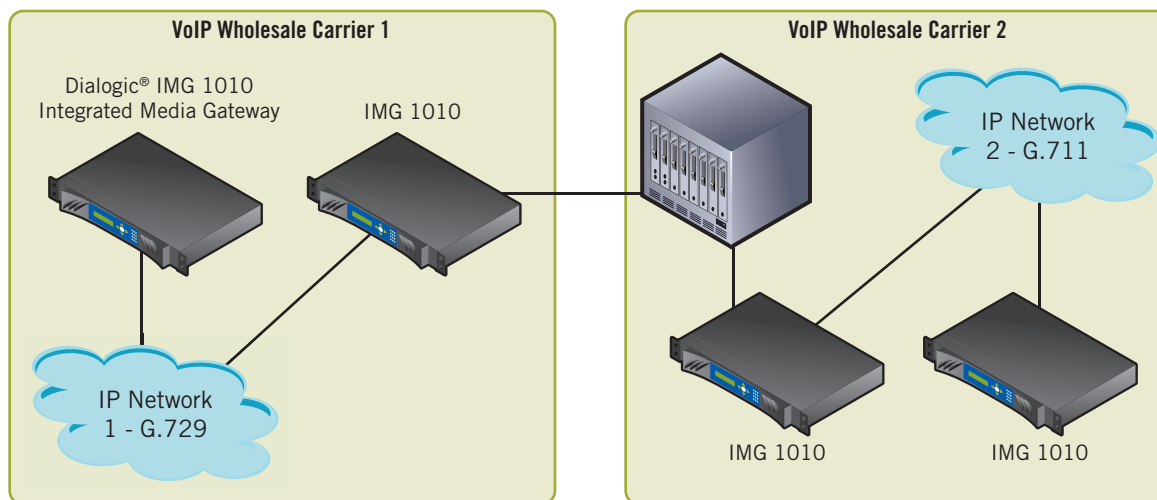


Figure 1. First Generation VoIP Network

The Introduction of SIP

With the introduction of SIP, architectures have moved from a strict hierarchical model to a distributed design, as shown in Figure 2. These new network elements include media servers for media processing, proxy servers for call control, and application servers for enhanced services. These enhanced features mean that media processing and session control occur in the IP domain, which can result in more network efficiency and the ability to reconfigure capacity on the fly. Additional services can be added in the IP domain through upgrades or additional Application Servers.

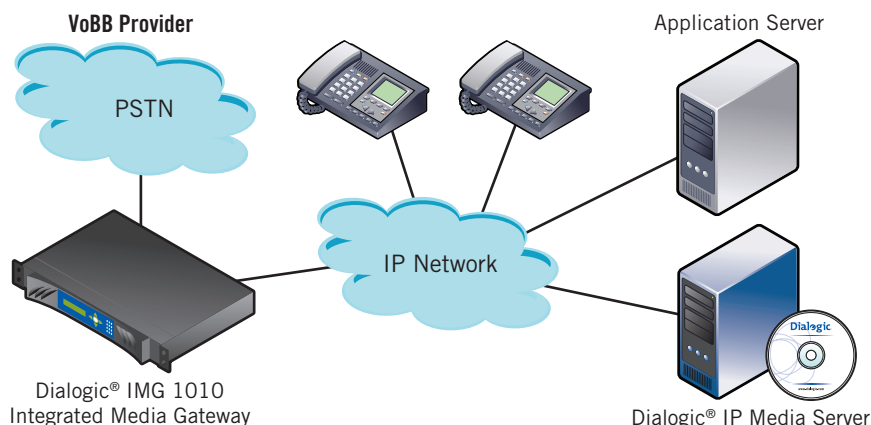


Figure 2. Next Generation IP Network

How Can Today's Media Gateway Support the New Model?

Service providers and OEMs desire VoIP Media Gateways that evolve as quickly as network requirements do, but VoIP Gateway solutions have until now been cumbersome to deploy and upgrade. First generation VoIP networks that used IP simply for transport are still handling enhanced services in the TDM domain. But in the new model, messaging, prepaid, fax, and other enhanced services can be handled in the IP domain. When evaluating media gateways for this new model, service providers and OEMs can consider several factors, such as SS7 interconnectivity, IP peering and fax support, which can impact the performance of their applications and services.

SS7 Interconnectivity

Traditionally, it was the role of a TDM-based Class 4 switch to provide access to SS7 networks from IP-based networks. SS7 signaling links would come directly into the Class 4 switch and be converted to other signaling approaches, such as ISDN or tonal-based for connectivity to the typical media gateway. This approach puts geographic limitations on the reach of the SS7 network and requires costly SS7 point codes in each physical location. When evaluating media gateways, service providers may consider not only whether the gateways will be able to integrate SIP and H.323 signaling, but also that they can address ISDN and SS7 connectivity, as can the IMG 1010 in the example shown in Figure 3.

Using integrated SS7, next generation carriers can extend their networks into emerging markets and connect to the operators that require SS7 connectivity. A media gateway combined with a SS7 signaling server can control SS7 voice circuits geographically distributed from a single point code. This can make the network easier to manage as well as reduce costs for SS7 network connectivity.

IP Peering

With next generation service providers moving to an all IP-based ecosystem, concerns of security, access control, and compatibility can arise. Session Border Controllers (SBCs) have emerged as a common solution for access control issues in the next generation networks. SBCs can handle security, manage network address translations, and translate VoIP signaling between two incompatible networks, as shown in Figure 4. One area where they are often limited, however, is in translating incompatible RTP packet streams of media such as voice or fax. Traditionally, SBCs cannot convert or transcode media streams.

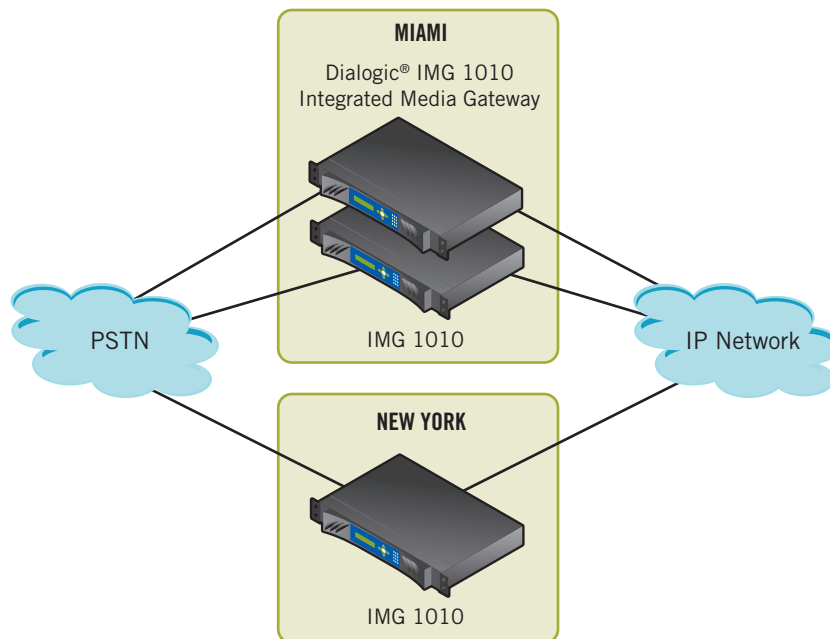


Figure 3. Remote SS7 Voice Circuits

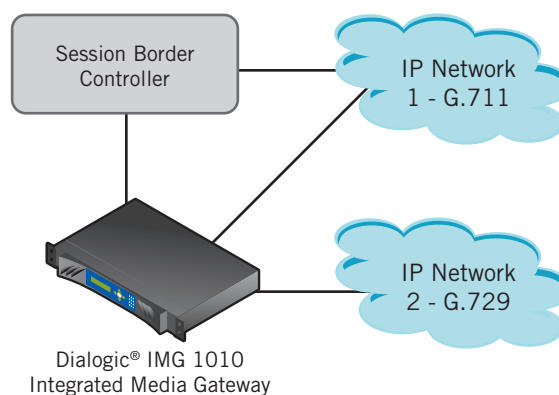


Figure 4. Typical IP Transcoding Between Two Networks

Providers look for a media gateway, like the IMG 1010, that can work in concert with an SBC and convert IP-based media streams. Support for G.711, G.723, G.729, iLBC and AMR voice coders allows convergence of wireless and wireline networks.

New standards such as Telephone Number Mapping (ENUM) take IP peering to the next level. ENUM defines a mapping between telephone numbers and various IP address types, including SIP addresses. With ENUM, native SIP users, even at different VoIP service providers, can call each other directly without ever involving a PSTN service. This can result in faster connection times and lower phone charges. Media Gateways that support ENUM map call routing information directly to SIP.

Fax

With an estimated 200 million fax machines generating over 100 billion fax pages around the world [Davidson], fax technology is a business critical communications tool. Fax is a standard method of transmitting an electronic copy of an original document and is at the heart of a wide range of document exchange processes in important functional areas such as finance, legal, human resources, and procurement.

It is important that a media gateway support T.30 on the TDM side as well as T.38 and G.711 pass through on the IP side. Considerable amounts of network traffic are fax-based and thus for the utmost compatibility these protocols must be supported.

Choosing the Right Media Gateway

The right Media Gateway evolves as your network evolves. Integrated media and signaling support for ISDN, CAS, and SS7 provides an affordable way to help increase your network presence in existing and emerging markets. With the advent of wireline and wireless convergence in the IMS architecture, support for popular voice compression protocols like G.711, G.723, and G.729 along with AMR and iLBC will ensure compatibility. The Dialogic® IMG 1010 Integrated Media Gateway (see the *For More Information* section for a list of supporting materials) provides all these capabilities and is backed by a supplier that delivers world class support and customer responsiveness.

References

[Davidson] Computer-Based Fax Markets, 2005-2010, Market Research Report, Davidson Consulting, 2005, <http://www.davidsonconsulting.biz/services.html>.

[Dell'Oro] IP Telephony Carrier Market Growth Fueled by Subscriber Access Solutions: Multimedia Services to Follow Voice-over-Broadband, Dell'Oro Group, February 7, 2006, <http://www.delloro.com/news/2006/IPTelCar020706.htm>.

For More Information

Datasheet

Dialogic® IMG 1010 Integrated Media Gateway —
http://www.dialogic.com/products/gateways/docs/10806_IMG_1010_ds.pdf

Technology Briefs

Dialogic® IMG 1010 Integrated Media Gateway: VoIP Transcoding —
http://www.dialogic.com/products/docs/techbrief/10880_IMG1010_Transcoding_tb.pdf

Independent Reliability Assessment for Dialogic® IMG 1010 Integrated Media Gateway —
http://www.dialogic.com/products/docs/techbrief/10882_IMG1010_reliability_tb.pdf

Dialogic® IMG 1010 Integrated Media Gateway Feature Highlight: VoIP Reliability —
http://www.dialogic.com/products/docs/techbrief/10881_IMG_VoIP_Reliability_tb.pdf

VoIP-Enabling a Class 4/5 Switch Network —
http://www.dialogic.com/products/docs/techbrief/10866_VoIP_Enable_Class4-5Switch_tb.pdf

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