

White Paper
Media Gateways

Choosing a Media Gateway Appliance

Executive Summary

Although many enterprises are eager to deploy converged voice and data applications and services over IP, they see their legacy PBX systems and up-front costs as roadblocks to the enhanced capabilities that IP would bring. This paper demonstrates that legacy PBX equipment does not have to be replaced for enterprises to begin a phased migration to IP convergence. Dialogic® Media Gateway Series appliances make the implementation of IP technology in PBX systems possible right now, and with low up-front investment costs.

Table of Contents

Introduction	2
Benefits of Gateway Appliances	2
Rapid and Cost-Effective Development	2
Move to IP without Major Changes	2
Selecting a Media Gateway Appliance	2
PBX Integration/Interoperability	2
Media Server Integration/Interoperability	3
Sample Deployments	3
Adding IP in a Corporate Environment	3
Using a Gateway for VoIP/SIP Toll Bypass	4
Using a Gateway for SIP Trunking Access	4
Deploying a Converged Architecture with an IP Media Server	5
Unified Communications and Media Gateways	6
Media Gateways from Dialogic	6
Summary	7
Acronyms	8
For More Information	8

Introduction

Appliance gateways are turnkey solutions that enable a phased migration to IP. They seamlessly converge voice, data, and fax across IP networks, creating a single, integrated enterprise network without expensive changes to an existing circuit-switched network. They protect a company's investment as it grows by bridging legacy hardware to the latest technology.

Appliance media gateways let users receive both voice and data content in a single call over a managed packet network (LAN, WAN, or VPN) that interfaces directly to a legacy PBX. This enables enterprises to take a phased approach to a fully converged voice and data network while prolonging the useful life of legacy switching equipment.

This white paper provides information about the benefits of gateway appliances, options for selecting a gateway appliance, trends to be aware of like Unified Communications, and media gateways available from Dialogic.

Benefits of Gateway Appliances

A gateway appliance is a self-contained unit that enables enterprises to interface traditional PSTNs to the IP networks that are proliferating today. This allows users to realize the benefits described below.

Rapid and Cost-Effective Development

Appliances are ideal for enterprises that require a low-cost, low-maintenance solution. A gateway appliance can be installed and configured easily — usually in a matter of minutes — and can help enterprises reap the benefits of VoIP with a low up-front cost.

The key component of an appliance platform is its embedded gateway software. Because of this software, the gateway can be made ready for a live environment with a minimal amount of integration testing. Since the gateway's functionality is embedded within the appliance gateway, developers can concentrate on high-level end-user IP application development rather than on low-level gateway application development.

Because they are easy to deploy, provide a rapid return on investment, and have a low total cost of ownership, appliances can reduce from months to days the time spent on installation,

integration, and troubleshooting. Appliance gateways interface on one end to the IP network and on the other to the PSTN network. Also, appliance gateways are available in small stackable desktop form factors and 1U chassis running their own operating system and gateway-related software, making them software independent.

Move to IP without Major Changes

Gateway appliances enable customers to deploy new IP services and features without major changes to existing hardware and software architecture. Media gateways can do all of the following:

- Connect IP telephones to a legacy PBX
- Integrate network-hosted applications with a PBX
- Extend a PBX to branch offices
- Integrate various voice, fax, and call processing capabilities into an enterprise LAN or WAN environment

When enterprises are ready to transition to a complete IP solution from a hybrid solution, the IP applications will continue to function seamlessly. When customers require higher density solutions, the solutions can be scaled easily with reduced equipment downtime.

Selecting a Media Gateway Appliance

Many gateways are currently available on the market, and selecting the suitable one can mean the difference between seamless integration and a prolonged installation and testing process. In addition, the suitable gateway can determine the ease with which enhanced services, such as conferencing, messaging, IVR, and other media-server-based applications, can be integrated into a legacy network. For these reasons, the considerations discussed in this section become critical when choosing a gateway.

PBX Integration/Interoperability

Choosing a gateway that has been pre-tested with the leading PBX systems on the market can save time because the interoperability testing has already been done. Two modes should be considered:

- **Emulating mode** — Legacy PBXs are IP-enabled by connecting the gateway to digital or analog station ports on the PBX, essentially emulating a traditional station endpoint. This allows low-to-mid-density communication between the circuit-switched telephony network and SIP-compatible devices (such as IP phones and wireless phones) and applications (such as softphones and IP-enabled unified messaging).
- **Line-side T1/E1 mode** — Legacy PBXs are IP-enabled by connecting the gateway to high-density digital line ports on the PBX, and running standard T1/E1 protocols such as ISDN and QSIG. This allows much higher density communication between the circuit-switched telephony network and SIP-compatible devices and applications.

Media Server Integration/Interoperability

Enterprises are no longer content with deploying VoIP solutions only for toll bypass. Many want to integrate multimedia convergence services (for example, collaboration, voice mail, and unified messaging) to handsets and desktops in both their headquarters and remote locations. Selecting a gateway that has been pre-tested with media processing software can save weeks or even months of installation, integration, troubleshooting, and maintenance.

Sample Deployments

Media gateways can function in several scenarios. Three scenarios are outlined in this white paper:

- Adding IP at a corporate office
- Using a gateway for toll bypass
- Deploying a converged IP media server

Adding IP in a Corporate Environment

Figure 1 shows how appliance gateways can use SIP standards to interface with SIP devices, such as IP phones, softphones, or applications servers on an IP-based network at a main site or home office.

Here, the IP media gateway supplies the link between a legacy PBX and new IP technology, which can:

- Provide a low-cost way to add IP technology to an existing legacy system
- Protect investment in legacy equipment because the equipment does not have to be replaced
- Prevent disruption of service. Because calls can be transferred freely between IP phones and legacy phones, the addition of IP technology to a legacy environment is largely seamless.

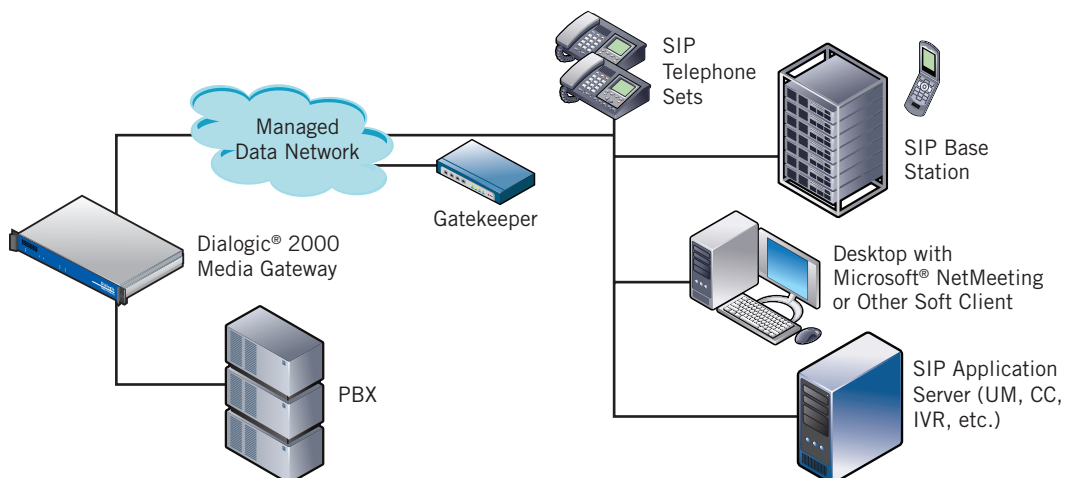


Figure 1. Connecting IP End Points to the Corporate PBX

- Reduce development costs. An application such as voice mail can be written for an IP environment, but can be used without software changes in a mixed environment enabled by a PBX-IP media gateway.
- Enable enterprises and service providers to supply enhanced services such as find me/follow me, conferencing, and fax to their employees and clients

Using a Gateway for VoIP/SIP Toll Bypass

The type of system shown in Figure 1 is very different from the toll bypass gateway setup illustrated in Figure 2. To create the toll bypass configuration shown in Figure 2, gateways are placed at two different sites, and the corporate WAN carries calls between the two sites to avoid the PSTN and consequent toll charges. Failover relays and extra T1/E1 ports can enable a PSTN backup route in the event the VoIP/SIP connection degrades or is unavailable.

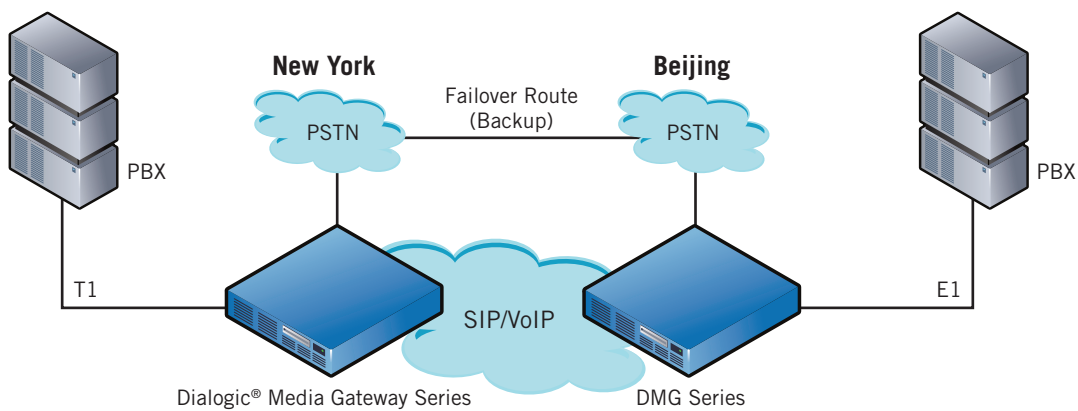


Figure 2. Toll-Free Inter-office Communication

Using a Gateway for SIP Trunking Access

Similar to the use case in Figure 2, the gateway is used to enable SIP trunks as a replacement or as a least-cost routing option to PSTN trunk service. To create the SIP trunking configuration shown in Figure 3, a gateway is placed between the PBX and the PSTN and SIP trunk interfaces. The legacy PBX “views” the gateway as its traditional PSTN central office T1/E1 trunk service, and the gateway routes the calls via VoIP/SIP to the SIP Trunk Internet Telephone Service Provider (ITSP). Once again, failover relays and extra T1/E1 ports can enable a PSTN backup route in the event the VoIP/SIP connection degrades or is unavailable.

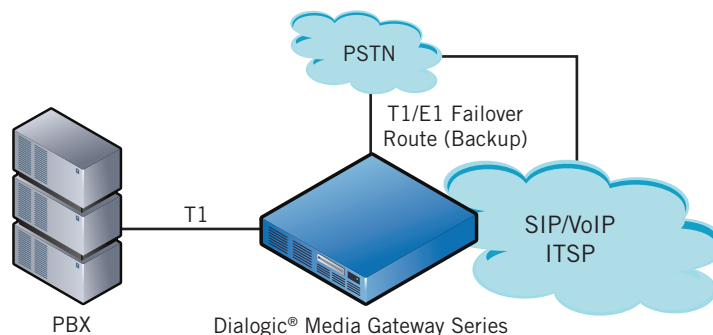


Figure 3. SIP Trunking Configuration Using a Gateway

Deploying a Converged Architecture with an IP Media Server

Media gateways and software can support the development of cost-effective IP media servers, which are accessible from both PSTN and IP networks. In Figure 4, the media gateways are used to deploy multimedia applications at headquarters and at remote offices around the world. An IP media server can provide an efficient central messaging server in an existing Time Division Multiplex (TDM) voice infrastructure by servicing remote locations using an IP network.

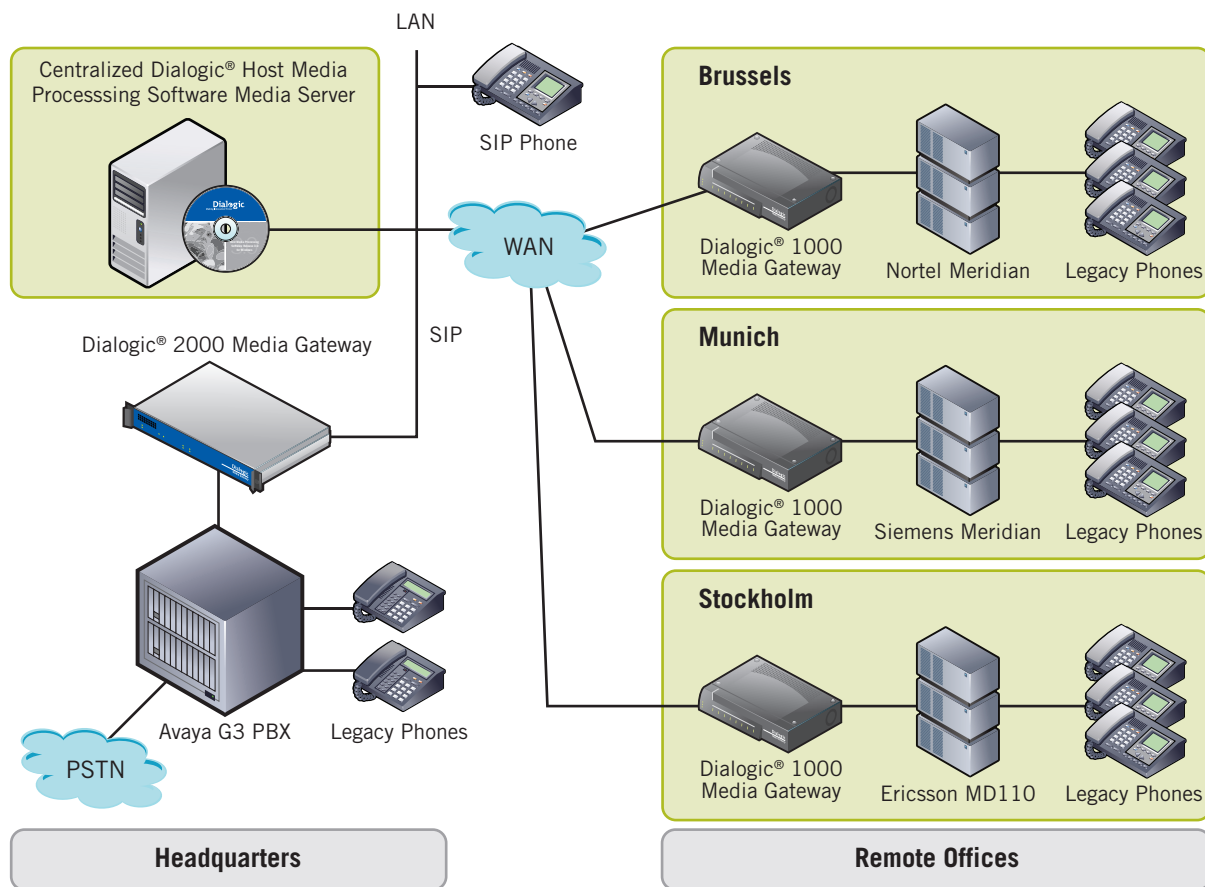


Figure 4. Sample Converged IP Media Server Architecture

Dialogic customers have built IP media servers with Dialogic® Host Media Processing (HMP) Software. The centralized media server provides enhanced services that can be used by remote sites, creating a cost-efficient solution. Dialogic's appliance gateways have been tested in this scenario and work seamlessly with Dialogic HMP Software to create a converged architecture using an IP media server.

Unified Communications and Media Gateways

Unified Communications (UC) is an important trend in converged TDM-IP enterprise communications for businesses that want to remain competitive today. UC integrates disparate communication elements that employees use every day to deliver significant productivity gains. Among these elements are voice, voice messaging, email, fax, instant messaging, and mobile communications. These elements can be combined in a convenient desktop user interface and a separate voice user interface, and may also be embedded in business applications. The goal of UC is to improve access and control over user communications, as well as to speed up the business process overall.

Media gateways can provide a standard interface and a bridge between IP-network-based UC solutions, such as Microsoft® Office Communications Server 2007, and legacy PBX and PSTN networks. See Figure 5 for an example of a converged UC environment.

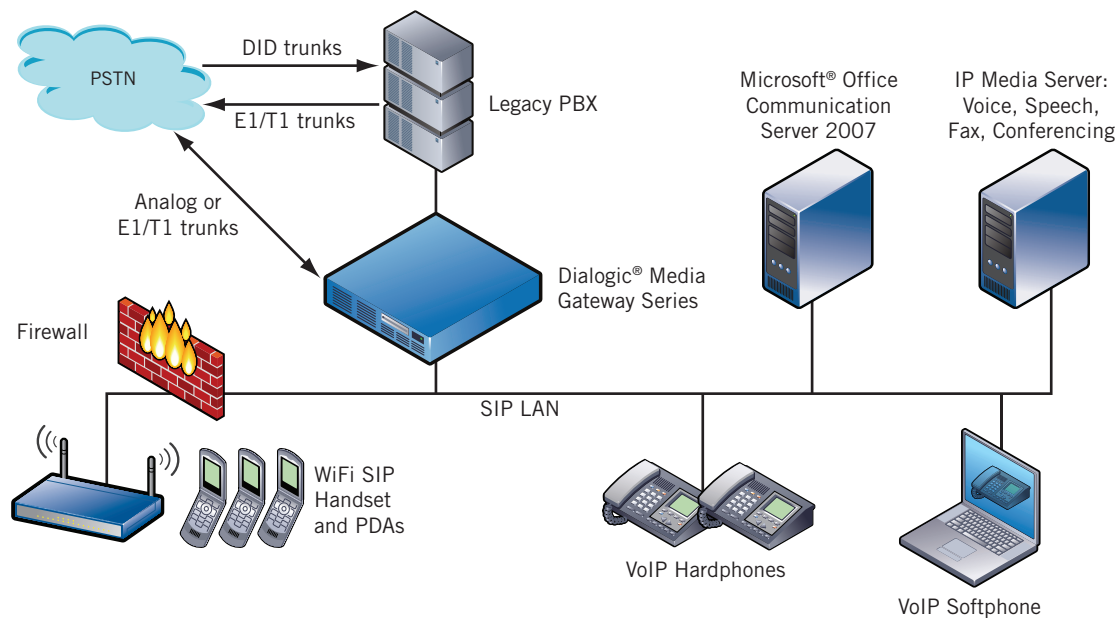


Figure 5. Converged Unified Communications Environment

Media Gateways from Dialogic

Dialogic offers two media gateway appliance series that have been pre-tested with leading PBX systems as well as with Dialogic HMP Software (see the *For More Information* section for the web link to the *PBX Interoperability and Configuration Guides*). The gateways are a suitable solution for enterprises seeking a fast and efficient way of integrating PSTN and IP networks. The two DMG Series are:

- **Dialogic® 1000 Media Gateway Series** — Four or eight-port gateways that connect to PBXs with analog or digital station emulation ports and to the IP network with an Ethernet interface, making the gateways well suited for small- and medium-sized enterprises and remote offices.
- **Dialogic® 2000 Media Gateway Series** — Gateways for higher density needs that connect to systems with one, two, or four T1/E1 interfaces, making the gateways a suitable solution for medium- and large-sized enterprises interested in deploying a variety of applications such as IP media servers, remote office connectivity, long-distance consolidation, and call centers.

The Dialogic® Media Gateways are also IP-enablement tools that allow IP technology to be introduced easily and gradually into a legacy environment at the exact pace an enterprise finds most cost-effective for its workload and current infrastructure.

Table 1 shows the appropriate Dialogic Media Gateway (DMG) Series for various density requirements and applications.

Application	4- to 24-Port FX0 Appliance	8- to 24-Port PBX Emulation Appliance	24- to 60-Port T1/E1 Appliance	120-Port T1/E1 Appliance
IVR/Messaging	DMG1000 Gateways	DMG1000 Gateways	DMG2000 Gateways	DMG2000 Gateways
IP PBX	DMG1000 Gateways	DMG1000 Gateways	DMG2000 Gateways	DMG2000 Gateways
Toll Bypass	DMG1000 Gateways	DMG1000 Gateways	DMG2000 Gateways	DMG2000 Gateways
SIP Trunking	DMG1000 Gateways	NA	DMG2000 Gateways	DMG2000 Gateways
Contact Center	N/A	DMG1000 Gateways	DMG2000 Gateways	DMG2000 Gateways
Enhanced Services	N/A	N/A	DMG2000 Gateways	DMG2000 Gateways

Table 1. Application/Gateway Reference Grid

Summary

Media gateways are critical components for enterprises choosing to integrate PSTN and IP networks. Using a turnkey solution such as a gateway appliance is a suitable way to quickly introduce IP endpoints and applications while protecting investment in legacy hardware. Many media gateway appliances are available today, and it is important to select the ones that are easiest to integrate and manage.

Appliance gateways from Dialogic offer a unique turnkey solution, which has been pre-tested with the leading PBX systems on the market, as well as with Dialogic HMP Software. These gateways allow the benefits of a converged voice and data network to be realized without radical, disruptive, and expensive upgrades to existing PBX equipment.

Acronyms

DMG	Dialogic Media Gateway
IP	Internet Protocol
ISDN	Integrated Services Digital Network
IVR	Interactive Voice Response
LAN	Local Area Network
PBX	Private Branch eXchange
PSTN	Public Switched Telephone Network
TDM	Time Division Multiplexing
UC	Unified Communications
VoIP	Voice over IP
WAN	Wide Area Network

For More Information

PBX Interoperability and Configuration Guides —
http://www.dialogic.com/microsoftuc/pbx_integration.htm

Dialogic® 1000 and 2000 Media Gateway Series SIP Compliance (5.1) —
http://www.dialogic.com/products/gateways/docs/SIP_Compliance_for_DMG1000_and_DMG2000.pdf

Additional information on the Dialogic® 1000 Media Gateway Series —
http://www.dialogic.com/products/gateway/1000_Media_Gateway.htm

Additional information on the Dialogic® 2000 Media Gateway Series —
http://www.dialogic.com/products/gateway/2000_Media_Gateway.htm

www.dialogic.com

Dialogic Corporation
9800 Cavendish Blvd., 5th floor
Montreal, Quebec
CANADA H4M 2V9

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH PRODUCTS OF DIALOGIC CORPORATION OR ITS SUBSIDIARIES ("DIALOGIC"). NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN A SIGNED AGREEMENT BETWEEN YOU AND DIALOGIC, DIALOGIC ASSUMES NO LIABILITY WHATSOEVER, AND DIALOGIC DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF DIALOGIC PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT OF A THIRD PARTY.

Dialogic products are not intended for use in medical, life saving, life sustaining, critical control or safety systems, or in nuclear facility applications.

Dialogic may make changes to specifications, product descriptions, and plans at any time, without notice.

Dialogic is a registered trademark of Dialogic Corporation. Dialogic's trademarks may be used publicly only with permission from Dialogic. Such permission may only be granted by Dialogic's legal department at 9800 Cavendish Blvd., 5th Floor, Montreal, Quebec, Canada H4M 2V9. Any authorized use of Dialogic's trademarks will be subject to full respect of the trademark guidelines published by Dialogic from time to time and any use of Dialogic's trademarks requires proper acknowledgement.

The names of actual companies and products mentioned herein are the trademarks of their respective owners. Dialogic encourages all users of its products to procure all necessary intellectual property licenses required to implement their concepts or applications, which licenses may vary from country to country.

Any use case(s) shown and/or described herein represent one or more examples of the various ways, scenarios or environments in which Dialogic products can be used. Such use case(s) are non-limiting and do not represent recommendations of Dialogic as to whether or how to use Dialogic products.