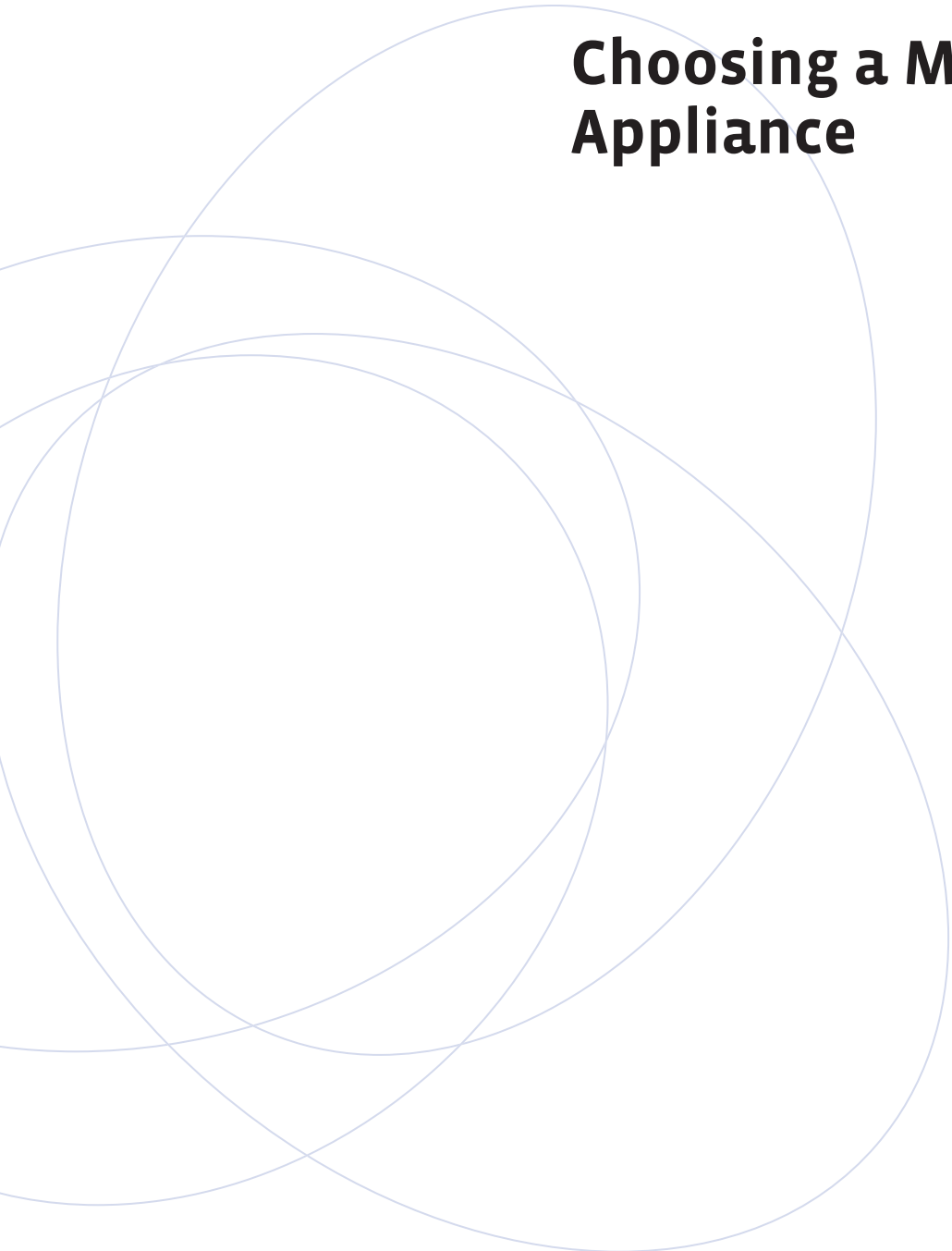


Choosing a Media Gateway Appliance



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 upfront 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 appliances make the implementation of IP technology in PBX systems possible right now, and with low upfront investment costs.

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Introduction

Appliance gateways are turnkey solutions which 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.

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 upfront 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. In addition, few issues with equipment compatibility arise because the gateways do not interface with many other types of hardware. 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.

Future-proof, Scalable Solutions

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 the Right Media Gateway Appliance

Many gateways are currently available on the market, and selecting the right one can mean the difference between seamless integration and a prolonged installation and testing process. In addition, the right 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 valuable 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 H.323- or 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, running standard T1/E1 protocols such as ISDN and QSIG. This allows much higher density communication between the circuit-switched telephony network and H.323- or 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 paper:

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

Adding IP at a Corporate Office

Figure 1 shows how appliance gateways can use H.323 or SIP standards to interface with H.323 or 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.
- Reduce development costs. An application such as voice mail can be written for an IP environment, but 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 find me/follow me, conferencing, and fax to their employees and clients.

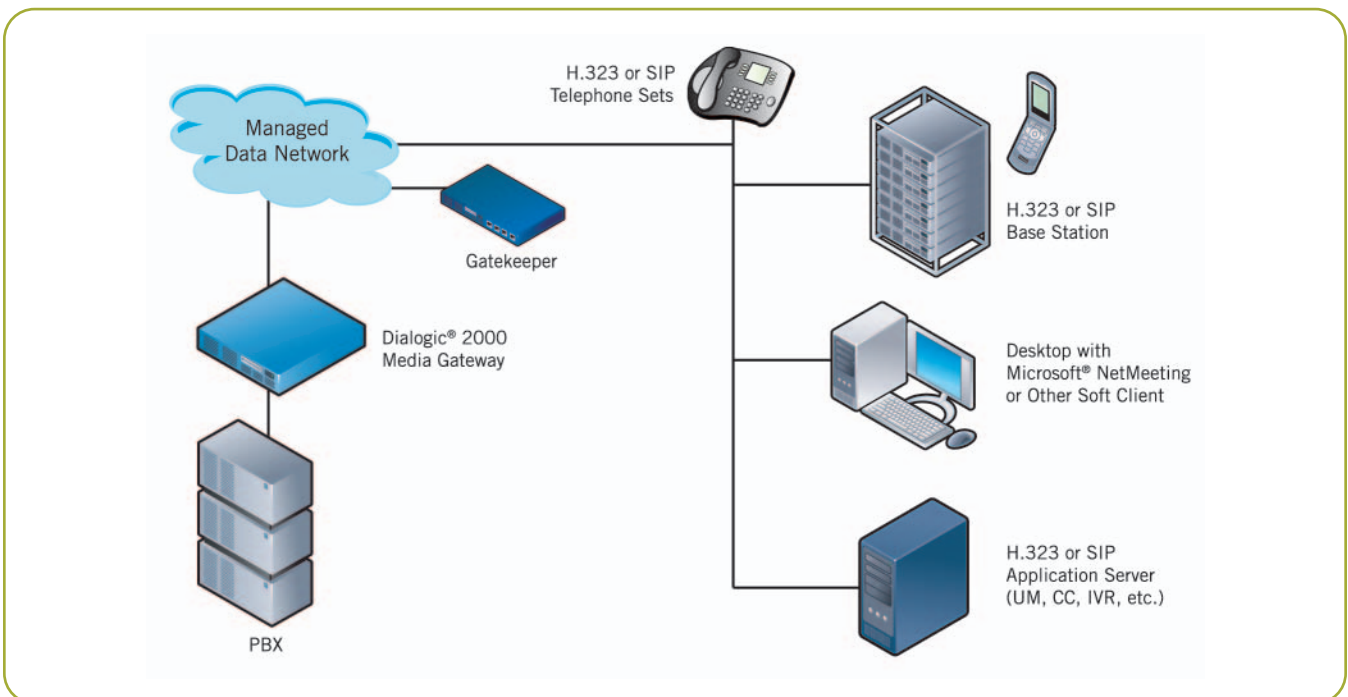


Figure 1. Connecting IP End Points to the Corporate PBX

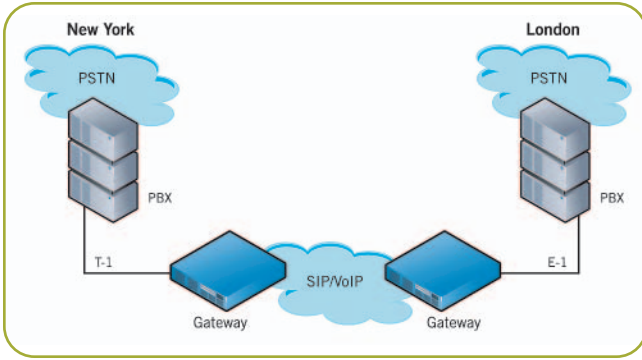


Figure 2. Toll-free Inter-office Communication

Using a Gateway for 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 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.

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 3, 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 multiplexing (TDM) voice infrastructure by servicing remote locations using an IP network.

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.

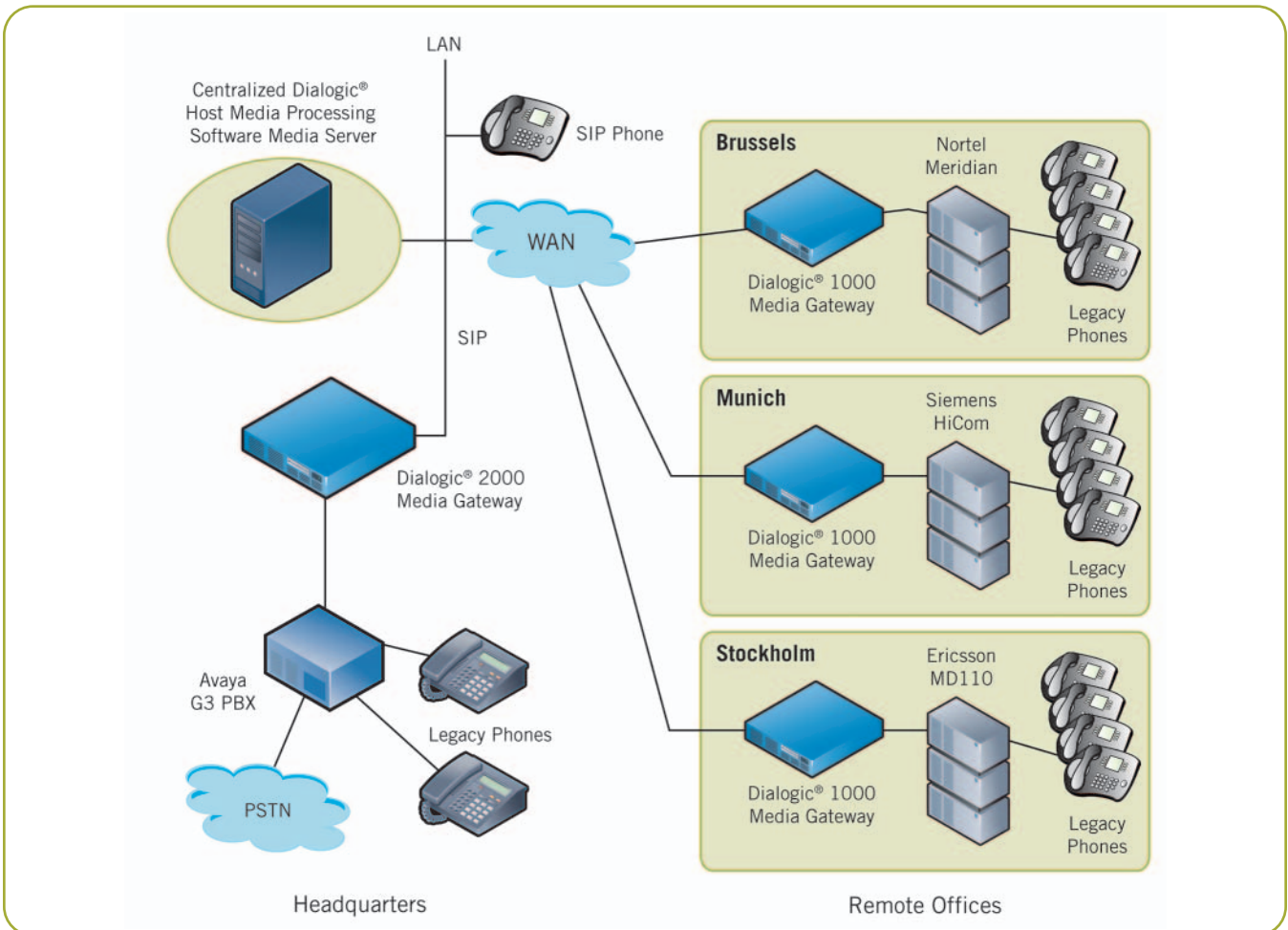


Figure 3. Sample Converged IP Media Server Architecture

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 4 for an example of a converged UC environment.

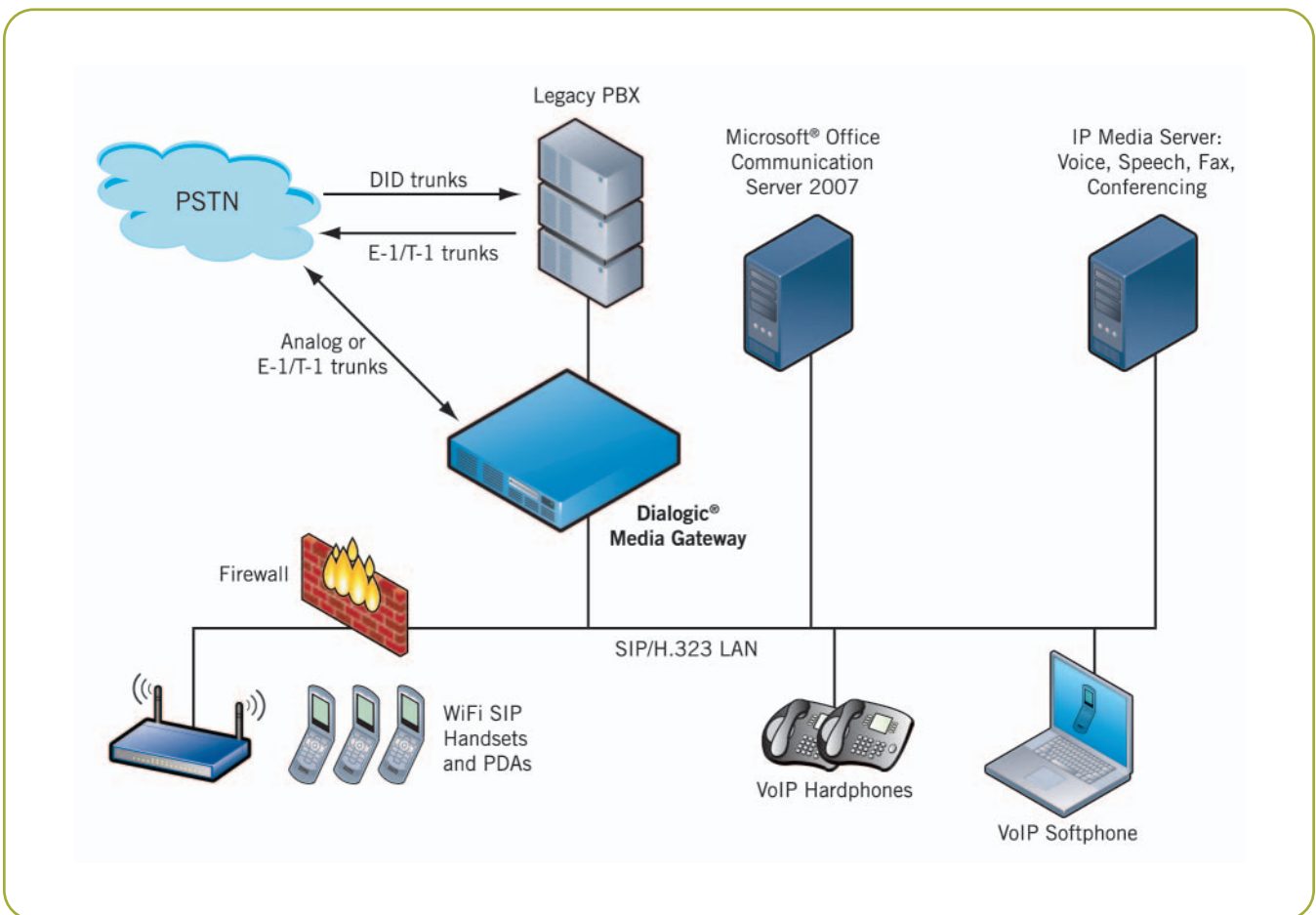


Figure 4. Converged Unified Communications Environment

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. The PBX test results are shown in

Appendices A through G. The gateways are an ideal solution for enterprises of all sizes seeking a fast and efficient way of integrating PSTN and IP networks. The two series are:

- **Dialogic® 1000 Media Gateway Series** — 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 ideal 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 T-1/E-1 interfaces, making the gateways an ideal 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	8- to 24-Port FXO Appliance	8- to 24-Port PBX Appliance	24- to 60-Port T-1/E-1 Appliance	120-Port T-1/E-1 Appliance
IVR/Messaging	DMG1000 Series	DMG1000 Series	DMG2000 Series	DMG2000 Series
IP PBX	DMG1000 Series	DMG1000 Series	DMG2000 Series	DMG2000 Series
Least Cost Routing	DMG1000 Series	DMG1000 Series	DMG2000 Series	DMG2000 Series
Contact Center	N/A	DMG1000 Series	DMG2000 Series	DMG2000 Series
Enhanced Services	N/A	N/A	DMG2000 Series	DMG2000 Series

Table 1. Application/Gateway Reference Grid

Summary

Media gateways are critical components for enterprises wishing to integrate PSTN and IP networks. Using a turnkey solution such as a gateway appliance is an ideal 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 Host Media Processing 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.

Appendix A – PBXs Supported by the Dialogic® 1000 Media Gateway Series

Manufacturer	Models	Software Version	DMG1000 Model
Avaya	Definity G3	Version 3 or greater	DMG1008DNIW
	S8100, S8300, S8700, and S8710	Communications Manager SW V2.0 or greater	
	Magix	Release 2.0 or greater	DMG1008DNIW
	Legend	Release 7.0 or greater	DMG1008LSW
Mitel	SX-200D, SX-200 Light, SX-2000 Light, SX-2000 S, SX-2000 VS	Lightware Release 17 or greater	DMG1008MTLDNIW
NEC	2400 IMG	Release 7400 or greater	DMG1008DNIW
	2400 IMX, 2400 IPX	Release 5200 Dec. 92 1b or greater	
Nortel	Meridian 1 – Option 11, 21, 21A, 51, 61, 71, and 81	Release 15 or greater and options 19 and 46 are required	DMG1008DNIW
	Meridian SL1 – Generic X11	Release 15 or greater and options 19 and 46 are required	
	Nortel Communication Server – 1000E, 1000M, and 1000S	Release V3.0 or greater	
	Norstar 8X24	DR5 Release 1.2 or greater	
	Norstar MICS	Release 4.5 or greater	
Siemens	HiCom 300E CS	Release 9006.4 or greater (Note: North American software load only)	DMG1008DNIW
	HiCom 300E	Release 2.0 or greater (Note: EU software load only)	DMG1008DNIW or DMG1008LSW
	8000	Release 80003 or greater	DMG1008RLMDNIW
	9000	Any release	
	9751	Any release of 9005	
	9751	Release 9006.3 or greater	
Various	Including Alcatel, Ericsson, Fujitsu, and others		DMG1008LSW

Appendix B – CAS PBXs Supported by the Dialogic® 2000 Media Gateway Series

Manufacturer	Models	Software Version	Supplementary Service Support		
			Call Party ID	Transfer	MWI
Avaya	Definity G3	Version 3 or greater	✓	✓	✓
	S8500	Communications Manager SW V2.0 or greater	✓	✓	✓
Nortel	Meridian 1 - Option 11c	Release 15 or greater and options 19 and 46 are required	-	-	-
NEC	2400 IMX	Release 5200 Dec. 92 1b or greater	✓ ¹	✓	✓ ¹
Siemens	HiCom 300E CS	Release 9006.4 or greater (Note: North American software load only)	✓ ²	✓	✓

Note 1: Call Party ID and MWI are supported via the MCI serial protocol.

Note 2: PBX does not send the Calling Party on inbound calls. However, the Called Party and the Call Reason Code fields are supported.

Appendix C: T-1 QSIG PBXs Supported by the Dialogic® 2000 Media Gateway Series

Manufacturer	Models	Software Version	Basic Call Control			Supplementary Service Support					
			Inbound	Outbound	CPID	Diversion		Call Transfer		Path Replacement	MWI
						Forward ID & Reason	Redirect	Join (Hairpin)	Re-Route (TBCT)	Route Optimization	MWI
Alcatel	Omni PCX 4400	Version 3.2.712.5	✓	✓	✓	✓	-	✓	N/A	✓	N/A
Avaya	S8500	Communications Manager SW V2.0	✓	✓	✓	✓	-	✓	N/A	✓	✓
Mitel	SX-2000 S, SX-2000 VS	LW 34	✓	✓	✓	✓	-	✓	N/A	✓	✓
	3300	Version 5.1.4.8	✓	✓	✓	✓	-	✓	N/A	✓	✓
NEC	2400 IPX	R17 Release 03.46.001	✓	✓	✓	✓	-	✓	✓	✓	✓ ¹
Nortel	Meridian 1 - Option 11c	Release 15 or greater and options 19 and 46 are required	✓	✓	✓	✓	-	✓ ²	N/A	✓	✓
	Communications Server 1000	Version 2121, RELEASE 4, ISSUE 00 T	✓	✓	✓	✓	-	✓ ²	N/A	✓	✓
Siemens	HiPath 4000	V2 SMR 9 SMPO	✓	✓	✓	✓	-	✓ ²	N/A	✓	✓

Note 1: MWI operation is supported via the MCI serial protocol.

Note 2: Display on the Called Party phone does not update after the Join transfer completes.

Appendix D: E-1 QSIG PBXs Supported by the Dialogic® 2000 Media Gateway Series

Manufacturer	Models	Software Version	Basic Call Control			Supplementary Service Support					
			Inbound	Outbound	CPID	Diversion		Call Transfer		Path Replacement	MWI
						Forward ID & Reason	Redirect	Join (Hairpin)	Re-Route (TBCT)	Route Optimization	MWI
Alcatel	Omni PCX 4400	Version 3.2.712.5	✓	✓	✓	✓	-	✓	N/A	✓	N/A
Avaya	S8500	Communications Manager SW V2.0 or greater	✓	✓	✓	✓	-	✓	N/A	✓	
Mitel	SX-2000 S, SX-2000 VS	LW 34	✓	✓	✓	✓	-	✓	N/A	✓	✓
	3300	Version 5.1.4.8	✓	✓	✓	✓	-	✓	N/A	✓	✓
Siemens	HiPath 4000	V2 SMR 9 SMPO	✓	✓	✓	✓	-	✓ ¹	N/A	✓	✓
Nortel	Meridian 1 - Option 11c	Release 15 or greater and options 19 and 46 are required	✓	✓	✓	✓	-	✓ ¹	N/A	✓	✓
	Communications Server 1000	Version 2121, RELEASE 4, ISSUE 00 T	✓	✓	✓	✓	-	✓ ¹	N/A	✓	✓
Ericsson	MD110	Release MX1 TSW R2A (BC13)	✓	✓	✓	✓	-	✓ ¹	N/A	✓	✓
Phillips	Sopho (iS3030-288)	Version 6810.34	✓	✓	✓	✓	-	✓ ¹	N/A	✓	✓

Note 1: Display on the Called Party phone does not update after the Join transfer completes.

Appendix E: NI-2 PBXs Supported by the Dialogic® 2000 Media Gateway Series

Manufacturer	Models	Software Version	Basic Call Control			Supplementary Service Support					
			Inbound	Outbound	CPID	Diversion		Call Transfer		Path Replacement	MWI
						Forward ID & Reason	Redirect	Join (Hairpin)	Re-Route (TBCT)	Route Optimization	MWI
Avaya	5ESS	Version 5e16(2)02.00	✓	✓	✓	✓	-	N/A	✓	N/A	✓ ¹
Mitel	SX-2000 S, SX-2000 VS	LW 34	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A
	3300	Version 5.1.4.8	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A
NEC	All Models	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nortel	DMS100	Version SN000.007	✓	✓	✓	✓	-	N/A	✓	N/A	✓
	Meridian 1 - Option 11c	Release 15 or greater and options 19 and 46 are required	✓	✓	✓	-	-	-	-	-	-
Siemens	HiPath 4000	V2 SMR 9 SMPO	✓	✓	✓	-	-	-	-	-	-

Note 1: MWI operation is supported via the SMDI serial protocol.

Appendix F: 5ESS PBXs Supported by the Dialogic® 2000 Media Gateway Series

Manufacturer	Models	Software Version	Basic Call Control			Supplementary Service Support					
			Inbound	Outbound	CPID	Diversion		Call Transfer		Path Replacement	MWI
						Forward ID & Reason	Redirect	Join (Hairpin)	Re-Route (TBCT)	Route Optimization	MWI
Avaya	5ESS	Version 5e16(2)02.00	✓	✓	✓	✓	-	N/A	✓	N/A	✓ ¹

Note 1: MWI operation is supported via the SMDI serial protocol.

Appendix G: DMS100 PBXs Supported by the Dialogic® 2000 Media Gateway Series

Manufacturer	Models	Software Version	Basic Call Control			Supplementary Service Support					
			Inbound	Outbound	CPID	Diversion		Call Transfer		Path Replacement	MWI
						Forward ID & Reason	Redirect	Join (Hairpin)	Re-Route (TBCT)	Route Optimization	MWI
Nortel	DMS100	Version SN000.007	✓	✓	✓	✓	-	N/A	✓	N/A	✓ ¹

Note 1: MWI operation is supported via the SMDI serial protocol.

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

Additional information on the Dialogic® 1000 Media Gateway Series (formerly Dialogic® PBX-IP Media Gateways)
http://www.dialogic.com/products/gateway/1000_Media_Gateway.htm

Additional information on the Dialogic® 2000 Media Gateway Series (formerly Dialogic® T1/E1-IP Media Gateways)
http://www.dialogic.com/products/gateway/2000_Media_Gateway.htm

To learn more, visit our site on the World Wide Web at <http://www.dialogic.com>.

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