

White Paper

Using a Cost-Efficient Online Service to Handle Fax in a Unified Messaging Environment

Dialogic[®] Media Gateways Help
Concord Technologies Continue Its
Tradition of Flexibility

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Executive Summary

As PSTN and IP networks continue to converge and businesses are introduced to increasingly tempting applications that promise to dramatically reduce costs and increase productivity, the challenge of fitting all the disparate pieces together and making them interoperate seamlessly becomes more complex.

One particularly knotty problem is how to handle fax transmissions that are sent as PSTN calls when the recipient is using Unified Messaging on an IP network and has a converged interface to handle voice and email messages.

This white paper proposes a simple solution using Concord Fax Online for Microsoft Exchange Server 2010 from Concord Technologies, a fax service provider, and an appliance gateway from the Dialogic® Media Gateway Series. Details are provided about the problem and solution, along with the benefits and special technologies available with each part of the solution.

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Cutting Costs with a Fax Service

Although the invention of the fax machine is credited to the Scottish mechanic and inventor Alexander Bain in 1843, faxing did not become wildly popular until the 1980s when instantly sending text, line drawings, or even photographs across a telephone line to a remote location became a critical technology for most businesses.

Today, fax remains a mainstay in a surprisingly large number of organizations, and can be a costly and labor-intensive function whether a law enforcement agency is faxing confidential information to a judge, a draft contract needs to be sent immediately to seal a deal that cannot wait for overnight delivery, government regulations require documents be tracked, or an SMB marketing department wants to make a special offer to its best customers.

For the last decade, smart organizations have been dramatically reducing fax costs by using service providers who specialize in fax transmission such as Concord. Customers find that Concord fax service is not only extremely reliable, with redundant data centers and access to all major carriers, but it is also very flexible, providing a wide variety of services and easy access. Subscribers can receive faxes from or send them to a Multi-Function Peripheral (MFP), such as a copying machine with a fax function, or a traditional fax machine, although the preferred “faxing” method today is often an email attachment. Another strength of the Concord service is that it can offer a customized “hybrid” solution, allowing a customer to combine fax delivery and transmission modes.

Today's Challenging Environment: Unified Messaging

As anyone knows who has a new smartphone or has recently begun tweeting, consumer technology changes at a breakneck pace. Businesses too must constantly take advantage of new technology if they wish to continue to cut costs and increase their competitive edge with greater productivity. Today, the move to converged environments is accelerating, with the adoption of new IP networks and Voice over IP (VoIP) becoming as critical now as buying fax machines was a few decades ago. And among the most efficient applications used in converged legacy and IP environments are Unified Messaging and its sister technology Unified Communications.

Unified Messaging (UM) breaks down the traditional communications silos in an organization. Using a different tool for each communications mode (phone, fax, email, and calendaring) hinders productivity, wastes time, and causes frustration. Business users no longer want to juggle multiple devices and phone numbers, multiple message stores, and multiple directories when they can instead access all types of communications in a single interface on the desktop, making all types of messages more easily accessible and saving significant time and resources.

But as the tasks of the end user have become easier, the technology to implement them has become more complex. Convergence entails bringing together a legacy digital PSTN environment with an IP environment. And once the technical gap between the PSTN and IP networks has been bridged, how does an organization handle fax in the new IP environment?

Bringing the Networks Together and Adding Fax

Two interoperable solutions that can easily make the very different legacy PSTN and IP networks work together seamlessly and bring fax to a new UM environment are the appliance gateways in the Dialogic® Media Gateway Series and Concord Fax Online for Microsoft Exchange Server 2010 (normally combined in a hybrid service).

Benefits of Appliance Gateways

Appliance gateways are turnkey solutions that enable a phased migration to IP. They can seamlessly converge voice, data, and fax across IP networks, creating a single, integrated enterprise network without expensive changes to an existing circuit-switched network.

A gateway appliance is a self-contained unit that allows organizations to interface traditional PSTN connections such as a PBX or KTS to the IP networks (LAN, WAN, or VPN) that are proliferating today. This allows users to realize important benefits.

Rapid and Cost-Effective Development

Appliances benefit organizations seeking a low-cost, low-maintenance network-convergence solution. A gateway appliance can be installed and configured easily — usually in a matter of minutes — and can help enterprises gain the benefits of VoIP with a low up-front cost.

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A key component of an appliance gateway is its embedded gateway software. Because of this software, the gateway can be made ready for a live environment with minimal integration testing. Appliances can reduce the time spent on installation, integration, and troubleshooting from months to days.

Move to IP with Easy Integration

Gateway appliances enable customers to deploy new IP services and features without major changes to existing hardware and software architecture. Originally used simply for toll bypass, appliance gateways now integrate complex converged services such as UM for handsets and desktops at headquarters and worldwide remote locations.

To meet this challenge, Dialogic® Media Gateways (DMG Gateways) undergo thorough and rigorous testing both at Dialogic in its PBX Integration Center and at third-party interoperability testing organizations such as tekVizion Labs, which certifies compatibility with Microsoft® UM and UC products. Selecting a gateway that has been pre-tested with application software can save weeks or even months of installation, integration, and troubleshooting.

Benefits of Using a Fax Service

Concord Fax Online for Microsoft Exchange Server 2010 is designed to meet the needs of businesses that depend on fax in their daily operations. The Concord solution provides a wide range of functions that enable users to eliminate fax machines and supplies, fax servers, and fax-related telephone lines from their organizations. There is no capital equipment to purchase or install, and businesses can be fax-enabled, over multiple fixed and mobile locations, within hours. By allowing users to send and receive faxes over a secure connection using their computers or mobile devices just as easily as they send and receive email, Concord Fax Online for Microsoft Exchange Server 2010 enables organizations to log, store, and manage their faxing with the same or a greater level of security and confidentiality than with their current IT infrastructure.

Meeting Demanding Fax Requirements

Concord's service includes a number of across-the-board features designed to meet the most demanding fax requirements, including:

- International DID numbers
- Toll free numbers
- Support for any email client
- Comprehensive order processing, billing, and help desk support
- Global fax delivery
- Transport over a redundant, geographically distributed network designed for uptime exceeding 99.99%.

Because of the large facilities that Concord maintains, fax capacity is virtually unlimited. If a marketing department occasionally needs to send out a large number of faxes, a business's IT department no longer needs to worry about purchasing extra capacity for those occasional needs. As a pay-as-you-go service, Concord provides both capacity as needed and flexibility in budgeting and planning.

Supplying Solid Security

Concord's fully redundant IP fax platform supports multiple secure methods with which customers can connect:

- **Transport Layer Security (TLS)** — for email-based services
- **Virtual Private Networks (VPNs)** — for secure connectivity
- **Hyper Text Transport Protocol Secure (HTTPS)** — for web services

Messages within the Concord network are moved through private lines, and when data is transferred from one data center to another, the data is sent encrypted through a VPN. The Concord data centers are protected by state-of-the-art firewalls and intrusion detection systems, and all access by employees is monitored and logged. Strict password strength and change requirements are enforced. As a result, the Concord IP fax service is compliant with many recent regulations such as Health Insurance Portability and Accountability Act (HIPAA), Sarbanes-Oxley (SOX), Gramm-Leach Bliley (GLB), Patriot, Know Your Customer, Base, and many more. Organizations can benefit tremendously as they can still rely on faxing for their communication needs while eliminating the huge costs of installing, administering, and maintaining systems that comply with the security and privacy regulations of their particular industries.

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Concord customers can enjoy the benefits of feature-rich fax communications without the cost and effort associated with conventional fax systems and alternative fax technologies. This is achieved by platform-independent integration of fax and email, which, in turn, adds value to existing IT infrastructure and maximizes return on IT investments. Overall operational efficiency is greatly increased by the reduction of paper volume and the automation of document handling. Concord's software development kits enable easy customization of any software application to render it "fax-enabled."

Spotlight on Technology

Both Concord Fax Online for Microsoft Exchange Server 2010 and DMG Gateways have technologies that make them especially effective and provide customers with added advantages.

Concord Fax Online for Microsoft Exchange Server 2010

Concord worked closely with Microsoft to integrate Microsoft® Exchange Server 2010 with the Concord Fax Online platform and create a new solution — Concord Fax Online for Microsoft Exchange Server 2010. When a call is routed to Exchange Server 2010, it detects whether the transmission is a voice call or fax call. If it is a voice call, Exchange Server 2010 routes the voice mail to the recipient's inbox using its UM feature. If it is a fax call, Exchange Server 2010 routes the call over an IP network to a Concord Fax Online data center. The Concord data center then converts the call into a fax document and sends it back to Exchange Server 2010 as an email attachment to the intended recipient.

The solution supports faxing through DMG Gateways or IP phone systems at the customer premises and directly through fax numbers on the Concord global fax network. In addition, Concord Fax Online for Microsoft Exchange Server 2010 provides several benefits over the fax solution in Microsoft® Exchange Server 2007.

- **Greater cost savings** — Concord anticipates that Concord Fax Online for Exchange Server 2010 can provide an average cost saving of 15% to 25% for customers that are migrating from Exchange Server 2007, and significantly more if fax machines are eliminated

- **Increased uptime** — Exchange Server 2010 focuses on high availability, and offers new features, such as database availability groups, that make it easier to extend data replication between data centers to achieve automatic failover.
- **Easier usability** — Exchange Server 2010 includes an archiving feature that lets users archive faxes on an email server for corporate and legal compliance. Exchange Server 2010 also allows Concord to adapt dynamically to the equipment a customer is using, select the optimal settings, and route in a way that delivers faxes as reliably and efficiently as possible. In addition, Concord customers can have a single phone number or extension for both voice mail and fax instead of separate lines.

[New Cost-Saving Online Fax Solution Offers Increased Uptime and Improved Usability](#), a Microsoft case study about Concord Fax Online for Microsoft Exchange Server 2010, is available online.

Concord Fax Online Flexibility

Other special technologies are provided to Concord customers at no additional charge include:

- **Concord "Flipper" Technology** — Ability to programmatically "flip" from one carrier to another from the lowest cost option to the highest cost option at Concord's expense in case of connection problems. "Flipper" provides superior reliability in difficult situations.
- **Quality Aware Fax Routing** — Patent-pending proprietary technology that stores recipient information and carrier information for intelligent routing (on a per number basis). The Concord fax delivery system is constantly gathering information and "learning" how to provide the best service possible.

Such value-added technologies not only allow Concord to provide great service but also reflect the constant search at Concord for the optimal way to provide fax service.

Gateway Integration Modes

Selecting the right appliance gateway can mean the difference between seamless integration or a prolonged installation and testing process. Choosing a gateway that has been pre-tested

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with leading PBX systems on the market can save time because the interoperability testing has already been done. In addition, suitable pre-testing 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 example, compatibility between Concord Fax Online for Microsoft Exchange Server 2010 and DMG Gateways has been thoroughly tested.

In addition, DMG Gateways provide two modes for integration, depending on the series chosen:

- **Emulating mode** — Legacy PBXs can be 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 UM). This mode is available with the Dialogic® 1000 Media Gateway Series (DMG1000 Gateways). These gateways are generally used in small- to medium-sized organizations, and this type of emulation can allow a business to avoid an expensive PBX upgrade.
- **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. This mode is available with the Dialogic® 2000 Media Gateway Series (DMG2000 Gateways), which is generally used by medium- to large-sized organizations. A PBX upgrade is not normally required.

Providing two emulation modes allows a choice of gateway density and the ability to right-size the gateway fit for an organization. For information about the PBXs that DMG Gateways support, see Appendix A.

Making Fax Work with UM

For more than 15 years, Concord has been leading the industry with innovative solutions enabled with Dialogic® fax technology. Today, Concord is spearheading the industry with its SIP/T38 enabled network. Based on a pair of fully redundant data centers located in Seattle, WA and Chicago, IL, Concord provides reliable fax functionality even in the case of regional catastrophic events. Concord's revolutionary data center failover technology enables rerouting of fax traffic almost instantaneously, resulting in exceptional business continuity and reliability. Figure 1 provides a simplified illustration of the Concord system.

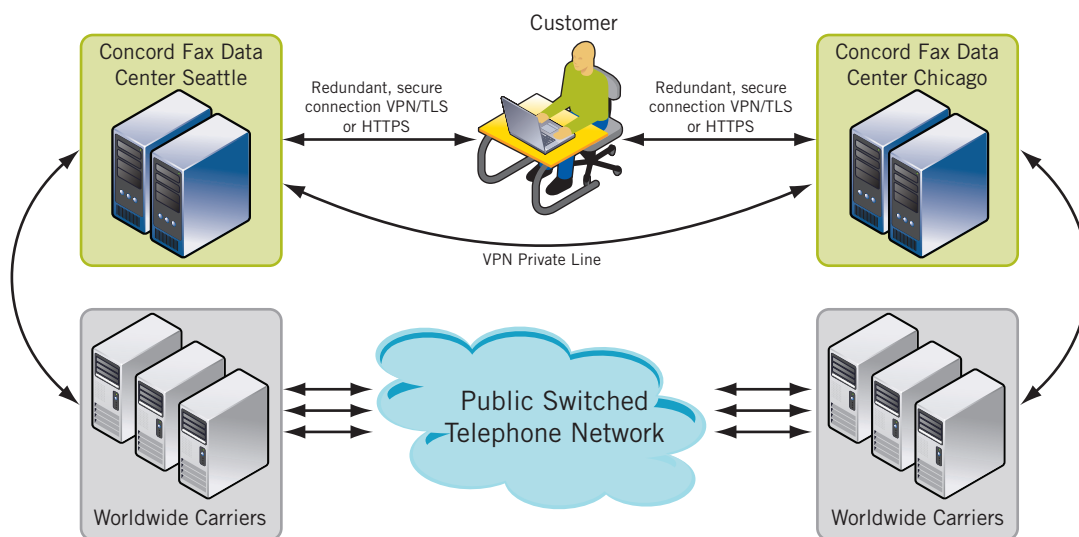


Figure 1. Fully Redundant Concord Fax Network

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What sets Concord apart is its network architecture, which provides real-time failover for both inbound and outbound communications. Real-time failover for inbound communications, a product of significant capital investment, represents a technological breakthrough for the IP fax industry and for Concord. Many IP fax providers and in-house solutions only offer outbound failover, making their networks less reliable. Concord customers enjoy the unique advantage of a robust network built for reliability and speed.

In addition, Concord uses field-proven Dialogic® Diva® Media Boards with Dialogic® Diva® softIP for SIP and Dialogic® Brooktrout® TR1034 Fax Boards in both of its data centers.

Adding the UM to the Network

Figure 2 shows how a Dialogic® Media Gateway (DMG1000 or DMG2000 Gateway) can be added to relay fax transmissions to Concord when UM is added to a customer network.

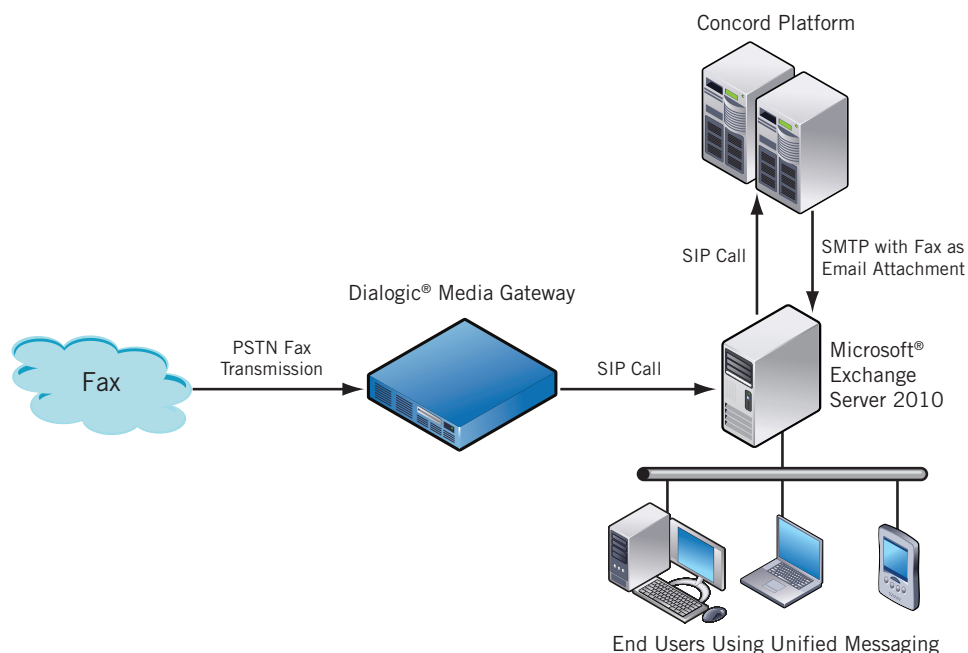


Figure 2. Adding UM to the Network

A fax transmission is sent over the PSTN to the customer site, and the DMG Gateway can intercept it directly or it can first go to a PBX that would send it to the DMG Gateway. (The optional PBX is not shown in Figure 2.) The DMG Gateway translates the fax transmission into a SIP call and can optionally send the SIP call to Concord directly or to Exchange Server 2010 on an IP network. Exchange Server 2010 would relay the SIP call containing the fax transmission to Concord for processing. Whether it received the fax transmission directly from the DMG Gateway or from Exchange Server 2010, the fax transmission would be returned to the corporate network as an SMTP email attachment to be distributed to the Inbox of the recipient using the UM application. At this point, the end user can access the fax message as easily as a voice message received as an audio file attachment or a normal email message.

In all cases, the fax transmission is passed via telephone number, eliminating concerns about dedicated “lines” or other “pipes” into the customer network.

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Dialogic and Concord: A Shared Focus on Value

The expertise and innovation of Dialogic and Concord have worked together successfully since 1996 to benefit fax customers. Today, Concord fax service innovation is not only compatible with DMG Gateways, but Concord also uses fax technology from Dialogic in its data centers: both Diva Media Boards with Diva softIP for SIP and Brooktrout TR1034 Fax Boards.

Concord can provide unparalleled reliability and uptime and significant cost savings in part because it can innovative confidently on trusted, technically sophisticated Dialogic® products, which can help Concord to further reduce the time, cost, and complexity of delivering fax services in today's highly competitive business environment. The emphasis placed by Dialogic and Concord on product testing and information exchange benefits Concord customers, providing superior value when they choose to move to a converged network and Unified Messaging with Concord Fax Online for Microsoft Exchange Server 2010.

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Appendix A. PBX Interoperability

This appendix provides detailed interoperability information for the Dialogic® 1000 Media Gateway Series (DMG1000 Gateways) and the Dialogic® 2000 Media Gateways (DMG2000 Gateways) based on testing reports from Dialogic's PBX Interoperability Center. Testing is ongoing, and if your PBX is not listed in this appendix, send an email to diallogic@diallogic.com or visit the Dialogic Media Gateway Forum at www.diallogic.com/den/forums/9.aspx.

Dialogic® 1000 Media Gateway Series

Table 1 lists the specific DMG1000 Gateway models and the PBXs with which they are currently compatible. Models are specified by product code.

PBX		DMG1000 Gateway	
Manufacturer	Models	Software Version	Product Codes
Avaya	DEFINITY G3	Version 3 or greater	DMG1008DNIW
	S8100, S8300, S8700, and S8710	Communications Manager SW V2.0 or greater	
	Legend	Release 7.0 or greater	DMG1008LSW
	Magix	Release 2.0 or greater	DMG1008DNIW
Mitel	SX-200D, SX-200 Light, SX-2000 Light, SX-2000 S, and SX-2000 VS	Lightware Release 17 or greater	DMG1008MTLDNIW
NEC	2000 IPS	Release 8.2 or greater	DMG1008DNIW
	2400 IMG	Release 7400 or greater	
	2400 IMX	Release 5200 Dec. 92 1b or greater	
	2400 IPX	Release V.17 issue 3.46.001 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 Release 9006.3 or greater; Release 9006.4 or greater is required for end-to-end signaling	
Various	Including Alcatel, Avaya, Ericsson, Fujitsu, Mitel, Siemens, etc., through analog port and/or serial port integration		DMG1008LSW or DMG1004LSW

Table 1. PBX Compatibility

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Dialogic® 2000 Media Gateway Series

PBXs that follow one of the protocol specifications listed in the Table 2 will interoperate with the DMG2000 Gateways. DMG 2000 Gateway models are distinguished by density and by whether or not they support failover.

Tables 3 through 8 list the PBXs that were specifically tested with DMG 2000 Gateways either in a Dialogic facility or a third-party interoperability lab.

Type	Protocols
Serial	MCI, MD-110, SMDI
T-1 ISDN	5ESS, DMS100, NI2, QSIG
T-1 CAS	E&M, GroundStart, LoopStart
E-1	EuroISDN, QSIG
VoIP	Call transfer/call hold/message waiting indicator, SIP per RFC 3261, RTP/RTCP for delivery of voice
FoIP	T.38 FoIP emulating units transcode fax from T.30 fax protocol, supporting V.21, V.27, V.29, and V.17 modulation schemes, to T.38 for transmission over a packet network
Security	SRTP, HTTPS, TLS

Table 2. Protocol Support for DMG2000 Gateways

Manufacturer	Models	Software Version
Avaya	DEFINITY G3	Version 3 or greater
	S8500	Communications Manager SW V2.0 or greater
NEC	2400 IMX	Release 5200 Dec. 92 1b or greater
Nortel	Meridian 1 – Option 11c	Release 15 or greater and options 19 and 46 are required
Siemens	Hicom 300E CS	Release 9006.4 or greater (North American software load only)

Table 3. PBX Support — CAS

Manufacturer	Models	Software Versio
Alcatel	OmniPCX 4400	Version 3.2.712.5
Avaya	S8500	Communications Manager SW V2.0
Mitel	SX-2000 S, SX-2000 VS	LW 34
	3300	Version 5.1.4.8
NEC	2400 IPX	R17 Release 03.46.001
Nortel	Meridian 1 – Option 11c	Release 15 or greater and options 19 and 46 are required
	Communications Server 1000	Version 2121, Release 4, Issue 00 T
Siemens	HiPath 4000	V2 SMR 9 SMPO

Table 4. PBX Support — T1 QSIG

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Manufacturer	Models	Software Version
Alcatel	Omni PCX 4400	Version 3.2.712.5
Avaya	S8500	Communications Manager SW V2.0 or greater
Mitel	SX-2000 S, SX-2000 VS	LW 34
	3300	Version 5.1.4.8
Nortel	Meridian 1 – Option 11c	Release 15 or greater and options 19 and 46 are required
	Communications Server 1000	Version 2121, Release 4, Issue 00 T
Siemens	HiPath 4000	V2 SMR 9 SMPO
Ericsson	MD110	Release MX1 TSW R2A (BC13)
Philips	Sophos (iS3030-288)	Version 6810.34
Tenovis	Integral 3	E062V01.0.0.2

Table 5. PBX Validation — E1 QSIG

Manufacturer	Models	Software Version
Avaya	5ESS	Version 5e16(2)02.00
Mitel	SX-2000 S, SX-2000 VS	LW 34
	3300	Version 5.1.4.8
NEC	All models	N/A
Nortel	DMS100	Version SN000.007
	Meridian - Option 11c	Release 15 or greater and options 19 and 46 are required
Siemens	HiPath 4000	V2 SMR 9 SMPO

Table 6. PBX Validation — T1 NI2

Manufacturer	Models	Software Version
Avaya	5ESS	Version 5e16(2)02.00

Table 7. PBX Validation — T1 5ESS

Manufacturer	Models	Software Version
Nortel	DMS100	Version SN000.007

Table 8. PBX Validation — T1 DMS100

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About Concord Technologies

Concord Technologies is the premier provider of integrated fax solutions for business. Its advanced network architecture provides best-of-breed capacity, reliability, and security features, and supports a comprehensive range of service offerings, including versatile Web Services that facilitate integration with any corporate software application. Concord customers enjoy all the benefits of feature-rich fax communications without the cost, effort, and maintenance issues associated with conventional fax systems and alternative fax technologies.

About Dialogic

Dialogic Corporation is a leading provider of world-class technologies based on open standards that enable innovative mobile, video, IP, and TDM solutions for Network Service Providers and Enterprise Communication Networks. Dialogic's customers and partners rely on its leading-edge, flexible components to rapidly deploy value-added solutions around the world.

Learn More about This Innovative Solution

For general information, proof points, and case studies about the products described in this white paper, visit <http://www.concordfax.com/> and <http://www.dialogic.com/>.

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