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The Benefits of Migrating Fax Communications to Converged IP Networks

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Executive Summary

This white paper discusses the potential of using fax servers in an IP architecture to save costs and enhance productivity. It also reviews how deploying centralized and fault-tolerant IP fax servers can assist companies in their efforts toward automating business processes, managing documents, and meeting regulatory and compliance standards.

Special focus is on the lower operating costs realized when converging voice and data infrastructures, the easier deployment and lower maintenance due to centralized resources, and the enhanced disaster preparedness that IP fax brings. Also discussed are the productivity benefits of an IP fax server and the option to use Multi-Function Peripherals (MFPs) to further leverage the IP fax sever to capture, store, and archive documents.

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Introduction

Enterprise networks are evolving to support voice, video, and data applications on a single network infrastructure at an increasing pace. One technology that is often overlooked when transitioning to VoIP networks is fax. By migrating fax communications to converged IP architectures, companies can enjoy many advantages over legacy analog or Time Division Multiplex (TDM) fax. The centralized and fault-tolerant IP fax servers can help companies:

- Reduce their phone bills by driving long distance fax traffic over IP
- Eliminate the cost of maintaining analog Private Branch eXchange (PBX) ports
- Reduce network administrative costs
- More easily provide fax services to all employees regardless of location
- Lower the cost of disaster preparedness associated with fax technology
- Consolidate remote fax servers in a central location
- Eliminate analog lines

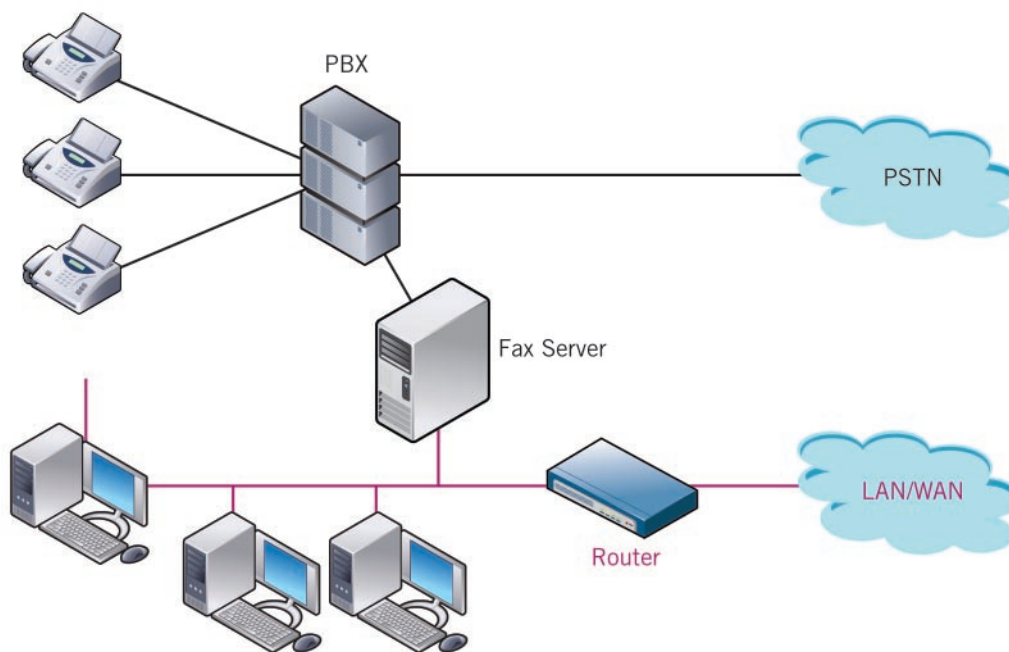Figure 1 shows how a traditional fax server integrates with a PBX:

Figure 1. Traditional Fax Server PBX Integration

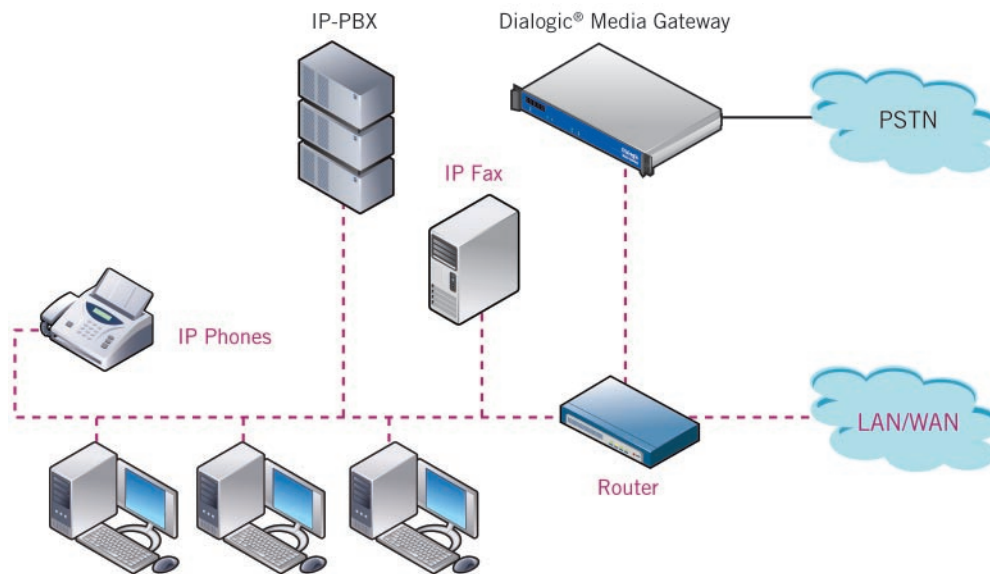Figure 2 shows how an IP fax server integrates with an IP-PBX:

Figure 2. IP Fax Server IP-PBX Integration

This white paper describes the specific cost and productivity benefits offered by implementing an IP fax server. It also reviews how fax servers can assist companies in their efforts toward business process automation, document management, and regulatory and compliance standardization.

Less Complexity — Lower Operating Costs

One of the main reasons that companies converged their voice and data infrastructure was to reduce the complexity of their total infrastructure, which in turn reduces the cost of maintaining the network. By ensuring that facsimile traffic is also run on this same infrastructure, companies can further leverage the investment made in their converged voice and data network. By removing traditional telephone lines (and perhaps fax machines altogether through the use of Multi-Function Peripherals [MFPs]), companies can further reduce their operation and maintenance costs.

Centralized Fax Resources Provide Easier Deployment and Maintenance

As shown in Figure 2, the location of the IP fax server is independent of the PSTN network access point. In a VoIP environment, gateways provide the connection to the PSTN. The fax processing resources simply need access to a data network, Local Area Network (LAN), or Wide Area Network (WAN) where the gateway resides. The various application servers on the enterprise WAN can deliver services to all locations from one central data center, using the gateways in remote offices to gain access to the PSTN. This arrangement reduces the number of remotely-managed network elements, thus consolidating maintenance and lowering costs. It also simplifies deployment, enables greater consolidation of fax services, lowers disaster preparedness costs, and enables least cost routing via the WAN.

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Traditionally, provisioning fax services to employees in remote locations required installing an on-site fax server in those remote locations. However, with an IP fax server, companies can easily deploy a central solution to service all employees, local or remote. The gateway that resides in the field offices provides the access to the PSTN. Thus, with IP fax services configured as shown in Figure 3, below, adding remote employees to an IP fax server is done entirely through software; for example, by purchasing a seat license for the fax server. In fact, with IP Fax, a remote employee in Brussels can use the company's fax server in New York just as easily as if it were located in the remote employee's local office.

Least Cost Routing

Another benefit of a centralized fax resource is the ability to better control costs through least cost routing. As companies implement gateways at remote locations and centralize voice and fax services, they are able to leverage their network infrastructure to route calls between office locations in the least costly fashion. In this way, for example, a company can send faxes from New York to Tokyo without paying long distance tolls, because its gateway in Tokyo can bridge its WAN to the public calling area, as shown in Figure 3:
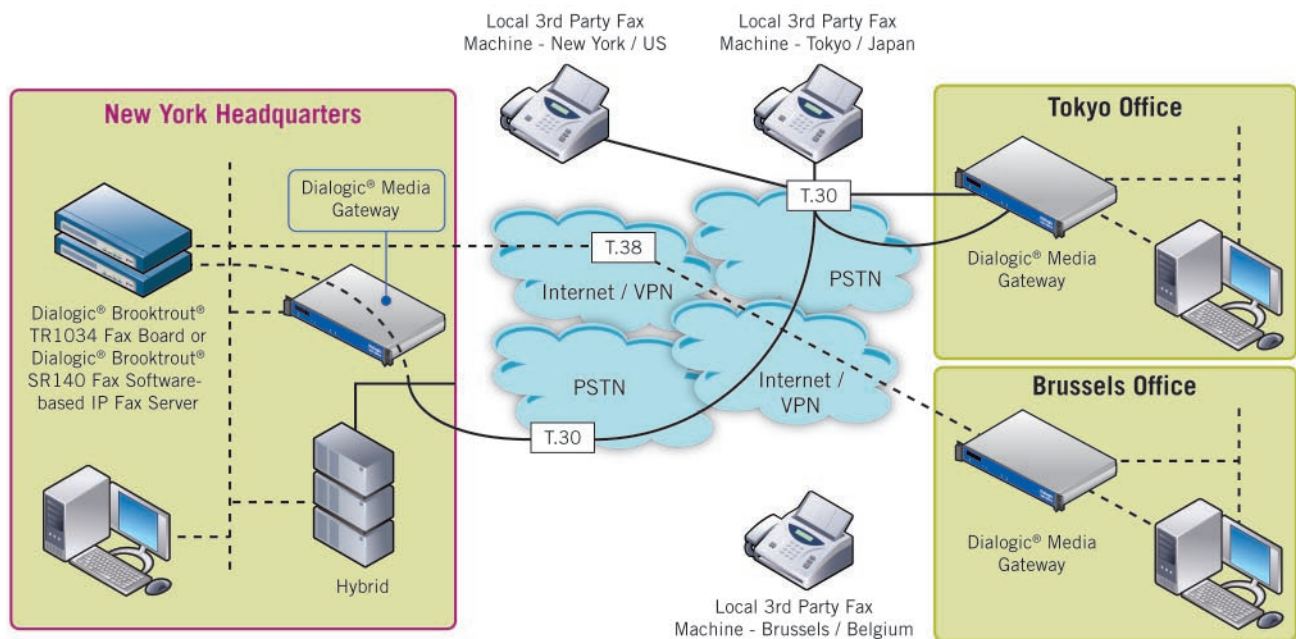

Figure 3. Least Cost Routing

Enhanced Disaster Preparedness

An IP network architecture enables the location of the fax server to be independent of the user, allowing companies to consolidate fax servers down to one or two strategically located data centers. This greatly simplifies disaster planning and preparedness by reducing the number of sites that need rapid response capability, and enables companies to locate the fax server in the most secure and stable environments. In this way, IP communications architecture, by its nature, is more fault tolerant to network outages than the traditional circuit switched architecture. IP inherently has the ability to route traffic via fully functional network nodes, even if part of the network is down.

In the circuit switched world, if the network connection between the fax server and the central office is down, then the fax server is not able to send or receive faxes. With IP, a single fax server or multiple load-balanced redundant fax servers can be installed on multiple different network nodes, effectively eliminating the likelihood that the fax server will ever be without access to a network.

This is particularly important for services that utilize fax to communicate with law enforcement and other government agencies in the event of a crisis, such as to provide or receive tsunami warnings or severe weather alerts.

Productivity Benefits of Implementing an IP Fax Server

The migration to IP communications is taking place at the same time that companies are focusing their efforts and investment on IT infrastructure to resolve difficult operational and compliance issues. As companies look to make the switch to IP communications, they will also consider how these purchases can assist their efforts in compliance, business process automation, and document management.

Fax server technology sits squarely at the intersection of communications, document management, business process automation, and compliance. The shift to IP communications, combined with the increased focus on business process automation and document management, makes the IP fax server an excellent solution as companies accelerate their IP communications plans.

"Desktop" faxing software enables end users to send or receive faxes directly from their PCs. In addition to just being able to send/receive single documents, these applications often enhance user productivity by allowing users to send fax documents to multiple destinations in a matter of minutes. Unlike traditional walk-up fax machines where users must enter multiple fax numbers to send to multiple faxes, desktop fax allows users to fax to multiple addresses the same way an e-mail message is sent to multiple people. This reduces interruptions to workflow and increases productivity.

Although this is often considered as a "soft" savings only, the savings can also be calculated as a "hard" savings, as each time a fax is sent manually, it requires the user to print the document, walk to the fax machine, write out the cover sheet, type in the fax number, and then wait for the fax machine to send and confirm delivery. This process can take five minutes per fax. If the person responsible for sending faxes is paid $12 to $18 per hour, then the cost of manually sending faxes can range from $1 from $1.50 per fax. Multiply that by the number of faxes that can be sent per day, per month, per year, and the labor cost involved with faxing can climb into thousands of dollars per year.

Table 1 highlights the approximate costs of manually faxing documents.

Number of Faxes Sent Per Day	Cost Per Day Per Fax Sent		Cost Per Week		Cost Per Year	
	$1 per fax	$1.5 per fax	$1 per fax	$1.5 per fax	$1 per fax	$1.5 per fax
10	$10	$15	$50	$75	$2,600	$3,900
50	$50	$75	$250	$375	$13,000	$19,500
100	$100	$150	$500	$750	$26,000	$39,000

Table 1. Approximate Costs of Manually Faxing Documents

These costs are conservative in that they do not take into account hidden costs such as the paper required to print out the fax, long distance charges to send the fax, and the fax machine maintenance costs, such as replacing toner cartridges. Most importantly, desktop fax applications integrate easily with existing e-mail infrastructure, making the addition of fax to the end-user's e-mail applications comparable to sending e-mail attachments.

The electronic delivery of documents saves companies time and money. Mailing a document involves printing out the document, stuffing it into an envelope and mailing it out, which can cost almost a dollar per document with postage, and even more for multiple-page documents or materials being sent out of the country. As discussed previously and shown in Table 1 above, manually faxing documents is costly as well. If the majority of the day-to-day operations of a business involves sending out multiple documents per day, such as invoices, order confirmations, and inventory ordering, then the cost per year can be a significant piece of a company's operational expenses. With a "production" fax solution, a company can reduce these costs by up to 90% by automating fax delivery and reducing the administration costs to print, mail, or fax a document.

Production fax is an attractive option for a company whose day-to-day operations consist of manually delivering large numbers of paper documents to customers and/or partners. Production fax allows companies to automatically deliver business-critical documents electronically, such as purchase orders, invoices, statements, order confirmations, loan applications, loan approvals/denials, bills of lading, financial reports, and mortgage tables, without the need to print, mail, or manually fax a document.

Table 2 highlights the savings a typical enterprise would experience with a production fax solution versus the cost to manually fax or mail a document:

	50 Documents per Day	250 Documents per Day	500 Documents per Day
Yearly Cost to Manually Fax (Cost Per Document: $1 – $1.50)	$13,000 – $19,500	$65,000 – $97,500	$130,000 – $195,000
Yearly Cost to Manually Mail (Cost Per Document: $0.65 – $0.80)	$8,450 – $10,400	$42,250 – $52,000	$84,500 – $104,000
Yearly Cost with Production Fax (Cost Per Document: $0.10)	$1,300	$6,500	$13,000
Production Fax Savings vs. Manual Faxing (Cost Per Document: $0.90 – $1.40)	$11,700 – $18,200	$58,500 – $91,000	$117,000 – $182,000
Production Fax Savings vs. Mail (Cost Per Document: $0.55 – $0.70)	$7,150 – $9,100	$35,750 – $45,500	$71,500 – $91,000

Table 2. Approximate Savings Using Production Fax versus Manual Fax or Mail

Enhanced Customer Satisfaction

Another "soft" benefit of adding a desktop fax solution is that inbound faxes can be directly delivered to the appropriate recipient for quicker resolution. Without this type of solution, received faxes could lie unclaimed at the fax machine for hours (or days if a fax arrives late on a Friday) before it is delivered to the appropriate person.

Other delays could be caused when a fax machine is out of paper or ink and faxes are queued inside the machine before they are printed. There is also the case when a printed document is inadvertently picked up by wrong person along with a stack of other pages, which, besides causing costly delays, can raise privacy issues or concerns about sensitive information (for example, financials, transactions) getting in the wrong hands.

By routing inbound faxes directly to the desktop (or email inbox) of the target recipient, these types of delays can be avoided.

Compliance

Being able to adhere to the growing list of federal, state, and industry compliance frameworks is fast becoming a concern in companies. Recently, Forrester conducted a study wherein it reported the following:

"Governance, risk, and compliance (GRC) continues to be a hot topic of interest for security and risk professionals. Between July 2007 and July 2008, Forrester's security and risk management team received 1,798 inquiries on a variety of topics — 198 of which were from clients interested in GRC. Of the GRC-related inquiries recorded, 46% covered compliance best practices, 32% concerned GRC vendor selection, and 24% addressed risk management. Forrester doesn't expect the focus on compliance to diminish drastically, but maturing companies are focusing more on how to manage a federated compliance program that encompasses all standards and regulations rather than managing separate initiatives for each. Inquiries about enterprise risk management and selecting comprehensive GRC management software platforms also echo the same trend toward maturity." [Forrester]

These compliance needs dovetail with many of the features found in document management solutions that can be implemented as part of a network fax solution. Document management systems bring greater organization and control of documents, and serve as a foundation for numerous compliance-related initiatives. According to Forrester, "The combination of compliance, governance, and process efficiency has placed an increased focus on document imaging, document management, and records management." [Forrester] With their workflow, access control, version control, and search and retrieval features, document management systems enforce the controls that companies seek to establish in their efforts to comply with legislation, regulations, or corporate-governance initiatives.

Security

With desktop fax, end users can send, receive, view, print, and save faxes from their PC or laptop computer. Desktop fax provides small, medium, and enterprise customers with safe, secure, and confidential fax to and from the desktop through integration with Microsoft® Exchange, Lotus Notes®, Novell GroupWise, and other e-mail applications.

Desktop fax also provides end users with security and confidentiality in sending and receiving faxes to and from their desktop with receipt confirmation from Direct Inward Dial (DID) routing, in which end users are assigned a personal secure fax number and faxes are routed directly to the desktop. Because the fax is received on the desktop PC, faxes are not left out in public view on traditional walk-up fax machines where other people can view them, thus reducing privacy and confidentiality concerns.

In addition, signed documents transmitted by fax serve a legal purpose. Despite the signing of the Electronic Signatures in Global and National Commerce Act (E-SIGN bill) in 2000 by U.S. President Bill Clinton that legalized digital signatures, the internet has not replaced fax as a means of business communications, as experts had predicted. This is attributable to the fact that many businesses still have concerns regarding privacy, security, fraud, and identity theft with the internet. The bottom line is that fax is still one of the most highly secure mechanisms for transmitting important and confidential information.

Multi-Function Peripherals

Multi-Function Peripherals (MFPs) that integrate copying, printing, faxing, and scanning are quickly gaining popularity. As a second choice, companies can further leverage the IP fax server to enable users to send and receive faxes from the MFP, just as they would from a fax machine, but with the fax server performing the actual fax processing once the image has been captured by the MFP. This process ensures that all fax communications are routed through a fax server that centralizes the capture, storage, and archival of the document, as shown in Figure 4.
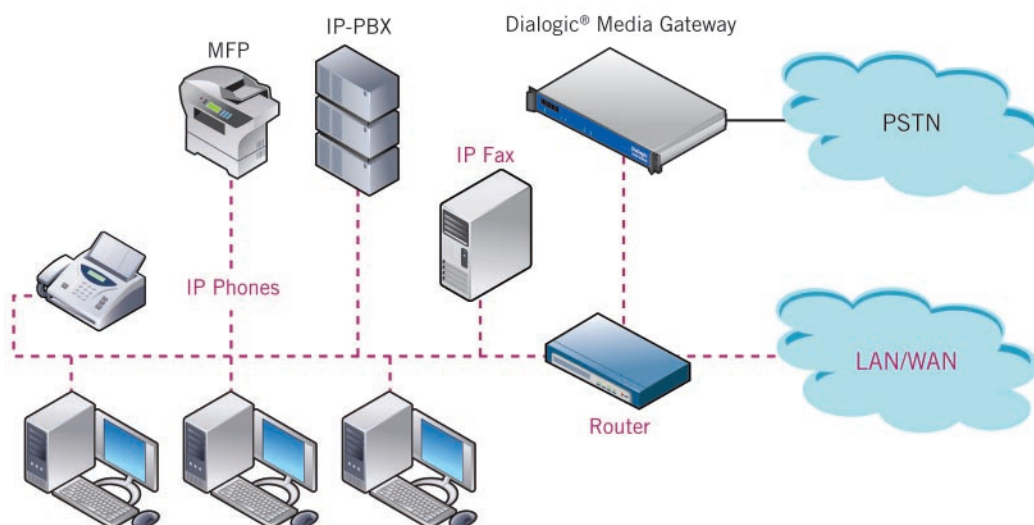

Figure 4. Integrating Multi-Function Peripherals with an IP Fax Server

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Dialogic's IP Fax Leadership

For more than 20 years, Dialogic® Brooktrout® intelligent fax technology has enjoyed a leadership position in the market. While the Brooktrout® brand is well known as a leader in intelligent fax, it is less well known that Dialogic's experience with IP fax goes as far back as the early 1990s, before internet and IP became household technologies, with early development work to enable faxing over X.25 networks. Much of what Dialogic learned through developing fax for X.25 networks went into the design of T.38, the protocol for real-time IP fax. Dialogic was a primary contributor to the T.38 ITU-T specification, which has become the industry standard for real-time Fax over IP (FoIP) networks.

While Dialogic leads the market in the development of IP fax technology, its strength and field experience in T.30 fax is what differentiates its Dialogic® Brooktrout® SR140 Fax Software and Dialogic® Brooktrout® TR1034 Fax Board IP products. The T.30 protocol for faxing over TDM or analog telephone networks remains at the heart of fax connections, including connections between two T.38 IP fax devices. Dialogic's T.38 IP fax products use the same T.30 code that has propelled the Brooktrout-brand fax technology to lead the market. To this day, Dialogic continues to develop its core fax technology in-house, which enables it to deliver unsurpassed support to the end customer.

The culmination of the many years of development work in IP fax technology are Dialogic's Brooktrout SR140 and the Brooktrout TR1034 IP fax platforms.

Dialogic® Brooktrout® SR140 Fax Software

Brooktrout SR140, an all software product, offers businesses of all sizes real-time FoIP capability with the same high performance that companies have come to expect from the Brooktrout Fax Boards. The Brooktrout SR140 is a host-based intelligent fax platform that takes advantage of the latest advances in computational processing power.

Host-based processing allows media processing and call control functions — traditionally performed by specialized Digital Signal Processors (DSP) on boards — to be performed on general-purpose host CPUs that run on industry-standard servers. The Brooktrout SR140 is available in a variety of densities from 2 to 60 ports, and may be used to build fax servers with hundreds of ports. It is suitable for a variety of computer-based fax applications such as fax server, unified messaging, fax document management, and compliance systems. To add more ports as needs grow, simply purchase and install a new software license key to instantly upgrade a system. The Brooktrout SR140 supports both SIP and H.323 call control and has been tested and certified with market leading IP-PBXs and gateways.

To learn more about the Brooktrout SR140 software-only IP fax platform, see Dialogic® Brooktrout® SR140 Fax Software.

Dialogic® Brooktrout® TR1034 Fax Board

Brooktrout TR1034 is a high-performance intelligent fax board offering support for PSTN and FoIP connectivity. The Brooktrout TR1034 is suitable for a variety of computer-based fax applications such as fax server, unified messaging, fax document management, and compliance systems.

To learn more about the Brooktrout TR1034, see Brooktrout Fax.

References

[Davidson] Davidson Consulting, *Fax over IP Server Markets: 2007-2012*, Preliminary Report, December 2008.

[Forrester] Inquiry Spotlight: Governance, Risk, And Compliance, Q4 2008, Chris McClean November 3, 2008, web document excerpt, http://www.forrester.com/Research/Document/Excerpt/0,7211,47047,00.html

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