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Pioneer & global leader
in boardless IP fax

Choosing between Traditional and FoIP/VoIP Faxing

White Paper

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The market is buzzing with vendors selling fax server solutions.

Which one is right for you? A traditional PSTN- or an IP-enabled fax server solution?

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Executive Summary

Voice over IP (VoIP) has flourished over the last few years. It has attained massive acceptance from organizations of all sizes and sectors with its promise of dramatic cost savings, increased mobility, and optimized operational efficiency.

As VoIP sizzles prominently in the mainstream IT world, enterprises, government entities and service providers are swiftly adapting their workforces and realigning business processes to newly adopted or soon-to-be VoIP environments. They are on the lookout for complementary IP communications technologies, such as Fax over IP (FoIP) server software that will:

- Scale to their requirements with guaranteed uptime for faxing anywhere, anytime;
- Further leverage their IP telephony investments;
- Integrate seamlessly with their VoIP technology to significantly lower costs and boost workforce productivity;
- Accelerate ROI.

Despite the convenience of email, faxing remains the only legally binding and essential means of electronic messaging for all industry sectors.

Today, even in VoIP-enabled organizations with IP PBXs, faxing may still lag behind as a costly and inefficient legacy technology requiring: numerous fax machines; analog POTS phone lines; hefty long-distance telecom charges; expensive fax boards; and other specialized hardware and supplies (e.g., toners and paper).

As organizations leap into VoIP, they may be solicited to consider various network fax server options that are secure and reliable, albeit expensive at first glance.

Since FoIP solutions integrate easily with VoIP systems they are sometimes offered as a bundled VoIP offering, because they are compatible and easy to deploy with the T.38 fax relay capabilities of leading VoIP gateways from Cisco, Avaya, AudioCodes and Alcatel.

However, the proposition of spending extra IT dollars on a network fax server solution may be daunting, particularly if it entails more hardware or a higher Total Cost of Ownership (TCO) than expected.

This white paper addresses two basic types of network fax server solutions:

- Traditional PSTN/PBX-based fax server software that requires fax boards;
- T.38 or T.37 IP fax or FoIP technology (boarded or boardless) for VoIP/IP PBX-based infrastructures.

Boardless IP fax solutions are emerging, boasting how they eliminate the hassle and cost of maintaining expensive fax boards. This white paper will outline the pros and cons of boardless FoIP/VoIP solutions versus fax servers that require fax boards.

Whether you are already riding the VoIP bandwagon, or you are part of a forward-thinking organization with a legacy PSTN/PBX-based network, it is the opportune time to explore diverse unified messaging and network fax server migration strategies that will immediately benefit you.

Faxing remains vital. Read on to gain a comprehensive understanding of the computer-based fax landscape with facts, trends and expert insights on topics such as: fax document security and privacy; boarded and boardless fax server functionality, fax server ROI and benefits; fax workflow support; regulatory compliance with laws such as HIPAA and SOX; as well as faxing with networked multifunction printers (MFPs) and copiers.

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Faxing remains vital.

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Targeting enterprises in diverse industry sectors, government and service providers. Small, medium or large.

Despite efforts to become a paperless society, there are still more than 100 billion fax pages transmitted around the globe on a yearly basis, according to fax-industry analyst firm Davidson Consulting.

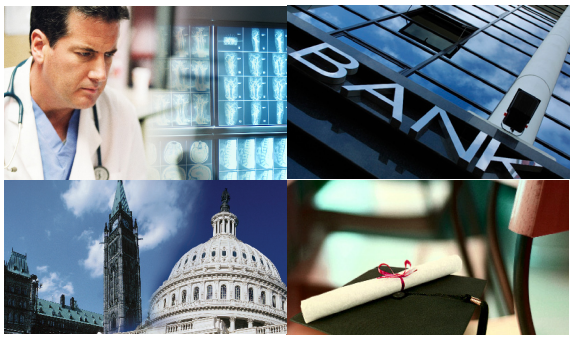
The continued popularity of faxing means that every day, an organization can fax hundreds or thousands of invoices, purchase orders, legal documents, financial summaries, and other confidential records and mission-critical business documents. The Gallup Institute and the Institute for the Future estimate that knowledge workers handle an average of 178 fax documents per week.

Traditional faxing is expensive and inefficient. For some organizations, meeting their fax demands means linking numerous fax machines, and inward and outward analog trunk lines and extensions, to the corporate PBX system.

Then there are the costs for long distance, electricity, toners, paper, and labor – walking to and from the fax machine.

Over the course of a year, this can add up to thousands or even millions of dollars spent on analog equipment and fax supplies. An average Fortune 500 company may spend millions per year on faxing alone, according to Pitney Bowes.

Despite all these expenses, research firm Gartner estimates that the total market for printers, copiers, faxes and multifunction devices (MFDs) in the United States will grow 2% a year to 37 million units by 2008.



Fax retains advantages over email

"Fax retains advantages over e-mail – never-think-about-it compatibility, retention of the format of complex documents, sending documents that are virtually uneditable (you don't want recipients editing the invoices and contracts you transmit to them), and ease of electronically sending paper documents." – Davidson Consulting, fax-industry analyst firm

Fax Is Legally Binding, Email Is Not.

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Faxes are popular because they are "real," substantive documents that are legally binding.

A signature on a fax is legal, but not if it is on an email-delivered attachment.

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Fax Server Basics

Organizations in both the private and public sectors are deploying fax servers to increase employee productivity by as much as 90%, and to reduce telecommunications costs by at least 40%.

Fax servers typically require three components: a PC or server running a standard operating system, fax server application software, and an intelligent fax board. They integrate with networks, software and hardware devices, including email servers, for enterprise-wide deployment across multiple geographic locations.

Fax servers are most commonly integrated with corporate email systems, thereby allowing for email-based faxing from users' desktops. Incoming faxes arrive directly and securely in email inboxes, so that sensitive information is no longer left in the open for unsolicited viewing. Fax servers can also connect to all-in-one multifunction printers (MFPs) with printing, scanning, faxing, and copying functions combined in one device. Connecting to MFPs provides for intelligent routing and handling of faxes, as well as additional features such as default cover pages and access to calling lists.

Fax server solutions create audit trails, helping organizations comply with regulations such as the Sarbanes-Oxley Act (SOX) and the Health Insurance Portability and Accountability Act (HIPAA). They direct incoming faxes to email inboxes or protected network servers to avoid sensitive data being left on public fax machines. Fax servers have become a popular tool for helping organizations comply with a variety of regulations involving the security and protection of data.

How does a fax server work?

A fax server functions much like a network print server with the capability of transmitting faxes over the PSTN. It is able to send and receive faxes from legacy fax machines or other fax servers. Fax servers do not care what type of fax device they are receiving faxes from or sending to, and always supply the same type of failure or success status for each fax transmission.

For outbound faxes: Fax commands are sent from a user's desktop or networked MFP to the fax server, where outbound documents are converted into an electronic image that contains the print stream. Instead of being printed on paper, the data is converted to a fax transmission and routed based on the fax server configuration (generally over the PSTN at some point) to the receiving fax device or software. For inbound faxes: The fax server receives incoming fax transmissions and stores them as standard TIFF fax image files. The fax image is then automatically routed to a recipient's email inbox, a network server, or MFP. Once on a user's desktop, the faxed TIFF file can be annotated, archived or forwarded as desired.

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Fax Server Market

As more and more organizations switch to deploying fax servers to integrate fax into their IT systems and business processes, the fax server market continues to undergo consistent growth.

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Why Deploy a Fax Server?

Fax servers do more than just send and receive faxes. They cater to the needs of organizations of all sizes, from small to medium businesses (SMBs) to Fortune 100 companies and service providers. Fax servers enable benefits such as:

Cost reduction

- Elimination of dedicated analog fax lines, as well as specialized fax equipment, maintenance and supplies
- Reduce telecom costs by at least 40% through Least Cost Routing (LCR)
- Low Total Cost of Ownership (TCO) relative to legacy fax implementations
- High ROI usually realized within 3–6 months
- Centralization of communication assets and their administration

Productivity increase

- Boost employee productivity by 90% through desktop, email-based faxing since there is no more walking back and forth to fax machines
- Speedy and efficient fax delivery, including dramatically more efficient means of fax broadcasting
- Unified messaging (faxes share a common inbox with email and voicemail)

Streamlined workflow, security & regulatory compliance

- Clustering and load balancing for high-volume and fault-tolerant fax transmission
- Fax storage/archiving/tracking and fax workflow management that creates an audit trail that facilitates regulatory compliance with regulations such as SOX, HIPAA, DITSCAP, PHIPA, PIPEDA, among others
- Direct inbound DID routing of faxes to intended recipients' email inboxes or secure printers, maintaining the confidentiality of documents and facilitating regulatory compliance
- Faxing from desktop applications
- Integration with third-party applications and business processes through APIs

Improved features and mobility

- Active Directory or LDAP integration, so no need to maintain a separate fax user database
- Spam fax filtering
- Fax from a web browser, which meets the requirements of mobile workers who need to send or receive faxes while outside the office
- Fax-enable wireless data devices
- High-image-quality faxes

The market for fax servers will continue to grow

"…fax server revenues will show an increase from $270 million in 2005 to $400 million in 2010, a compound annual growth rate (CAGR) of 8.2%. This will be due primarily to increases in sales of fax servers with MFPs, which could account for one-third of fax server sales in 2010. … FoIP sales are expected to grow by a 50.7% CAGR to $245 million in 2010, with non-FoIP fax server sales dipping to $155 million in 2010." – Davidson Consulting (Computer-Based Fax Markets, 2005–2010)

Fax Server Least Cost Routing (LCR) and FoIP Reliability

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By leveraging existing email, LAN, and WAN connections, internal faxes can be routed between branch offices without ever incurring a long-distance phone bill using Least Cost Routing (LCR).

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Outbound faxes travel over WANs or VoIP networks for the longest possible distance before reaching a system resource, such as a local fax server, gateway or VoIP Point of Presence (POP), thereby bypassing long-distance dialing.

T.38 FoIP consolidates voice and data traffic onto a single, distributed IP network.

Fax Servers in an IP Fax or Fax over IP (FoIP) Setting

As VoIP networks permeate private and public organizations with IP Telephony technology, organizations want to leverage the value and convenience of their single, distributed IP communications network.

Standard VoIP CODECs, such as G.711, were designed for voice conversations. They allow for a certain amount of latency and packet loss, which is still acceptable in a voice conversation. Faxes cannot tolerate even small amounts of latency or any packet loss, making standard VoIP CODECs unacceptable for reliable faxing. This reality requires organizations to keep analog lines on their PBX, rent Centrex lines, and/or deploy expensive fax boards to support their fax traffic. These extra expenses and hardware undermine the ROI that organizations expect from their VoIP network investment and require legacy communication equipment and technology to be maintained alongside their modern IP network infrastructure.

The technology exists to migrate reliable, real-time faxing cleanly and completely to VoIP networks. It is known as IP fax or Fax over IP (FoIP).

Even with an IP infrastructure, we still have a PSTN connection. FoIP uses TCP/IP LANs and WANs to connect to the closest PSTN access to send and receive faxes. FoIP relies on the T.38 protocol, which is a public standard supported by most of the major vendors' VoIP gateways. Instead of requiring a fax card connected to the PSTN, a FoIP server connects directly to the T.38-supported VoIP gateway. This principle applies for both inbound and outbound faxes.

Fax servers built on the T.38 FoIP technology require no additional hardware for adding faxing capabilities to a network and allow organizations to consolidate voice and data traffic onto a single, distributed IP network.

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Two Types of FoIP: T.38 and T.37 Protocols

The T.38 (real-time) and T.37 (store-and-forward, asynchronous) standards are two methods for FoIP.

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Today T.38 FoIP Takes Center Stage

Approved in 1998 by the International Telecommunications Union (ITU), T.38 IP faxing is emerging as a globally accepted, secure, and reliable way to quickly transmit faxes over IP networks and the Internet.

With T.38, faxes are sent and received in real time, as with regular PSTN fax calls. It provides users with the satisfaction of instant fax delivery notifications. Faxes sent through T.38 FoIP are considered legally binding (as opposed to email-delivered) documents. They meet all of the requirements of the T.30 protocol, which is the standard for fax calls over the PSTN. T.30 is the T.38 packet interpreter in fax-session handshaking and image conversion from PSTN to IP connections.

With T.38 faxing, PSTN fax signals from the sender's end are transmitted via T.30 to a fax gateway, which then converts them into T.38 packets for IP network transmission. At the receiver's end, the fax gateway reconverts the T.38 packets into T.30 analog signals to be sent to the sending fax machine.

The T.37 "store and forward," asynchronous method sends faxes as an email attachment. However, T.37 faxes are not performed in real time, and do not automatically generate an immediate fax confirmation. T.37 confirmations depend on the "store and forward" mechanism called Delivery Service Notification (DSN). A confirmation can only be issued if DSN is supported by all email relay servers along the IP delivery path and even then, there must be no network congestion.

Most Internet fax services today offer only T.37 store-and-forward fax services, which lack the secure, point-to-point approach of T.38 FoIP, unless encryption is applied.

T.38 FoIP Security and Reliability

T.38 FoIP enables point-to-point, secure fax transmission in real time, since the fax server resides on a secure IP-based communications platform that transmits information via the T.30 fax communication protocol. T.30 provides a secure mechanism for transferring business documents. The T.38 FoIP fax server leverages VoIP gateway capabilities and related security to connect to the public network, just like the IP telephony system, protecting the network from security breaches.

FoIP Servers versus Traditional Fax Servers

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FoIP server advantages:

- Low Total Cost of Ownership (TCO)
- Evolution of boardless solutions
- Reduced long-distance faxing
- Future-ready
- Unified messaging

FoIP Fax Servers	Traditional PSTN-based Fax Servers
Low TCO – No analog lines needed; they leverage existing VoIP investments	High TCO – Expensive analog lines
Significantly eliminate long-distance dialing charges	High long-distance dialing rates
Future-ready as VoIP migration becomes imminent	Eventual scarcity of analog lines as organizations migrate toward VoIP
Market evolving toward boardless solutions	Require fax boards
Combine fax with email/voicemail for unified messaging	Email/fax integration only, no voicemail
Cost-savings by centralizing communications	Disparate and numerous analog POTS lines

TCO = Total Cost of Ownership

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Unified Messaging

The convenience of unified messaging is critical for organizations with multiple locations or highly mobile workers. Being able to get faxes, voicemail and email via a single interface saves time and money, as well as increases productivity.

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Boardless FoIP Fax Server Software

The market is evolving toward Fax over IP solutions that are "software-only" or "boardless." This means that the solutions do not require intelligent PCI fax boards.

The market's first T.38 boardless FoIP fax server software emerged in 2002 with Sagemcom's XMediusFAX.

Sagemcom's T.38 fax server software has unparalleled automation capabilities via XML, Java/CORBA, and native scripting interfaces. Applications include fax broadcasting; integration with CRM, call-center or invoicing systems; automatic data entry, routing and spam filtering of received faxes via OCR; and more.

With VoIP migration, IP fax systems are forecasted to dominate the market by 2010. "***Boardless IP fax systems*** were the major benefactor as it grew its market share from 1.4% in 2004 to 2.1% in 2005," per Davidson Consulting.

The market is evolving toward Fax over IP solutions that are software-only or boardless.

Sagemcom's XMediusFAX

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Sagemcom is the *pioneer* in *boardless FoIP*, maintaining its leadership in IP fax worldwide for 5 consecutive years.

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Sagemcom brings fax into the 21st century. As a research and development-led company, Sagemcom has brought key innovations to the fax server software industry.

XMediusFAX®

BOARDLESS, T.38 FAX OVER IP SERVER

As the worldwide leader of boardless T.38 Fax over IP (FoIP) solutions for enterprises and service providers, Sagemcom is at the forefront of IP communications with leading-edge, award-winning products

2006 INTERNET TELEPHONY PRODUCT OF THE YEAR

XMediusFAX, the award-winning T.38 Fax over IP (FoIP) fax server software, fax-enables VoIP networks by plugging seamlessly into voice gateways, leveraging an organization's IP investment.

Sagemcom's XMediusFAX software packages work in VoIP or PSTN network environments, with or without fax boards.

While it differentiates itself in the market as the first and only boardless deployed FoIP solution, it caters also to organizations that have not yet made the leap into VoIP or that want to maintain their legacy technology requiring fax boards.

In fact, XMediusFAX adapts to both VoIP and PSTN networks, which makes it an ideal solution for eventual VoIP migration, since it can be deployed immediately in a mixed TDM/IP Telephony environment.

Trusted by enterprises and service providers for its security, scalability and real-time transmission of confidential documents, XMediusFAX optimizes fax workflow and archiving. It provides an audit trail, facilitating compliance with regulations such as SOX and HIPAA.

Integrating with networked MFPs, enterprise messaging systems and e-business solutions, Sagemcom's products make fax more relevant and useful than ever before.

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Sagemcom's Technology Partnerships

Sagemcom holds technology partnerships with leading VoIP vendors, which provide the IP platforms that Sagemcom's FoIP software integrates with.

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Sagemcom's Competitive Landscape

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Sagemcom's XMediusFAX solutions: GSA-approved for the U.S. government & adaptable to various industry sectors.

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Target Industries

Sagemcom's FoIP solutions for Microsoft Windows/Vista and Microsoft Exchange 2003 and 2000 cater to the specific needs of customers in sectors such as:

Government
Healthcare
Banking
Finance/Mortgage
Education
Insurance
Legal
Human Resources
Publishing
Transportation
Manufacturing

Sagemcom's fax server solutions are GSA-approved fax communication software products for the United States government.

Sagemcom's products are deployed by government agencies in the United States and Canada. They are flexible and adaptable to various industry sectors.

Sagemcom maintains its #1 position in the FoIP market, and has gained overall fax server market share in 2005, leaping to the #2 position from #9 last year, per Davidson Consulting.

In the segment for large enterprises with 5,000+ users, Sagemcom ranked 5th, "a surprising finish for a company that put its weight behind a Fax over IP product," stated Davidson Consulting.

Sagemcom's XMediusFAX T.38 fax server software is the world's first and only boardless deployed FoIP solution, dominating the global IP fax industry since it was first launched in 2002.

Sagemcom's family of XMediusFAX T.38 boardless FoIP solutions are deployed in more than 40 countries worldwide, among private enterprises of all sizes, traditional telecom and VoIP service providers, and in major government accounts.

* Source: Davidson Consulting's December 2006 market research titled "Computer-Based Fax Markets, 2005–2010."

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VoIP/FoIP Popularity

Demand for VoIP, IP PBXs, IP telephony and FoIP has skyrocketed.

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In vertical industry sectors such as healthcare, education, finance, government and retail, FoIP is gaining popularity. According to a June 2005 article in VoIP Magazine, written by Frost & Sullivan analyst Ronald Gruia, these vertical sectors were the biggest drivers for IP PBX market demand in North America in 2004.

Frost & Sullivan has also released a study titled "North American Hosted IP Telephony and VoIP Access Service Markets," which discusses the market, the technology, the competition, and the key market drivers and restraints. Per Frost & Sullivan, hosted IP telephony and VoIP access lines will grow in North America from 292,000 in 2004 to 9.7 million in 2010. Both revenues and access lines are projected to grow at approximately 80%.

International VoIP Council

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Sagemcom Inc.
is a founding member of the
International VoIP Council,
an organization that later integrated with the
International Packet Communications Consortium (IPCC).
The IPCC transitioned into the IMS Forum
– The Voice of IP Convergence –
in February 2006.

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