BISCOM

Integrating Fax and Email

An Overview of Exchange, Active Directory and Group Policy Fax Solutions

• Integrate Fax with Exchange 2007 and Active Directory

• Manage Users by Policy

• Outbound Faxing for Users & Applications

• Advanced Fax Routing

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WHITE PAPER SUMMARY

This white paper focuses on the implementation of a fax software solution on a Windows network. Fax software solutions are used by organizations to manage faxes that are sent out of and received into their enterprise. Within a Windows network, there are critical architectural, administrative and usage concerns to consider. It is important to not only review the feature set supplied by a fax software solution, but also how it will be implemented and managed, and its ability to grow with your network.

In addition to considering integration of a fax solution with Windows applications, and administration of the fax solution using Windows administration utilities, it also important to consider the business issues that the fax solution will address — inbound and outbound faxing by users and applications. A full-featured solution will provide a number of user and application interfaces for outbound faxing, and a robust feature set for routing received faxes. Routing of received faxes is often a component of a larger business workflow, and so it is critical that the fax solution be able to assess known data such as when a fax arrived and which number it was sent to; extract data from the fax image so as to make the contents searchable; query network resources for fax routing instructions; and be flexible in providing multiple formats in which the fax file and corresponding data are delivered.

A fax software solution consists of one or more fax servers, which send and receive faxes over phone lines, one or more fax queues that collect and distribute faxes, and one or more application or environment specific fax connectors.

A fax server includes fax server software, a document conversion engine and intelligent fax boards, which connect to the phone lines. Biscom's FAXCOM Server, discussed later in this paper, uses best-in-class high performance, high density intelligent fax boards by Brooktrout Technology.

FAX SERVER SOLUTIONS – AN OVERVIEW

Organizations large and small rely on fax communications more today than ever before. Faxing offers unique advantages that make it an absolute necessity to most organizations. Fax is a point-to-point communication, which means you can deliver information in real-time, you can verify receipt and you can be sure that your communication is secure. Fax is a also a virus-free communication, a fact that has permanently secured its importance as a means of information delivery. Globally, fax is the most ubiquitous and most reliable way to send information from one point to another.

### Fax server solutions are used for a wide variety of applications, including:

- Users sending faxes from their desktops – via email applications such as Outlook and via desktop fax clients or browser-based fax clients.

- Applications send and receive faxes through automated processes. For example, Purchase Orders or Invoices prepared by an accounting application can be automatically submitted for fax delivery.

- Users receiving faxes directly to their desktop — as email messages or to a fax client. The fax server can intelligently deliver a received fax to its intended recipient based on routing criteria.

- Users in workgroups access a shared mailbox to process received faxes as they arrive. Such workflow requirements are common to customer service and order processing groups.

Fax server solutions provide a number of tangible benefits, including:

- Automates an every day business process that is otherwise accomplished by printing documents and then manually sending them through fax machines.

- Reduces the hard costs of fax machines – leasing, maintenance, paper and toner – and improves the efficiency of your workers and processes.

- Provides a secure, reliable and proven way to communicate information from your enterprise to any other worldwide.

- Reduce spam fax traffic by monitoring and quarantining received faxes.

A Fax Server solution includes two components – a Fax Server and Fax Queue. The Fax Server connects to phone lines to send and receive faxes. The Fax Queue interfaces to the users and applications that send and receive faxes. The Fax Queue submits fax jobs to the Fax Server, and receives from the Fax Server completion statuses for outbound faxes and also received faxes that need to be delivered.

One of the advantages of the Fax Server and Fax Queue architecture is the ability to easily distribute many Fax Queues that utilize consolidated Fax Server resources. Each queue can support a different application or user group, and can be administered independent of the Fax Server.
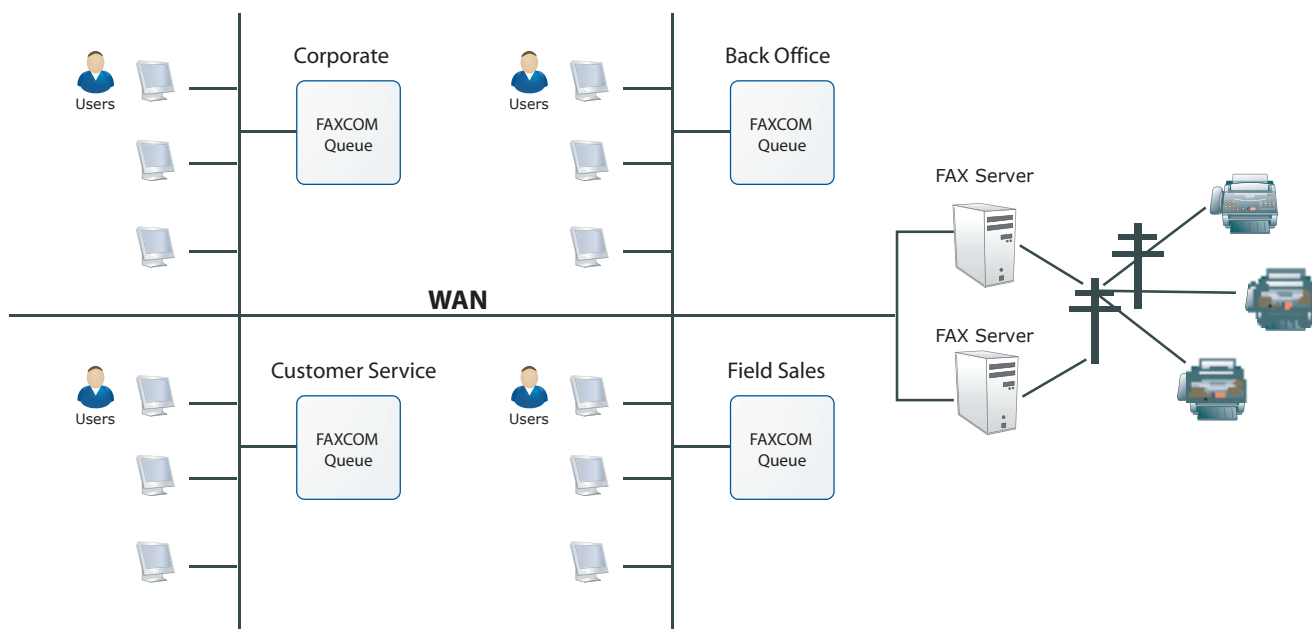
FAX SERVER SOLUTIONS FOR WINDOWS NETWORKS

Organizations worldwide have made significant investments in deploying Microsoft Windows networks. This is not a one-time investment in a technology, but rather it is an investment in an architecture. It makes sense for IT professionals looking at business applications – be they fax server, CRM or any other solutions – to focus on solutions that integrate with and that take advantage of the tools and resources provided by their Windows network.

Specifically, a fax server solution for a Windows network should satisfy these fundamental requirements, each of which will be addressed in this paper:

Administration

- Utilize Active Directory or any other LDAP-Compliant Directory Service as a fax user list, such that no external database needs to be maintained or synchronized.

- Provide an MMC Snap-In to manage all aspects of the fax service, including installation and removal of fax queues worldwide from a single location.

- Implement application redundancy by distribution of multiple fax queues.

- Manage user attributes by policy, including support for Active Directory Group Policy as well as fax service policy.

- Require no schema extensions.

Email Integration

- Support sending and receiving faxes through an Exchange 2007, 2003, 2000 and 5.5 Server.

- Support Exchange integration through a native Exchange Fax Connector and through an SMTP Gateway.

- Enable users and applications to send and receive faxes through Outlook, providing a full feature set without requiring installation of an Outlook form.

- Extend Outlook Fax Functionality with Client Extensions.

Desktop Integration

- Enable desktop users to send and receive faxes from a desktop fax client.

- Enable users to send and receive faxes from a browser.

Extending Fax Applications

- Provide a full set of Application Programming Interfaces (APIs) to fax enable business processes and applications.

- Enable non-Windows applications and processes to access the fax service.

ADMINISTRATION

Utilize Active Directory – or any other LDAP-compliant directory service - as a fax user list

One of the features of a Windows network is the ability to manage users and computers through Active Directory or other LDAP compliant directory service. It makes sense for your business applications to take advantage of this user list, rather than creating a separate external list that requires additional administration.

Regardless of the fax application supported – email, desktop fax client or browser-based fax client – a truly Windows-integrated fax service will utilize your directory service as its user list. Within Active Directory, each user profile contains a Fax Phone field. When a fax is received to the fax service, a lookup is performed on the directory for matches to the received fax number. Upon locating a match, the fax is delivered to its intended destination.

Any changes that are made to your directory service, such as adding and removing users, are instantly available to and recognized by the fax service. This is accomplished *without any schema extensions.*

Reading from your existing directory service is efficient and logical. The alternative method is to maintain a separate fax user list external to the directory service. This requires an additional effort upon installation – creating the fax user list. It also requires regular maintenance – synchronizing the fax user list with your directory service.

Essential features of Directory Services integration:

> • Integrate Active Directory or any other LDAP-Compliant Directory Service as a fax user list.

> • No separate fax user database to maintain and synchronize.

> • Require no schema extensions.

MMC Snap-In to manage all aspects of the fax service

The fax service is administered with an MMC Snap-In. The MMC Snap-In is used to create, configure, and uninstall fax queues. Each fax queue fax enables users through email, desktop fax client, browser-based fax client or API.

The fax administrator can manage the enterprise fax service from a single desktop, including the upgrade and removal of any of the components. Local administrators can manage the users assigned to their fax queue without having access to, or knowledge of, any other aspects of the queue configuration. A centrally located administrator can delegate specific day-to-day user management tasks to local administrators.

Essential administrative functionality:

> • MMC to manage the fax service.

> • Simultaneous centralized and distributed management.

Implement application redundancy by distribution of multiple fax queues

The ability to easily create and distribute fax queues is critical in implementing a fault tolerant fax solution. Users can be assigned primary and secondary fax queues, ensuring that faxes will continue to send and receive in the event of a server failure.

Each fax queue is an independent entity that can be:

> • Managed separately.

> • Used to isolate users for security between departments.

> • Dedicated to particular workflow applications.

> • Integrated with separate Active Directory (AD) or LDAP services.

> • Located in a specific section of the network to be more accessible to a particular set of users based on network bandwidth.

Manage user attributes by policy

When integrating a fax queue with Active Directory, queue-specific user lists and schema extensions are not required. Using AD, user fax management is controlled through existing User Objects and through Group Policies. This leverages the power of Active Directory Group Policy by adding categories to the Group Policy objects.

By using Group Policy to define the fax attributes and permissions of a user, that user can be moved from one fax queue to another while maintaining their profile.

In addition to integrating with Active Directory Group Policy, the fax service can also be administered through a fax service Policy.

Essential policy features:

> • Manage users by Active Directory Group Policy – without extending the schema.

> • Or manage users by fax service policy.

Use policies to:

> • Specify the destination for received faxes – such as email mailbox or fax client.

> • Choose to deliver the received fax to a user and/or deliver a notification of and link to the fax.

> • Choose the file format – TIFF, Searchable TIFF, PDF, Searchable PDF, text – in which to deliver the fax.

> • Extract AD or LDAP sender information to be used on the cover page of an outbound fax.

> • Define outbound fax parameters such as cover page selection and fax job priority.

> • Enable enhanced monitoring and reporting capabilities that track fax jobs, generate alarms and report fax statistics to a database.

> • Select which users can fax and which ones cannot fax.

Require no schema extensions

It is essential that a fax solution not require any schema extensions in providing Active Directory and Group Policy integration. Many IT organizations, as a matter of policy, restrict or deny schema extensions.

EMAIL INTEGRATION

Send and receive faxes through Exchange 2007, 2003, 2000 and 5.5

While the installed base of Exchange 2007 is growing, many Exchange 2003 and 2000 and Exchange 5.5 implementations remain. Even those organizations committed to an Exchange 2003 rollout may need to operate in mixed mode for some period of time. Thus, it is critical that a fax server solution be able to support all three environments at one time and with equivalent functionality.
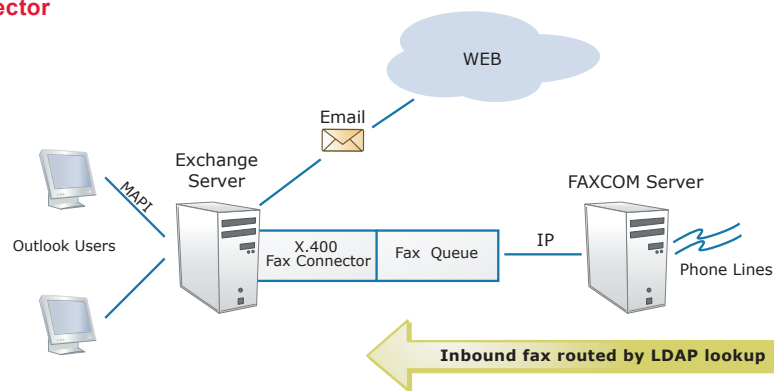
Essential email integration requirements:

> • Support Exchange 2007, 2003, 2000 and 5.5 Servers simultaneously.

> • Provide equivalent functionality in each of the three environments.

Support a native Exchange Fax Connector and an SMTP Gateway

There are two ways to implement faxing through Exchange – by installation of an Exchange Fax Connector or an SMTP Gateway. An Exchange Fax Connector installs on your Exchange Server, as do other third party application connectors. An SMTP Gateway typically installs on a server other than your Exchange Server.

Exchange Fax Connector

WEB

Email

Exchange Server

FAXCOM Server

MAPI

Outlook Users

X.400 Fax Connector   Fax Queue

IP

Phone Lines

Inbound fax routed by LDAP lookup

The SMTP Gateway delivers the same feature set as the Exchange Connector, albeit with a different installation. Instead of an Exchange Connector on your Exchange Server, the SMTP Gateway installs anywhere, possibly even on your fax server. This is an advantage to organizations that restrict connector installations and also to groups that require fax services integrated with Exchange but do not perhaps have the permissions to install and maintain a third party Exchange connector.

During installation, the SMTP Gateway requires you to create a domain for outbound faxing (for example, fax.company-name.com.). This fax domain is used to resolve routing from your Exchange mail servers to the SMTP Gateway. The SMTP Gateway, unlike the Exchange Fax Connector, requires only Exchange Standard Server.

SMTP Fax Gateway
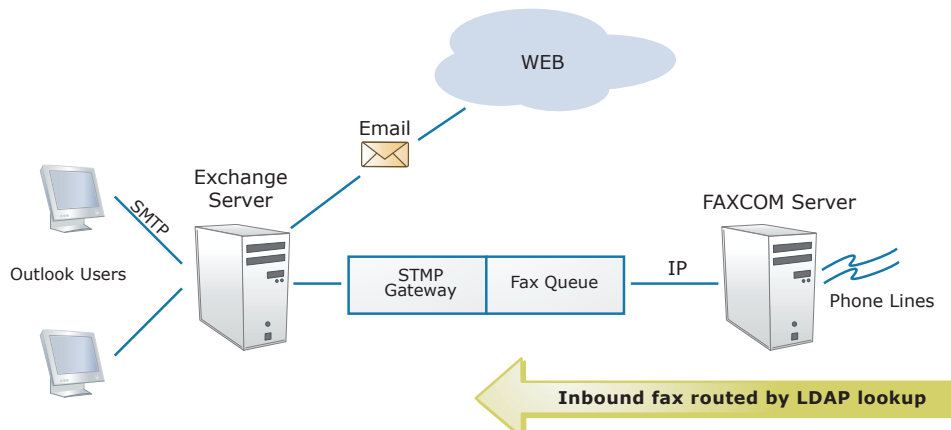
With either installation, Outlook users can send and receive faxes without installation of a client application such as an Outlook form. Users can utilize Outlook Contacts or type a fax address manually, such as FAX=1-978-250-4449@fax.company-name.com.

Email to fax integration should also offer an optional email client extension that adds buttons to the Outlook toolbar. These buttons offer a fax address builder, where the user enters name, company, and fax number, and the fax address builder resolves this to the correct syntax as an email address.

Essential Exchange and SMTP integration:

> • Enable faxing through Exchange via an Exchange Fax Connector and/or an SMTP Gateway.

Send and receive faxes through Outlook without requiring installation of an Outlook form

As with any application, ease of use for your users is critical. The optimal approach to faxing through Outlook, then, is to making fax as easy as email. For email messages, users compose a new message with a subject, body and attachments. They then add recipients selected from Contacts and other phone books, or they type in addresses manually. Sending a fax from Outlook should be no different – and it should not require installation of any client software.

Sending a fax through Outlook follows the same steps as sending an email message. Users compose a new message with a subject, body and attachments. They then add recipients, possibly mixing fax and email recipients in the same message.

Outlook users can retrieve fax recipients from Contacts, and they can also add new fax recipients to Contacts. The benefit of this approach is that each recipient is listed only once in Contacts, with multiple ways of reaching them.

In addition to using Contacts, Outlook users – still without any client software – can enter a fax address manually. The user must only know the correct syntax.

A third addressing option is also available. Within the Select Names dialogue of a new mail message, they can choose Fax Recipient. They will then be presented a dialogue in which to provide the recipient name, fax number and other details.

Essential Outlook integration:

> • Users send faxes through Outlook as easily as they send email.

> • Send messages to a mix of email and fax recipients.

> • Retrieve from and store fax recipients into Contacts – without client software.

> • Address an email message to a fax recipient using the correct syntax – without client software.

Extend Outlook Fax Functionality with Client Extensions

While it is advantageous to immediately fax enable Outlook users by installing an Exchange fax connector or an SMTP gateway, it is beneficial to have available an optional client installation that increases the ease of use for Outlook users. The optimal way to do this is through Outlook client extensions.

Client extensions provide one or more Outlook toolbar buttons that simplify fax addressing and allow users to select fax job options. While faxes to new recipients can be addressed manually with the correct syntax or addressed through the Select Names dialogue, it is fastest for users if they can select a toolbar button and enter the new recipient into a dialogue. New recipients should be able to be saved to Contacts.

Client extensions should also allow users to choose the parameters of a fax job. These include the date and time for delivery, the priority and the cover page. These details should be able to be saved for the current fax job or be able to be saved as defaults.

Increase ease-of-use for Outlook users by:

> • Providing Client Extensions that install as buttons on the Outlook toolbar.

DESKTOP INTEGRATION

Enable desktop users to send and receive faxes from a desktop fax client

While email is often used to provide fax capabilities to users, a full-featured solution will also provide two other options – a desktop fax client and a browser-based fax client.

A workflow-optimized desktop fax client operates as a stand-alone application for sending, receiving, and tracking fax jobs. The fax client UI typically includes, at a minimum, a Windows Explorer folder based interface, a Send Fax dialogue, a print driver and a fax viewer.

One of the common reasons for choosing a fax client over email integration is the need to have multiple users collaborating on a single received fax mailbox called a Shared Mailbox. For example, a fax client could be used to setup a fax workflow in which a group of users access a Shared Mailbox into which Purchase Orders are received. Advanced sorting and tracking capabilities ensure that faxes received to this mailbox are available to the entire group, are always processed in the order in which they are received and are always processed only once. This guarantees that multiple users do not simultaneously retrieve and process the same fax.

The fax viewer is used for viewing received faxes, which are typically delivered in TIFF or PDF format. A full-featured fax viewer will integrate into the Shared Mailbox so that the viewer can be used to process faxes without the user needing to switch back to the fax client UI.

The print driver is used for initiating outbound faxes from within any application, such as MS Word. This launches a Send Fax dialogue, from which the fax sender can add additional attachments, and a subject and memo as needed. The sender also addresses the fax, choosing from public and private phone books – with user and group entries in each – or by entering in a new address. This Send Fax dialogue can also be launched on its own, without initiating the print driver.

Essential desktop fax client functionality:

> • Support a workflow-optimized desktop fax client.

> • Provide Shared Mailbox functionality so that multiple users can process faxes received to one location.

> • Provide a print driver for initiating faxes from within applications.

> • Provide a fax viewer for viewing received faxes.

Enable users to send and receive faxes from a browser

In addition to faxing through email and through a desktop fax client, faxing through a Web interface is essential functionality. The browser interface, or Web Client, requires users to login to a Web page, which then presents a Send Fax dialogue. From there, users add additional attachments, if any, and a subject and memo as needed. The sender also addresses the fax, choosing from public and private phone books – with user and group entries in each – or by entering in a new address.

The Web Client includes folders similar to those in the desktop fax client. With these folders, users manage pending, sent and received faxes. Users can view received faxes in either TIFF or PDF format.

The Web Client provides Windows administrators with a way to provide fax capabilities to their users worldwide, without necessarily requiring network access. This capability is frequently required of a mobile workforce.

Essential Web integration:

> • Support a browser-based Web Fax Client.

EXTENDING FAX APPLICATIONS

Provide a full set of Application Programming Interfaces (APIs)

There is often a need to extend fax capabilities beyond the user community to business applications and processes. For example, each night a manufacturing facility processes all of the data from the days transactions – new orders placed, orders fulfilled by ship-ment and orders returned. Based on this data, the ERP application used by the manufacturing facility recalculates its inventory and faxes the results to each of its sales locations. The interface between the ERP application and the fax service could be an API.

APIs provide a toolkit for sending, receiving and tracking faxes from applications or processes. APIs are often used to implement fax applications that do not involve users – such as the manufacturing facility example above, where the data is calculated after hours and faxes are sent late at night.

While there are many APIs available, a good API Toolkit will incorporate several standards, including:

> • COM – exposes fax service functions as COM objects.
>
> • Java – exposes fax service functions to an any JVM.
>
> • SMTP – send and receive faxes via email.
>
> • Web Services – program from any development platform that supports Web Services.
>
> • File Drop – drop the file to be faxed into a directory along with sending instructions.
>
> • Document Templating – submit print or application output 'as-is' and require the fax service to interpret the output based on a previously defined template.

Enable non-Windows applications and processes to access the fax service

While the focus of this paper is implementing a fax service in a Windows network, a complete fax service solution will also provide fax capabilities to your non-Windows platforms. For example, business processes running on Linux or perhaps legacy applications running on Mainframe or older UNIX platforms. Via APIs or via connectors, these environments should also have access to the fax service.

Essential extended functionality:

> • Provide fax capabilities to non-Windows environments such as Linux, UNIX and Mainframes.

ABOUT BISCOM INC.

The following sections of this paper provide information on Biscom Inc., the author of this paper. They also address Biscom's FAXCOM Suite for Windows application, an integrated fax solution for Microsoft Windows environments. FAXCOM Suite integrates with Active Directory and Group Policy, supports multiple user interfaces including Exchange 2008 and is administered via an MMC.

Biscom is full-service provider of high-availability information delivery solutions that integrate, process and automate the flow of documents for enterprise and government users that need to manage a high volume of communications traffic. Biscom's products enable users to streamline the handling and management of business documents and assist businesses in complying with government regulations.

Biscom's products include enterprise fax systems, document conversion systems and Web services that enable document access, manage-ment and storage.

Biscom is a leading provider of high-end enterprise production fax systems for organizations that have intensive, mission critical fax require-ments. Biscom was the first company to provide enterprise fax solutions in 1986, is strongly focused on the enterprise fax market and contin-ues to lead the field with innovations in its fax technology.

Biscom's systems provide modular, scalable, enterprise-wide fax solutions for applications such as messaging, transaction processing and workflow management. Our solutions provide the customer with automation and integration of fax communication throughout their enterprise.

Biscom has been successfully addressing the fax requirements of large organizations since its founding in 1986. Biscom provides the fax infrastructure for federal, state and local agencies, large financial institutions with very high fax transaction volumes, global shipping and transportation enterprises, healthcare companies and telecommunications carriers.

FAXCOM SUITE FOR WINDOWS

FAXCOM Suite for Windows is software that integrates fax to a Windows network. FAXCOM Suite for Windows provides system management with an MMC snap-in and user management with Active Directory or any other LDAP-compatible directory service. It connects users to FAXCOM Queues by providing an Exchange Connector, SMTP Gateway, Web Client and a Windows Client.

The FAXCOM Queues are services that integrate with network systems and applications to allow the transmission and reception of faxes. FAXCOM Suite for Windows allows for redundant FAXCOM Queues. FAXCOM Suite for Windows works in conjunction with FAXCOM Servers to provide a complete fax solution. FAXCOM Servers and FAXCOM Queues can be installed on any Windows NT, 2008, 2003 or 2000 platform.

This architecture provides a redundant set of fax lines shared by all applications in the enterprise. This insures access to the maximum number of available fax lines for any application at any time.

FAXCOM FAX SERVERS

FAXCOM Servers are high performance, scalable systems that translate documents to and from a fax format and connect to the Public Switched Telephone Network to send and receive faxes. Each FAXCOM Server can handle up to 96 fax ports (or 90 ports in an E1 configuration). A FAXCOM Server can accept simultaneous connections from multiple FAXCOM Queues. A FAXCOM Queue can connect to multiple FAXCOM Servers for the purposes of redundancy, load balancing and least cost routing.

Since the FAXCOM Queue implements user management and application integration, administrators can expand or reorganize FAXCOM Servers without impacting the network services and applications that are sending and receiving faxes.

To monitor resource utilization, each FAXCOM Server is capable of issuing SNMP alarms and Windows events for issues such as inoperative phone lines and fax port utilization.

Biscom's FAXCOM Server software has been certified for Windows 2008. The testing procedures for Windows 2008 require that specific Microsoft standards be met in areas such as Windows Fundamentals, Installation Requirements and Security Services.

The FAXCOM Server application can be used to implement real-time fax communications over IP. The FAXCOM Server application supports the T.38 protocol that enables Fax Over IP. Using the T.38 protocol, faxes are sent and received in "real-time" over an IP network. As organizations consolidate voice and data traffic onto their own IP networks, demand for Fax Over IP has increased.

FAXCOM QUEUES

The FAXCOM Queues are the components that network services and applications access to send and receive faxes. Because the FAXCOM Queues do not translate documents or handle the direct transmission or reception of faxes, they are lightweight services that can be easily installed on any server. The server does not need to be dedicated to the FAXCOM Queue and a single server can host multiple FAXCOM Queues.

Each FAXCOM Queue (or redundant FAXCOM Queues) represents one or more applications in an enterprise, or integrates with one or more existing network services such as email, each isolated from the other. Biscom provides FAXCOM Queues that run on Windows and Linux. Least cost routing is implemented at the FAXCOM Queue level.

FAXCOM Queue features include:

- The FAXCOM Queues configuration includes user accounts created internally or integrates with an LDAP-compatible directory service such as Active Directory. In the latter case, management is performed by using information that exists in the LDAP directory service entry for a user and complements that information with policies that can be applied to groups of users. No Active Directory schema extensions are required.

- Policies can be managed in the FAXCOM Queue or within Active Directory Group Policy. These policies can be used to determine which users have access to the FAXCOM Queue, as well as set other user options such as default cover page. Management by policy gives an administrator powerful leverage to manage large numbers of users by allowing users to automatically inherit the proper settings when they are added or moved to a different business unit.

- User information is read from and managed directly within the directory service. This allows for the most up to date information as well as not requiring redundant user information stored at the FAXCOM Queue level. User management occurs within the directory service itself, making synchronization unnecessary.

- FAXCOM Queues can be added, managed, upgraded or removed remotely on servers using a single instance of FAXCOM Suite for Windows.

- Each FAXCOM Queue can be managed independently in order to preserve security and performance on other FAXCOM Queues.

• Adding or removing a FAXCOM Queue has no impact on the FAXCOM Servers or on other FAXCOM Queues.

• Each FAXCOM Queue has its own individual configuration which includes standard fax settings such as retry tables, cover pages, header, TSI information and priority.

• A FAXCOM Queue can be set up with rules that restrict faxing to certain ranges of numbers in order to meet compliance guidelines.

Submitting and receiving faxes using a FAXCOM Queue

FAXCOM Queues deliver received faxes to users either by referencing an internal list, which can include email addresses and UNC (Universal Naming Convention) locations, or by searching for a match within a directory service. In the latter case, the fax can be delivered to an email address specified in the matched recipient's directory service entry, or to a UNC location similarly specified. The mode of delivery is controlled by the policy that applies to the matched recipient.

There are many options available when submitting faxes to a FAXCOM Queue. FAXCOM Suite for Windows includes as standard clients:

• Outlook

• FAXCOM Client for Windows (FAXCOM Manager)

• FAXCOM Web Client

• SMTP

The FAXCOM SDK, which includes:

• COM API libraries

• Java API libraries

• .NET Web Services interface

• The Envelope Specification, which is a file drop method for submitting individual or broadcast faxes via the UNC

• SMTP-based interface

• FAXCOM Command Language (FCL)

• DocFlow, an application that takes output from existing applications, extracts the faxing information (such as sender, recipient, subject and delivery instructions), converts the output to a fax and then delivers the fax to the intended recipient. DocFlow is commonly used to support document output from Unix and IBM Mainframe applications.

Integration with MFPs including those from:

• HP

• Xerox

• Canon

Regardless of the method used to submit a fax, a completion status can be delivered to an email or UNC location. For the case of desktop clients, a desktop application can be provided to view the status of a fax while it is in progress. For API developers, the API can be used to query the status of a fax while in progress.

Easy administration

With the FAXCOM Suite for Windows MMC snap-in, an administrator can install and manage:

• FAXCOM Queues

• Installations for desktop clients

• Exchange Connectors for Exchange 2000/2003/2007 integration

• SMTP Gateways to connect with any SMTP-enabled mail system including Exchange 5.5 and Exchange 2000/2003/2007

• FAXCOM Client Application on Windows IIS servers

FAXCOM JOB TRACKING AND REPORTING

FAXCOM Suite for Windows works with FAXCOM Job Tracking, a service that is capable of collecting transaction information from every FAXCOM Server and FAXCOM Queue in the enterprise. Each fax transaction is identified with a globally unique ID. This provides for a single complete source of information of all fax transactions stored in a SQL database. FAXCOM Job Tracking can be configured to signal alarms in the case that a transaction is not completed within a certain time period.

FAXCOM Job Tracking includes a browser-based application that provides standard reports. Custom reports can be created based on individual users or individual business units. Reports can be executed immediately or scheduled to be automatically delivered via email.

BEYOND ACTIVE DIRECTORY

FAXCOM Suite for Windows can be used in conjunction with other product offerings by Biscom, including FAXCOM Servers on Linux, FAXCOM Queues on Linux and Exchange connectors.

FAXCOM Suite for Windows integrates with any LDAP-compatible directory service, including Active Directory, Exchange, NDS, Netscape, Domino and Zoomit.

IMPLEMENTATION DIAGRAM

The following diagram illustrates an implementation of next-generation enterprise fax server architecture featuring FAXCOM Suite for Windows.
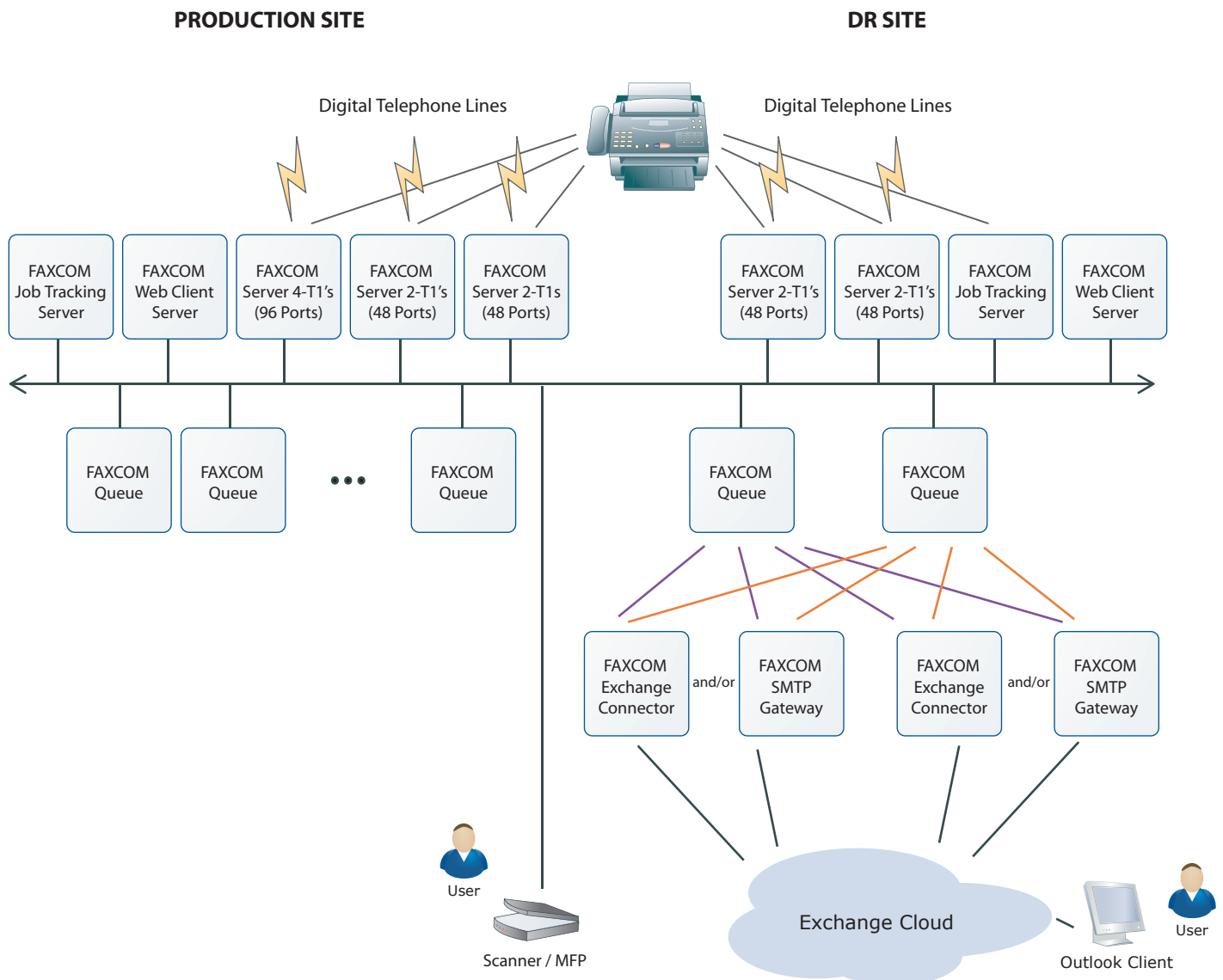
ROUTING RECEIVED FAXES

The FAXCOM solution provides numerous options for routing received faxes. These options allow you to specify on what criteria to determine the destination of a received fax, options for where to deliver the fax, and even multiple choices relating to the format of the delivery.

Delivery of received faxes involves:

> • Criteria for routing received faxes
>
> • Destination types for routing received faxes
>
> • File format for routed faxes

Criteria for Routing Received Faxes

Routing received faxes is a three step process:

> 1. The first step is to gather the data known immediately about the fax, such as the date and time it arrived and the number it was sent to.
>
> 2. The second step is to extract additional data from the fax image, perhaps through OCR or via barcodes.
>
> 3. The third step is perform a lookup in one or more data sources, referencing the data collected, for fax routing instructions.

Data known about the fax when it arrives

> - Fax Port — whereby all faxes over a given port on a server or range of ports on multiple servers are routed to a specified destination type. For example, with the implementation of an eight channel fax server, you could assign ports 1-4 to destination 1, and ports 5-8 to destination 2, where each port is a fax channel (i.e. phone line.)
>
> - Dialed Digits — whereby all faxes are routed to a specified destination type according to the phone number dialed. This option includes these variations:
>
>> DNIS on a Digital T1/PRI/E1/BRI Line, where a range of fax phone numbers is provided on a lesser number of actual lines. For example, the range of fax phone numbers 978-555-1000 to 978-555-1099 includes 100 unique fax numbers, each with a normal 10 digit dial string. These 100 numbers could be assigned across a 24 channel T1 line. The benefit of this implementation is that you can assign numerous unique fax numbers without acquiring the full number of phone lines, much as a PBX allows you to assign unique phone numbers without acquiring the same number of phone lines. Digital lines are bidirectional – i.e. they can send and receive faxes, unless configured to only do one or the other.
>>
>> Analog Direct Inward Dial (DID), where a range of fax phone numbers is provided on a limited number of physical phone lines called DID Trunks. As with DNIS routing, you can assign numerous unique fax numbers without acquiring the full number of phone lines. DID Trunks are provided by the phone company, and are "receive only" phone lines.
>>
>> DTMF (Dual Tone Multi Frequency), where "tones" are passed after the regular 10 digit dial string.
>
> - TSID — whereby all faxes received from the specified Transmitting Station Identifier (TSID) are routed to the specified destination type. Fax servers and fax machines are typically configured with an identifying TSID such as the organization name or fax number. Note that because the TSID is configured by the sender's organization, it is not always available or accurate.
>
> - Caller ID (ANI) — whereby all faxes received from the specified sending telephone number are routed to the specified destination type. The Caller ID, unless blocked, is provided by the telephone company completing the fax transmission. Note that Caller ID is not always provided on all phone line types and in all regions.
>
> - Date & Time — whereby the date and time the fax arrived is used to determine fax routing instructions. For example, whether a fax arrives on a weekday versus a weekend, or whether a fax arrives during business hours or after business hours.

Additional data gathered from the fax image

Additional data can be extracted from the fax image, for example:

- OCR — whereby the fax image is converted to text by OCR, and thus is made searchable

- Barcode — whereby a barcode on the fax is scanned and interpreted

Determining where to deliver the fax

Based on the information known about the fax when it arrives, and any additional information extracted from the fax image, fax routing instructions can be identified by querying a network resource such as:

- LDAP compatible server such as Active Directory, NDS, and Netscape

- ODBC database such as SQL, MySQL, Oracle, and Access

- Text file

- FAXCOM tables

Destination Types for Routing Received Faxes

After determining the criteria for routing a received fax, you then determine to where it should be delivered — i.e. one or more destinations. Destination types include:

Email — faxes are delivered to an email user mailbox or an email folder, including:

• Exchange

• SMTP

• Domino

• GroupWise

The fax file can be delivered as an attachment to the email message or a notification that contains a UNC link to the fax file can be delivered instead. This allows the faxes to be stored in a central location to which recipients link to view faxes.

• **FAXCOM Client** — faxes are delivered to a folder or subfolder in Biscom's workflow-optimized fax client.

• **FAXCOM Web Client** — faxes are delivered to a folder in Biscom's Web Client.

• **Host application** — delivers faxes to a custom application using the FCL (FAXCOM Command Language) API.

• **Printer** — delivers faxes to a printer.

• **UNC** — delivers faxes to a network directory.

• **FTP** — delivers faxes to an FTP location.

• **SFTP** — delivers faxes to a Secure FTP location.

• **Quarantine** — delivers faxes to Biscom's Quarantine Doctor application, which is used for filtering Spam Faxes. For example, if a received fax has a blank TSID, it might be delivered to Quarantine for review.

• **Hang up** — terminates the fax phone call without completing delivery. For example, if a specific TSID or Caller-ID is known to you as a sender of junk faxes, that TSID or Caller-ID could be configured with a "Hang up" destination.

• **Image Indexing** — delivers the received fax to the FAXCOM Image Indexing application, Biscom's fax workflow solution for data capture and image processing.

• **FileMarshal** — delivers the received fax to FileMarshal, Biscom's secure email and file delivery solution. With delivery to FileMarshal, an email notification containing a URL is sent to the email destination, while the fax itself is encrypted and stored in a secure database.

File Format for Routed Faxes

The final consideration with respect to routing received faxes is the file format. Faxes are received in the TIFF image file format that is the standard for fax communications.

File format options include:

- **TIFF** — The TIFF image file format is the format in which faxes are sent and received by fax devices. Routing faxes in TIFF formats delivers the exact faxed image to the final designation. TIFF is a widely supported file format, and most PCs include a TIFF viewer by default. Note that TIFF is an image file format, and thus its content is not searchable.

- **PDF** — whereby FAXCOM converts the TIFF image to PDF file that can be viewed with Adobe Acrobat. Note that the PDF Option, unlike the Searchable PDF option, does not produce a file with searchable content.

- **Searchable PDF** — whereby FAXCOM performs an OCR process on the TIFF file and then converts the OCR results into a Searchable PDF file that can be viewed with Adobe Acrobat and whose contents can be searched.

- **Searchable TIFF** — whereby FAXCOM performs an OCR process on the TIFF file and then converts the OCR results into a Searchable TIFF file that can be viewed with the Biscom Fax Viewer and whose contents can be searched.

- **Text** — whereby FAXCOM performs an OCR process on the TIFF file and then converts the OCR results into a text file whose contents can be searched.

- **Data** — whereby the final delivery includes the additional data, such as the text extracted by OCR and any additional data captured by a query to a network resource, with the fax in a format that can be easily read, such as keyword value pairs, .csv files, and .xml files. A record of the fax and corresponding data can be written to an ODBC database.

ADVANCED FAX ROUTING

Advanced Fax Routing extends fax routing capabilities to enable fax processing to be included in business workflows. These capabilities include extracting data from received faxes, making queries to network resources, splitting a received fax into multiple fax documents, determining one or more destinations for each fax, and then delivering the fax and its associated data.

The steps in implementing Advanced Fax Routing include:

- Extract information from a received fax

- Act on the extracted information

- Deliver the received fax

Extract Information from a Received Fax

Automatically extracting data from a received fax enables dynamic decision making for fax routing and also improves the efficiency of fax delivery. Some of the data that can be extracted from a fax includes:

Text captured by an OCR of the fax

> **For example:** A received fax might be an insurance claims form, where the claim number is printed in one of the boxes on the form.

Barcodes on the fax are scanned and interpreted

> **For example:** A received fax might be a Purchase Order that includes a barcode on the cover page, where the barcode is unique to a specific customer.

Fax header details such as Caller-ID, TSID, and DID

> **For example:** A received fax might be an invoice delivered to a specific DID number, where each DID number in the organization is assigned to a specific user. For example, it could be assigned to the Accounts Payable contact.

Act on the Extracted Information

Based on the data extracted from the fax, a number of additional steps may take place to determine the routing path of the received fax. Based on the data extracted from a received fax, next steps could include:

- Extract additional data from a secondary source, such as an LDAP server, an ODBC database, or a network text file.

> For example: After extracting the claim number from an insurance claims form received by fax, a second step could be to perform an LDAP lookup matching the claim number with a customer service representative. The received fax could then be forwarded to the customer service representative for review.

- Split the received fax into multiple fax documents.

> For example: Multiple Purchase Orders are received in a single fax. After reading a barcode on each Purchase Order, a second step could be to split each order into its own document. A third step could be to read a network data file to assess which product lines each Purchase Order is for, and then deliver each Purchase Order to an email address assigned to each product line.

Deliver the Received Fax

The information that is extracted from the received fax and the additional data that is retrieved from a network resource are used to determine the destination, or perhaps multiple destinations, of each received fax. Destinations for received faxes include:

- UNC locations

- Email addresses

- Printers

- FAXCOM Client folders and subfolders

In addition to delivering each fax to one or more destinations, the final delivery can also include the additional data — such as the text extracted by OCR and any additional data captured by a query to a network resource — and include this additional data with the delivery in a format that can be easily read. This enables seamless integration with the next stage of the fax workflow. These formats include:

- Keyword value pairs

- .csv files

- .xml files

The naming of the fax image can also be controlled. A record of the fax and corresponding data can be written to an ODBC database.

Design & Implement Workflows for Received Faxes

Each FAXCOM Queue can handle one or multiple workflows for processing received faxes. The workflow integration is accomplished by defining a set of criteria that trigger actions based on certain conditions. Examples of conditions include:

- Data extracted from the fax or from other data sources such as a network resource.

- The current date, time, or day of the week.

- Whether the user is in or out of the office when the fax is received.

Examples of **basic workflows** include:

- Deleting or forwarding faxes to specified subfolders when they are detected as spam based on the TSID.

- Routing faxes to users based on text extracted from the fax cover page.

- Automatically redirecting faxes when users are out of the office.

A sample **intermediate-level workflow** is to:

- First, convert a received fax to a text data file.

- Second, deliver the data file to an application for automatic processing.

A sample **advanced workflow** is to:

- First, separate a multi-page received fax into multiple documents.

- Second, search a network resource for the owner of each document based on extracted transaction IDs.

- Third, deliver each document to the correct owner with an attached .xml file that enables the document
  to be automatically indexed according to data extracted from the fax image included in the .xml file.

Advanced Fax Routing offers a number of capabilities that can be used in any number of combinations to satisfy the requirements of any Fax Workflow. For more information on using Advanced Fax Routing to design and implement a Fax Workflow, Biscom's Application Engineers are available for consultation.

FOR MORE INFORMATION

Biscom began its business by providing highly reliable carrier-class products for major telephone companies and service providers that offered fax services. Working with these large organizations led us to work with global enterprises that invested in their own telephony infrastructures. As a result, Biscom has significant in-house skills in working with large networks and telephony equipment. It is also highly attuned to the unique needs of large enterprises. Our engineering team is highly skilled in technologies like enterprise directory services because we have been working with them for years – long before the introduction of Active Directory.

Biscom offers its customers a full-service approach. Our sales approach is consultative and designed to understand customer requirements. Biscom's management actively encourages direct contact between developers who are building leading edge new products and our top tier accounts.

For more information on implementing a fax software solution on a Windows network, please contact Biscom to arrange a discussion with an applications engineer.

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