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Internet Exchange News

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NEWS FLASH!!!

IMA's Internet Exchange Messaging Server: Assuring Fast and Reliable Communications over the Net

Electronic mail or email plays a vital role in most of today's organizations, whether corporate, governmental, academic, or non-profit institutions. To maximize the benefits offered by email and provide these institutions with a powerful and cost effective communications tool, International Messaging Associates Ltd. (IMA) introduces the Internet Exchange Messaging Server (IEMS) with Internet Exchange Version 4.0, an electronic messaging system with a highly scalable architecture, capable of supporting disparate email systems.

The IEMS is responsible for sending and receiving messages over the Internet using either the SMTP protocol or the Batch SMTP Tunnel. It also performs other tasks on messages, such as antivirus scans and spam mail detection. The IEMS consists of the following modules:

- SMTPD
- SMTPC
- Batch SMTP Encoder
- POP3/Batch SMTP Decoder
- Preprocessor Unit
- Distribution List Manager
- Message Switch

SMTPD

SMTPD (Simple Mail Transfer Protocol Demon) is a background server process that runs continuously to listen for incoming messages from the Internet. Whenever a new connection request for incoming mail are detected, SMTPD creates a new thread that will manage that particular connection. It is capable of creating multiple threads that run concurrently for simultaneous processing of multiple messages.

The IEMS's SMTPD Module is designed to support the ESMTP service extension DSN (Delivery Status Notification), as well as the 8BITMIME, Message Size, and ETRN extensions for downstream dialup connected sites. The number of simultaneous incoming connections that can be created by the SMTPD Module is limited only by the system TCP stack and system resources.

SMTPC

SMTPC (Simple Mail Transfer Protocol Client) is responsible for delivering mail to the Internet. It polls the IEMS's MTA (Message Transfer Agent) Shared Message Queue regularly to check for new messages, which are then moved to SMTPC's own internal queue for further handling. Once the messages are in the SMTPC queue, it establishes the required number of connections with external Internet sites for message delivery to the next MTA. Each machine that runs IEMS's SMTPC Module is capable of maintaining simultaneous outbound SMTP connections (total number of simultaneous outbound SMTP

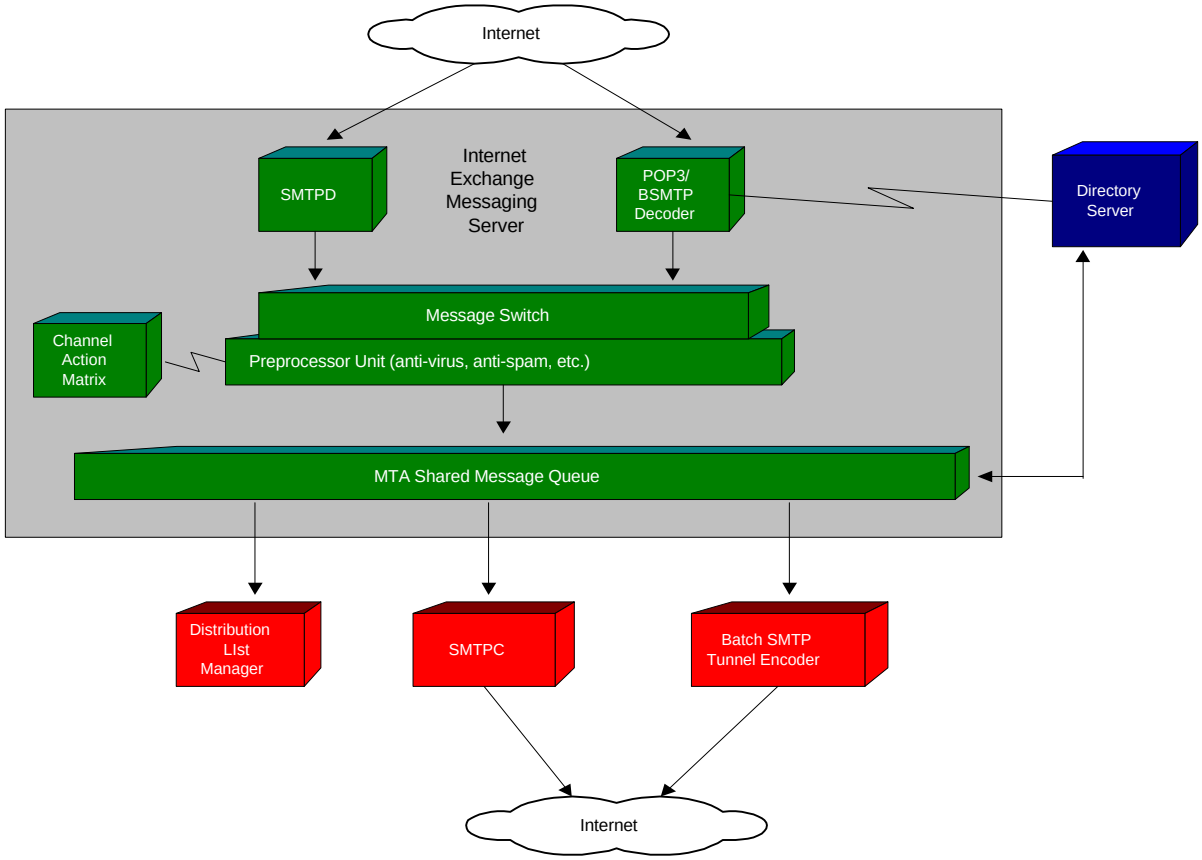

Figure 1. System Architecture of Internet Exchange 4.0

connections is limited only by the system TCP stack and system resources). Like SMTPD, this module supports the ESMTP service extensions DSN, Message Size, ETRN remote queue start-up, and 8BITMIME.

The SMTPC Module features an innovative approach to queue management that supports server side ETRN requests and provides a mechanism for message priority handling. It also comes with the SMTPC Queue Router which retrieves outgoing messages from the Message Switch and classifies them into two queue types: the Pending Queue and Deferred Queue.

- *Pending Queue* – newly arrived messages that must be sent out immediately are placed by the SMTPC Queue Router in the Pending Queue, which attempts to deliver them via SMTP. If the delivery of a message in the Pending Queue is unsuccessful, the message is passed on to the Deferred Queue so it can be delivered later. Messages that destined for intermittently connected hosts with ETRN support, such as dialup accounts, completely bypass the Pending Queue and are routed directly to the Deferred Queue. The queue run interval for each Pending Queue Processor can be configured by the system administrator. He/she can also define the maximum number of Pending Queue Processors that run concurrently and the number of messages that will be processed by each processor during each queue run. A Pending Queue Processor is capable of creating multiple threads for handling multiple SMTP sessions.

- *Deferred Queue* - Messages that are intentionally deferred or whose previous delivery attempts have failed are kept in the Deferred Queue. Messages in this queue are further grouped into different SMTP domain channels using information contained in the recipient addresses. This provides for server side ETRN support and prevents the deferred messages from delaying the processing of new messages. A message is placed in the Deferred Queue if one of the following conditions is encountered:

  1. the destination domain is a predefined ETRN SMTP domain (attempting to deliver to dialup SMTP hosts when they are not connected to the Internet is bound to fail).
  2. there is a temporary DNS error during domain

name resolution.
3. a destination host is found but SMTP connection cannot be established.
4. the destination SMTP server issues a temporary SMTP response code.
5. the SMTP connection is aborted prematurely due to network problems.
6. the destination SMTP server does not reply within the configured timeout period.

Messages in the Deferred Queue are processed by the Deferred Queue Processors on a per channel basis. During each scheduled queue run time, one of more Deferred Queue Processors are created for every domain channel by the SMTPC Module to handle outgoing messages. The messages are then processed according to their message priority weight.

- *Message Priority Handling* - the SMTPC Module assigns priority weight to each message based upon three factors: the predefined message precedence, the message size, and the total deferred time (for messages in the Deferred Queue).

  The message precedence is a configurable parameter that can be defined by the system administrator. For example, the system administrator may want to assign a lower priority level to messages coming from the Distribution List Channel. The message size is also a configurable parameter that enables the system administrator to prevent large messages from delaying the delivery of urgent but smaller messages. The total deferred time, on the other hand, represents the time a message has been stored in the Deferred Queue. A message with a longer total deferred time is given a higher priority level than those that arrived recently. This is also a configurable parameter.

  The Queue Router performs the first priority weight calculation as it imports messages from the Message Switch. This value is stored in the local message database. The Pending Queue Processors pick up messages from the Pending Queue for each scheduled queue run based on their priority weight.

Batch SMTP Encoder

The Batch SMTP Encoder handles the tunneling of messages for an entire organization or predefined addresses, while preserving the original envelope or delivery information for each message. When the IEMS's MTA receives a message addressed to a recipient on the other end of the BSMTP tunnel, it routes the message to the Batch SMTP Encoder. This module then encapsulates the message and envelope information into a new message. The new message is sent to the MTA Input Queue addressed to the BSMTP Decoder responsible for the intended recipient(s). The BSMTP Decoder converts the message back to a conventional SMTP message.

POP3/Batch SMTP Decoder

This module retrieves Batch SMTP messages from a remote host using the POP3 client protocol. It checks the MIME Content Type headers in the messages to ensure that they are labelled as application/Batch SMTP. The Batch SMTP Decoder then decodes the messages and inserts them to IEMS's Input Queue for further routing, with the original envelope recipients retained.

With Batch SMTP tunneling, important envelope information is preserved when a message is delivered to a POP3 account. Since the original envelope remains intact within the tunnelled message, this allows accurate reconstruction of all the message's recipients even if the accompanying outer envelope has already been discarded.

Preprocessor Unit

The Preprocessor Unit is an integrated subsystem of the IEMS which also features a highly scalable architecture. Each of the unit's program is a plug-in module that can be run on a separate machine, ensuring efficient utilization of computing resources and maximum throughput. Its unique architecture guarantees that the system can easily be scaled to cope with the changes in the messaging needs of an organization. In addition, the Preprocessor Unit, incorporates an open architecture framework that allows the development of third party or custom processing modules. Communication between the different modules is done via Remote Procedure Calls (RPC's) over TCP/IP.

IEMS's Preprocessor Unit initially consists of the Anti-spam Module, the Anti-Virus Module, and the Channel Action Matrix.

- *Anti-spam Module* - this module provides the system administrator with the options to create a list of allowed IP addresses/address ranges or a list of banned IP addresses/address ranges using simple GUI's. The Anti-spam Module can also verify the corresponding name of an IP address during the initial stage of the SMTP session via reverse DNS lookup to filter out forged names. This feature blocks out potential spammers even before they can enter the system.

- *Anti-virus Module* - this module is a multi-threaded application with the capability to create multiple threads for performing simultaneous virus scans, with each thread processing one mes-

sage at a time. It checks the MIME headers of a MIME/RFC822 message to determine what decoding method to use on each attachment. If the message is non-MIME, the module will use either UUDECODE or BINHEX on its attachment(s). After decoding the attachments, the module invokes an external virus engine. If the virus can engine finds a virus, it will either bounce the mail, copy the mail to a predefined location/folder, or delete the mail (with the option to notify the postmaster after deletion) as configured by the system administrator.

- *Channel Action Matrix* - IEMS's Preprocessor Unit comes with a Channel Action Matrix for each module. With the Channel Action Matrix, the system administrator can configure which module(s) should run for a particular message, based upon message flow or routing within the MTA. For example, to minimize delay in message delivery, the system administrator may configure the Preprocessor Unit not to run the Ant-virus Module for messages coming from a cc:Mail user and destined to another cc:Mail user or to a Lotus Notes user within the same system. Or he/she may want to run the Anti-virus Module only for messages that come from the Internet and not for outbound messages. These options can easily be configured in the Channel Action Matrix.

Distribution List Manager

The Distribution List (DL) Manager is an innovative feature in IEMS that allows messages to be submitted to all subscribers of an electronic mailing list simply by submitting these messages to a single address. This module also enables the system administrator to create Internet electronic mailing lists that support the following features: mail blocking, adding and removing of subscribers, and setting the preferred delivery options. The DL Manager supports both open and the closed types of lists.

When the IEMS's Message Switch receives mail, it performs a directory lookup using the Internet Exchange Directory Server to determine whether there are messages intended for a mailing list. If such messages are found, they are routed to the Distribution List channel via the Preprocessor Unit and the MTA Shared Message Queue. When the DL Manager receives a message destined for a mailing list, it performs a directory lookup also using the Internet Exchange Directory Server to find the corresponding addresses of all the members of that particular mailing list. After the list's members are identified, the message is re-injected into the MTA Input Queue and forwarded to the MTA Shared Queue once again for final delivery to all mailing list members. The DL Manager offers two options for delivering messages: immediate and digest mode. In the immediate mode, a message is sent immediately to the subscribers as soon as it is posted. This is the default setting for the DL Manager. In the digest mode, posted messages are allowed to accumulate in the local archive of each mailing list. These messages are sent each subscriber based on the delivery schedule that he/she has chosen. If a user wants his/her account to be in the digest mode, he/she must send a request to the system administrator/list owner.

Message Switch

The Message Switch is one of the most innovative features of IEMS. This module routes incoming messages to one of the several outbound messaging channels supported by Internet Exchange 4.0, including the cc:Mail Connector, the Lotus Notes Connector, the Local Message Store, the Batch SMTP Tunnel Encoder, the outbound SMTP, and the Distribution List Manager. The Message Switch is LDAP enabled and relies on user information provided by the Internet Exchange Directory Server to determine which channel an incoming message should be routed to.

The Message Switch greatly enhances the scalability of IEMS by allowing new functions and channels to be added arbitrarily to the system. Each new channel is able to register itself with the Message Switch as a new message queue, and messages will then be delivered to this queue based on the configuration in the Internet Exchange Directory Server.

Conclusion

Email is one of the most powerful communications tools today and will remain so in the years to come. The use of this technology is expanding at a very fast pace and has resulted in the proliferation of electronic messaging systems that adhere to a wide variety of standards, making it very difficult for system administrators to choose what email system to use. The Internet Exchange Messaging Server is specifically designed to address this problem. IEMS is capable of supporting co-existence between proprietary LAN-based email systems and those that adhere to open Internet standards, including IMAP4 and POP3, while providing a rich set of migration tools for users who may want to move from one type of messaging system to another and unlimited scalability. In addition, IEMS incorporates a lot of other features for safeguarding the integrity of the mail system and for assuring fast and reliable message delivery. All in all, IEMS is a robust messaging system that provides organizations and individuals with a very user friendly tool for reaping all the benefits offered by email and its underlying Internet technologies.

Note: Additional information on the Internet Exchange Messaging Server as well as the other Internet Exchange components can be found at http://www.ima.com

CASE STUDY

Christian missionaries rely on Internet Exchange to serve the needy – The case of the Mission Aviation Fellowship

The Mission Aviation Fellowship (MAF) was established by a small group of Christian aviators in 1945 to provide missionaries with reliable transportation facilities for reaching remote places where their services are needed. Since then, this non-profit organization has grown considerably to include IT and logistics services to more than 3,300 Christian groups and missionaries operating in more than 40 countries, including Ethiopia, Madagascar, Guatemala, Russia, and the Philippines.

MAF started using cc:Mail in 1994 shortly after its Information Technology Division was formed. "Email is a fast, practical and reliable way to communicate, especially for a network consisting of a number of bases scattered around the globe. Instead of waiting for weeks or months to receive a response by post, our remote users now receive response to their messages within the day. Email helps keep our users worldwide to keep in touch with each other, with their families or friends, with their mission headquarters, and with their home churches," says Pete Briggs, Technical Administrator.

MAF's IT Division consists of two departments, IS for internal support and MAFLink for providing services to other Christian agencies involved in relief and humanitarian work, such as World Vision, Habitat for Humanity and the Peace Corps. MAFLink is a telecommunication network with 69 email hubs in 32 countries that handle more than 3 million messages each month. "Some of these hubs connect directly to our main hub either by modem or by TCP/IP connection. We have a main hub for each region that MAF operates in, with each main hub servicing remote hubs that are used by remote users who do not have telephone connection. These remote users rely on HF and VHF radio to connect to their local hub to send and receive email," explains Briggs. "Users who are in areas where we do not maintain a hub rely on satellite telephone."

According to Briggs, MAF maintains Windows NT 4.0 servers/ workstations in its headquarters in Redlands, CA, to handle the cc:Mail Post Office databases as well as the router sessions. To provide the organization's more than 3,000 cc:Mail users with Internet connectivity, MAF uses Internet Exchange from International Messaging Associates (IMA) Ltd.

"Before we switched to Internet Exchange, we were using Link to SMTP from lotus to connect cc:Mail users to the Internet. However, we were experiencing frequent lockups with product, resulting in loss of messages and important data," says Briggs. "The WinSMTP version also did not work while the DOS version of Link to SMTP can easily get overloaded. Moreover, it (Link to SMTP) is not MIME compliant."

MAF tested several products to solve the problem based on several criteria, including reliability, MIME capability, speed and user referrals. Internet Exchange emerged as the most highly recommended among these products.

"When MAF first tested Internet Exchange, we found that it has a lot more features than Link to SMTP," says Briggs, admitting that they were initially overwhelmed by the product's many features. "One of its best features is its ability to support many threads concurrently. It is extremely fast in transmitting messages. It is also very reliable – we encountered very little downtime as compared to what we were used to before."

Another factor that convinced MAF to drop Link to SMTP in favor of Internet Exchange is the latter's ability to create various SMTP gateways for numerous client domains plus the fact that Internet Exchange easy-to-use features eliminate the need for end-user training.

"Internet Exchange has proven to be a very reliable and stable product, which has greatly reduced our downtime and frustrations that the previous software caused. It gives the important statistics at a glance, and the selection of configuration options and advanced features is simply great," attests Briggs. "We are able to get the desired output that we want by changing the configuration options without having to do other workarounds. Rules Based Addressing is another great feature that we use extensively. Other features such as the Log Analyzer are also very good additions.

And when asked for his final comments regarding Internet Exchange, Briggs says, "We plan to use Internet Exchange in the foreseeable future. Internet Exchange is a good product and does the job well. In addition, IMA has really done a good job at fixing the bugs and improving the overall look and feel of Internet Exchange. We look forward to seeing what future releases IMA will have to offer."

Questions & Answers

Q: Some of our cc:Mail users are complaining about missing *TO:* addresses in their messages. Our system usually encounters around 30 to 70 messages without recipients per day. We are using cc:Mail version 8.2 with VIM Version 6.3. How do we solve this problem?

A: cc:Mail Version 8.2 removes the 4Kb message size limitation on message headers by making use of VIM version 6.3. However, this feature only works if the latest cc:Mail client and NT router from the cc:Mail Version 8.2 CD-ROM are installed. If the older versions of any of these programs are used, VIM version 6.3 always returns a NO ERROR code even if the TO: header in a message has exceeded the 4Kb limit, leaving this field empty. One solution to this problem is to use VIM Version 6.03 instead of VIM 6.3.

If you still have a copy of VIM 6.03, do the following steps:

1. Extract the file to an empty directory.
2. Delete all the VIM 6.3 files and copy all the VIM 6.03 library files into the VIM directory. Make sure that the VIM directory is in your system path.
3. In addition, make sure that only one set of the VIM library is running to prevent errors .

Q: The Dialup Scheduler in our copy of Internet Exchange 3.11 does not work on weekends. During weekends, the Dialup Scheduler just issues a "NO CONNECTION" message at the scheduled dialup time and waits for the next dialup time. How can this problem be fixed?

A: The Dialup Scheduler in Internet Exchange 3.11 has a bug that writes a separate schedule for the weekends even if the option *Use different profile for weekends* is disabled. To fix this problem, please visit IMA's web site at http://www.ima.com so you can upgrade your gateway to Internet Exchange Version 3.12.

Q: We have upgraded our Internet Exchange gateway to version 3.11. Do we still have to download the IMACRON software to avail of Internet Exchange's dialup scheduling capabilities?

A: With Internet Exchange 3.11, you do not have to download the IMACRON software anymore because Internet Exchange version 3.11 already has a built-in dialup scheduler. To configure Internet Exchange 3.11's Dialup Scheduler, go to the Internet Exchange Control Panel and click on the *Schedules* tab. However, we suggest that you upgrade to Internet Exchange 3.12 since the Dialup Scheduler in version 3.11 has a bug that may cause problems in your system.

"But what ..... is it good for?" – an engineer at the Advanced Computing Systems Division of IBM, 1968, commenting on the microchip.

This Month's Tips

Rebuilding Corrupt Messages

Internet Exchange moves a message to the \bad directory when it is corrupted. This may be due to problems in the network or when Internet Exchange cannot connect to the post office, preventing it from sending messages to the cc:Mail recipients. Corrupt messages can be rebuilt or recovered via Internet Exchange's RCMESG utility. To recover corrupt messages using the RCMESG utility, do the following steps:

1. Move the messages in the \bad directory to the proper directory (IN or OUT).
2. Shut down the Internet Exchange gateway.
3. Remove the mesg.btr file.
4. Run RCMESG.EXE
5. Restart your Internet Exchange gateway.

Receiving Email With Different FQDN's

Sometimes, it is necessary to configure Internet Exchange to enable it to accept mail for several different organizations. To enable the gateway machine to be known by more than one FQDN (fully qualified domain name), go to the Internet Exchange Control Panel and click on the *Configure Gateway* tab. In the resulting screen, add the new FQDN to the *Alternate Host/Domain Name* field.