

HIGHLY AVAILABLE MICROSOFT® EXCHANGE® MANAGEMENT AND ARCHIVING

A TECHNOLOGY BRIEF



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1 Introduction




Electronic messaging is widely recognized as a quick, effective means for communicating and collaborating in the workplace. In today's global economy and widely disbursed collaboration environments, messaging and e-mail are mission critical services and a crucial intellectual asset, where both messages and file attachments must be available for immediate retrieval at any time. The growth of e-mail in both volume and complexity demands an effective e-mail archive and retrieval strategy. E-mail administrators must have; a better way to manage message stores, mitigate the increasing demand for storage, and develop more efficient performance from their servers and networks.

At the same time, corporate counsel and compliance officers must have a better method of monitoring the content of e-mail messages to both prepare for and avoid litigation. E-mail content and long-term retention of messages has become a growing requirement for many organizations. Long-term retention of e-mail requires ever increasing storage volumes.

Harvesting the informational value from e-mail requires the ability to facilitate a collaborative knowledge exchange between workers, management and clients. In addition to effective e-mail administration, enterprises that employ Microsoft® Exchange® have come to realize that downtime is not just an inconvenience to the end user but also a crippling break to the workflow of the entire organization. In the 24/7 global marketplaces, downtime of the corporate e-mail system equates to real losses in productivity and dollars.

The logical answer to the e-mail dilemma is to provide a single, highly available repository for e-mail processing and archival storage, regardless of the number of MS Exchange servers that are used by the enterprise. This technology brief discusses an integrated solution for a highly available environment for Exchange, and for storage management and archiving with EDUCOM Exchange Archive Solution (EAS).

2 Enhanced Storage Management for Microsoft® Exchange®



EDUCOM EAS provides enhanced storage management and intelligent archiving for any size Exchange environment. This highly scalable solution centrally manages the migration, long-term storage management, and retention of messages and their attachments based on comprehensive policies. Individual mailbox items, public folders messages, and .PST files are managed into a central archive where single instance storage and compression are applied.

A small pointer can be left in the user's mailbox to replace the messages that are migrated. Users can retrieve an archived item within Outlook® by simply double-clicking the pointer. EAS instantly retrieves the messages and their attachments with original integrity. There is also a web-based interface available for access separate of Outlook®.

By managing the storage and long-term access to e-mail, EAS allows Exchange® to strictly focus on message flow and transaction performance. Exchange is a production transaction server and was not originally designed to be a mass storage repository. By introducing EAS to your messaging environment, your Exchange® servers will optimally be more efficient, scalable, and easier to manage.

The following diagram represents the EAS architecture. The servers depicted are intended to represent logical servers. These service points can be separate physical servers. The architecture is mainly defined on two threads, and Archiving Run and a Client Request. The letter and number designations on the connectors in the diagram are references for the description.

Archive Run -

1. EAS Server opens a mailbox on the Exchange Server. Based on the defined rules and policies, searches out messages to be archived.
2. When a message is found that meets the criteria, EAS creates a record in the SQL Server database that contains details of the message contents and attachments.
3. If the message is not within the EAS archive, EAS writes a compressed version of the message to the File Server archive location.
4. EAS deletes the original message and contents in Exchange and creates a stub reference file.

Client Request -

- A. A user requests the retrieval of a message from the archive. This request is made to the IIS Server. IIS authenticates the request and provides the user access to the requested message.
- B. The IIS server queries the database for the location of the message.
- C. IIS connects to the archive files and retrieves the message contents and attachments.
- D. IIS passes the message back to the user in a compressed format. The client software interface then decompresses the message and presents it to the user.

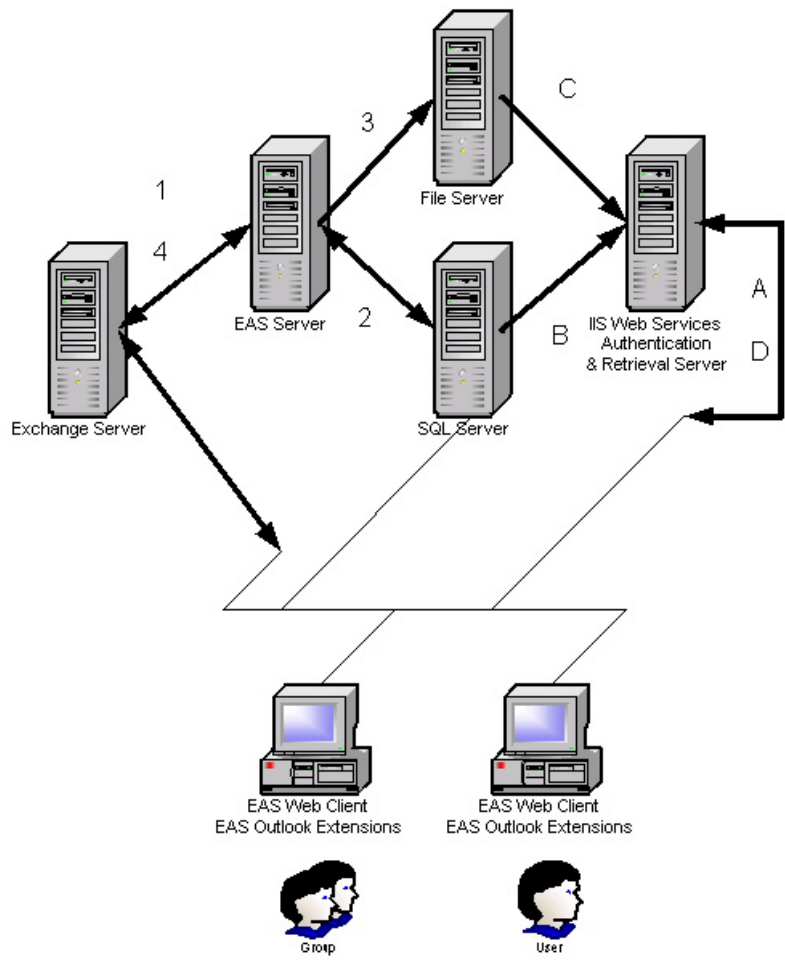



Figure 1: EAS Architecture

EAS Architecture and process description and diagram adapted from Corbett Enders, LOGICROP

2.1 The Benefits of Managing Exchange with EAS

2.1.1 Reduce storage load on MS-Exchange



How many times per year is additional disk space added to your MS Exchange environment? For many companies, adding more storage is likely to be a monthly task. Even though disk drives are becoming less and less expensive, the long-term costs associated with managing and maintaining a larger, less stable Information Store, will increase. There is a significant reduction of MS Exchange storage achievable by using EAS. The pointers (stub files that optionally replace the archived messages) seen in users Outlook mailboxes reside on the MS Exchange server. Stubs contain the header information and optionally a portion of the message body text. Because they do not contain the attachments and imbedded images, the size of a stub is significantly less than the original message (most stubs files aren't larger than 1kb). The stub files react the same as un-archived messages to Outlook features such as 'Find' and 'Show Related Messages'.

It is important to note that the stub file EAS creates is a copy of the original item, because it is a pointer to the complete message controlled under EAS. In storage, EAS treats the message and its attachments as one object.

2.1.2 Improve backup windows and maintenance

Common backup windows for MS Exchange servers are not unheard of to be several hours long. This is regardless of the type of backup used, whether it is an on-line hot backup, or an off-line cold backup. This is mainly because each Information/Message Store with MS Exchange is one single container file, regardless of size. As the MS Exchange Information Store grows in capacity, backup windows will continue to increase and so will restore times. Due to the nature of the information store process, the information store only grows in size. Message space can be re-used from deleted messages, but the information store never reduces in size.

The storage format of the EAS archive is similar to that of MS Exchange's Information/Message Store; messages are stored into container files. However, EAS builds further on the efficiency of this container file format by applying compression and breaking the single large container into smaller containers called 'day archive' files. A day archive file contains all the messages of a particular 'Sent Date'. When a day archive reaches 1 gigabyte (GB) in size, a sub day archive file is created for that date, and so on.

Because the day archives are date based and have the gigabyte size limit, backing up archived e-mail is incremental. Once a day archive reaches its limit, you can move it to a separate drive (or Document Store) from the current default for archiving. This is how EAS improves the efficiency and speed of backup processes. The recovery process is quicker as it then becomes necessary to only restore a specific day archive, versus complete information stores.



2.1.3 Augment disaster recovery

Many organizations have some form of disaster recover strategy for their MS Exchange environment. Regardless, restoring an MS Exchange server is still tedious and time consuming. EAS provides a simple restore interface for administrators to access the archive and select items, folders, or mailboxes to be restored instantly.

There are a number of scenarios where the EAS restore can save time and resources. Further to the restore feature, other tools such as check pointing and the ability to snapshot an archive (without really archiving) can improve your response to disaster.

2.1.4 PST file management

Managing PST files is generally a daunting task for any system administrator. As PST files can be downloaded to local systems, information splintering occurs, and local desktop systems are often not included in a corporate backup strategy in larger organizations. Individual users are mostly allowed to control the creation of their own PST files and this can easily lead to information being duplicated multiple times, and take information out from under protection of corporate backup procedures.

As well as providing the ongoing archive service for MS Exchange, EAS is able to migrate the contents of all existing PST files into the central archive. The EAS PST migration delivers huge space savings by bringing back single instance storage (SIS) to the PST data (creating PST files break MS Exchange level (SIS)) and by applying compression at an average ratio of 2:1. The EAS gathering feature migrates PST data from local/shared drives directly to the archive. Once archived, users can access their PST messages via stub files (in the PST folder, or Outlook) or through full text searching.

2.1.5 Increase user productivity

EAS can help minimize the housekeeping requirements on a mailbox by automatically managing mailbox storage and by providing housekeeping of archive pointers, thus keeping users under their storage limits. This allows users to focus more on using e-mail instead of managing e-mail.

The archiving is typically configured to require no user intervention. EAS does not disrupt or lock Outlook while archiving, thus no downtime is required to manage storage. Furthermore, all user retrieval of archived items is done through Outlook by simply double-clicking the archive pointer. When users retrieve an archive, the authentication is transparently based on the user's Outlook profile. Without overhead, EAS improves the way users go about their daily messaging.

2.2 Information Management with EAS

Today many businesses' records management practices are under intense scrutiny. One of the major benefits achieved from enhanced storage management is the ability to properly manage and implement e-mail retention and disposition (purging) schedules. With EAS, storage management of e-mail that is required in long-term corporate memory is now made feasible without any storage or performance impact to Exchange.


Some organizations try and accomplish e-mail management through PST files. However, using PST files puts the information at risk of not being backed up, and can also put an organization at risk towards the liabilities associated with careless e-mail management practices. Legal advisers, not always the most informed on the operational and technical details of messaging, tend to overlook that rotating backups and deleting known copies will not guarantee a deleted file. When it comes time to purge items that have expired their retention periods, traditional means of deleting e-mail are proving ineffective due to the duplicate copies that typically exist in PST files or across other servers and desktops within the organization.

Given that an EAS Server (archiving service) running on NEC's Express5800/ft fault tolerant server is so vastly scalable and truly fault tolerant, most organizations (regardless of size and volume) are able to establish a central archive store that stays on-line truly 24x7. From the central archive, corporate e-mail retention can be ensured more efficiently. The ability of EAS to centrally scale across multiple Exchange databases, servers, and sites (in conjunction with the

PST file gathering, OST file synchronization, and advanced full-text search [via EAS-Search - powered by AltaVista]), provides the most effective means of ensuring your company's e-mail management practices are inline with corporate, industry standard, accepted best-practices, and federal regulations.



3 **Fault Tolerant Servers and High-Availability for Exchange and EAS**



Fault tolerant servers provide the highest level of hardware availability. Conceptually, fault tolerant (FT) servers are a simple extension of the hardware redundancy of single-node servers from “crucial” components to all of the components. Until recently, the technology was cost prohibitive for small to mid-size organizations (and even some large organizations). Such servers did not support commodity operating systems such as Microsoft Windows® and often required that applications be completely custom or have large amounts of modification (leading to extremely high maintenance costs).

The key technological obstacle to fault tolerant servers has been to provide instruction-level redundancy. It is relatively easy to mirror disk drives, duplicate memory, and provide redundant network interfaces. Providing a “mirror” of the CPU has been the primary technical challenge. The CPU maintains a tremendous amount of “stateful” information.

Recent advances in FT servers have driven the cost down and allowed the use of industry-standard operating systems and commodity hardware. Placing any application on an FT server makes it immediately fault tolerant with minimum planning. While many IT organizations with FT servers choose high-end external RAID disks, it has possible to use less expensive internal RAID storage. IT organizations now have the opportunity to deploy a fault tolerant server that costs less to purchase and manage than most clusters, while providing a higher degree of availability.

3.1 **Benefits of Microsoft Exchange on a Fault Tolerant Platform**

NEC is one of the first vendors to offer a fault tolerant server running the Microsoft Windows 2000 Advanced Server platform. NEC Express5800/ft servers offer continuous availability with a starting price below US\$20,000. Fault tolerant systems like the Express5800/ft series go beyond high availability, into the realm of “continuous availability.” A continuously available server is designed to deliver 99.999% uptime, averaging 5 minutes of unplanned downtime per year. This includes time spent repairing failures, installing upgrades, and performing maintenance. By providing a fault tolerant server, a node of the server can fail, and the server will still be on-line and processing transaction and information.

NEC's Express5800/ft servers address the drawbacks of clusters and redundancy by offering;



- Significant reduced initial and ongoing costs versus a cluster
- Duplicate and redundant licensing not required presenting further costs savings
- One of the highest levels of availability in the industry
- Zero fail-over time should a hardware failure occur
- Protection against failure of CPU, memory, I/O cards, disk, and power supplies
- The simplest high-availability solution to install and maintain
- No application customization to run under Windows 2000 Advanced Server
- No specialized personnel or applications required to operate in a cluster
- Service with no experienced IT staff onsite (especially advantageous for remote sites)
- Field replaceable units of major subsystems requires no specialized training


	FT series 	Cluster solution
Availability	99.999% 5 min. average/year	99.9% >8 hrs. average/year
Recovery time	Zero switchover	Minutes of <u>failover</u>
Performance	No impact	Potentially serious impact
Data loss	None (memory & disk)	Disk protection
System integrity	Complete	None
Implementation	No work required	Script development & testing
Application modification	None required	Recommended
Operating system	Single system image	Multi-system cluster
IT support	Lights out	Extensive

Figure 2: NEC Ft versus Cluster Solutions

Replicated fault tolerant subsystems—CPU, PCI, memory, hard drives, and power supply—virtually eliminate any single point of failure. The replicated subsystems operate in lockstep, processing the same instructions at the same time, with automatic fail-over to the redundant subsystem should a problem occur. In the event of a hardware failure, users can replace subsystems while the server and application continues to run. NEC Express5800/ft servers are cost-effective, requiring only a single copy of the operating system and applications. They run Microsoft Windows 2000 applications, eliminating the need for customized or modified software. With messaging downtime costs averaging \$1000 per hour*, the benefits of running Microsoft Exchange on a fault tolerant platform such as the Express5800/ft are evident.

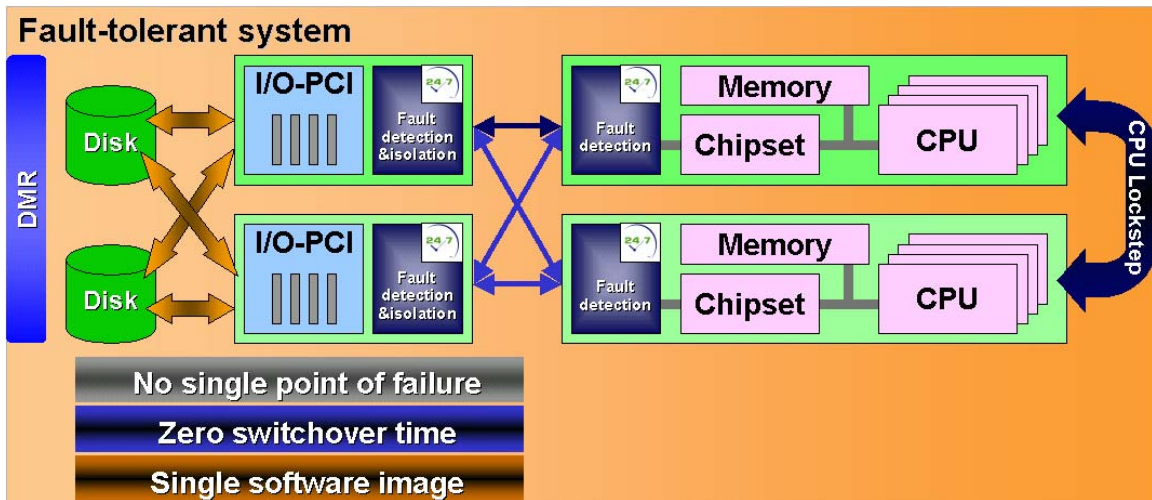


Figure 3: NEC Ft Architecture

3.2 Exchange storage archives on a Fault Tolerant Platform

As Exchange being available on a fault tolerant solution improves its' availability, the access to the message stores becomes of critical nature. Deploying EAS on a fault tolerant server raises the availability of the archive store to the same level as the Exchange server. As there are a number of options available for storage locations for the NEC/ft servers, the availability and access of information is an easy problem to resolve.

* Source: Standish Group, ©2001

4 Conclusion

E-mail embodies one of the most important intellectual assets to an enterprise. Effective management of Exchange information stores, combined with a highly available hardware platform for both Exchange and the storage management, increases ROI by:

- Reducing storage requirements
- Providing a simple, fast, and efficient storage format & backup regime
- Enabling quick and secure e-mail archival and recovery
- Minimizing Exchange downtime due to hardware outages

Rand IT Solutions is pleased to deliver the combined solution of EAS and NEC Fault Tolerant Servers to enterprises deploying Exchange that are concerned with availability and storage. The mission of RAND IT Solutions is “to positively impact their customer’s business by providing innovative IT solutions and support which improves system management, performance, integrity, and availability”. This solution presents such an impact.

The key environments RAND IT Solutions focuses on are: mission-critical / high-availability enterprises, e-commerce customers, ASP organizations and virtually any company engaged in cycle-time reduction initiatives as they relate to the product development process. RAND IT Solutions’ long history of providing highly complex mission-critical engineering solutions has given them the depth of knowledge and experience needed to understand these environments and to effectively deploy and support them.

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NEC Express5800/ft series servers: <http://www.necft.com>

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About RAND Worldwide



RAND Worldwide is one of the world's leading providers of engineering services and technology to manufacturers looking to optimize their Product Lifecycle Management (PLM) processes. Unlike traditional CAD/CAM/CAE/PDM technologies, PLM provides collaborative solutions to define and manage information throughout the complete product lifecycle and across the entire extended enterprise. PLM helps organize and facilitate secure access to product information by everyone who needs it – from those involved in initial product design to users in manufacturing, sales, marketing and maintenance, as well as business partners and suppliers. As the world's only independent global engineering technology provider, RAND Worldwide employs 1,200 people in more than 100 international sales and client service centers. The company's corporate head office in Mississauga, Ontario, Canada can be reached at 905-625-2000 or through the Internet at www.rand.com

About NEC Solutions (America), Inc.

NEC Solutions (America), Inc. is a leading provider of business solutions and services for the high-end commercial and professional markets in North America. As an affiliate of NEC Corporation (NASDAQ: NIPNY) (FTSE: 6701q.l), NEC Solutions America supplies customized technology solutions, including presentation systems, enterprise computing products, biometric and information security solutions, advanced eBusiness integration systems, and professional IT/IS services. Information about NEC Solutions America can be found at www.necsolutions-am.com.

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About EDUCOM TS Inc.

EDUCOM TS Inc. is an Ottawa-based software development firm specializing in email management. EDUCOM products help clients protect corporate intellectual property, enhance user access to information, and reduce e-mail server overload. Flagship products include Exchange Archive Solution (EAS), offering intelligent storage management for Microsoft Exchange mail stores; and EAS-Wireless, designed to manage the overwhelming quantity of e-mail with which mobile users have to manage. EDUCOM has established strategic relationships with Essential Computing, SOARsoft, FreTech, Kenfil, Warrior Sys, Microsoft, Auspex Systems, EMC, NEC, AmikaNow!, eManage, CompuSven, KOM, and IBM. For more information, visit www.educomts.com.

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