October 2003
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Ontrack® PowerControls™ 2.0: Comparative Analysis with Exchange 2003 Recovery Storage Group

Test report prepared under contract from Ontrack Data Recovery

Executive summary

Ontrack commissioned VeriTest to perform a comparative analysis of their Ontrack PowerControls 2.0 Mailbox Recovery application and Microsoft's Exchange 2003 Recovery Storage Group.

PowerControls debuted on the market in mid-2002 and Exchange 2003 was released to manufacturing in Aug 2003.

With the release of the new Microsoft Exchange Server 2003 comes a new feature called the Recovery Storage Group. It provides access to a backup copy of the live Exchange database file (EDB) mounted within the same server, creating the secondary back up mailbox storage group. The Recovery Storage Group feature also supports databases in Exchange 2000 (provided that the operating system is at least Exchange 2000 Server with Service Pack 3 installed).

Key findings

- Ontrack PowerControls 2.0 is a complete recovery application that only requires Outlook97 or higher.
- Ontrack PowerControls 2.0 is compatible with disk and tape backups created by Microsoft NT Backup, Veritas BackupExec, Legato Networker, and Brightstor ArcServe formats. Exchange Server does not contain any support to directly read disk or tape backups
- Restoring data in Ontrack PowerControls 2.0 can be handled from an entire database level down to the individual message level. Microsoft's Exmerge only handled restoration at the mailbox level.
- Ontrack PowerControls has a complete searching capability while Exchange Server does not employ this feature.
- Ontrack PowerControls is easier to configure for remote installation and deployment.

To restore individual mailboxes, Microsoft provides a download from their web site called the Exchange Mailbox Merge utility, otherwise known as Exmerge. With this application, an administrator can restore individual mailboxes from the Recovery Storage Group to the main storage group. The restoration process is performed at the mailbox level, and not the folder or message levels.

Ontrack's PowerControls 2.0 provides mailbox recovery functionality to Exchange Server's architecture with direct access to the production Exchange server, including individual mailboxes, folders, messages, calendar, notes, and tasks. PowerControls supports direct access to the various related file formats, such as EDB, and PST as well as removable storage access. PowerControls also supports Microsoft NT Backup files on local, networked, and removable storage drives, while Exchange Recovery Storage Group and the Exmerge utility do not support access to Microsoft NT Backup files from any source. Furthermore, PowerControls supports four different tape formats: Microsoft NT Backup, Veritas BackupExec, Legato Networker, Brightstor ArcServe.

PowerControls has an advantage over Exmerge in running remotely from any workstation that has authorization and access to the Exchange Server. Additionally, PowerControls uses full text searches to allow

the administrator to manually verify successful database backups and use the results for the customized and detailed restorations. PowerControls gives the administrator the ability view the individual emails, including any attachments, directly from the Exchange database.

Unlike the Microsoft's Exmerge utility, PowerControls 2.0 incorporates a simple user interface that displays an overall picture of the listed source and target databases within a two-tiered management console. The console also provides an option for a third tier designated for a preview pane to view the highlighted emails being selected for restoration.

PowerControls employs complete and easy to follow wizards for designating these source and targeted databases as well as the restoration process. Exmerge is a simple wizard driven application with no management interface to use afterwards, leaving the management of the main and backup databases handled in a limited basis in the System Manager console of the Exchange Server. Additionally, Exmerge requires the Microsoft NT Backup application to extract data from the backup files and to restore data from removable storage devices, while PowerControls comes with its own extraction utilities.

The System Manager interface in Exchange Server does not employ any of the extensive search or view functionality found in PowerControls. Another limitation is Exchange's Recovery Storage Group requires Active Directory to exist for each mailbox to be recovered. PowerControls can act independently in the recovery phases.

PowerControls also has the ability to read various tape and disk formats other than Microsoft NT Backup on removable storage devices, such as Brightstor ArcServe, Veritas BackupExec, Legato Networker.

We found that both applications we tested for Exchange data restoration were effective, but we did experience some issues when maintaining database integrity with Exchange 2003 Recovery Storage Group. After using the Exchange Recovery Storage Group in accessing the Exchange database, we were unable to regain access using PowerControls. For example, after using Exchange 2003 Recovery Storage Group to access the private EDB file, we installed PowerControls and attempted to access the same database. When this failed, we restored the original version of the database from our removable tape device using ExtractWizard and did not experience any further problems. After using PowerControls on this version of the EDB file, we could still access it using Exchange 2003 Recovery Storage Group

According to Ontrack, PowerControls maintains complete read-only accesses to source database files and has the advantage of never altering the source files and does not rely on Microsoft DLL file to read the database. Our evaluation appeared to concur with this statement.

Testing methodology

Ontrack commissioned VeriTest to perform a comparative analysis of their Ontrack PowerControls 2.0 Mailbox Recovery application and Exchange 2003 Recovery Storage Group.

Ontrack's PowerControls 2.0 provides mailbox recovery functionality to Exchange Server's architecture with direct access to the production Exchange server, including individual mailboxes, folders, messages, calendar, notes, and tasks. PowerControls supports direct access to the various related file formats, such as EDB, and PST as well as removable storage access.

The purpose of our evaluation was to analyze each application and compare the benefits and functionality in restoration with Exchange 2003 databases. We reviewed how each solution accessed the Exchange 2003 databases and files, how detailed and in depth each could explore the databases, including the search and sorting options, ability to write and extract from various backup files and removable storage devices and to discover which presented itself as the more complete package of the three.

Hardware Testbed

The systems used for purposes of this test were as follows:

- **Server:** Dell PowerEdge 4400 (2 x 1 GHz Pentium 4 processors with 2 GB of RAM), running Windows 2000 Server, Service Pack 4, and Exchange Server 2003.
- **Workstation:** Hewlett Packard Pavilion 8565C (1 x 500MHz Pentium III processor with 128 MB of RAM), running Windows 2000 Professional, Service Pack 4
- **Removable Storage:** Quantum Super DLT (Model SDLT320) attached to the Dell PowerEdge system via Adaptec AHA-2940 Ultra-wide SCSI PCI adapter.
- **Switch:** Compaq Netelligent 10/100 Base-TX Ethernet (full duplex)

Exchange Server and Database Generation

After installing the operating systems and the Exchange Server, we generated the Exchange database (EDB files) using Microsoft's Loadsim 2003 application available on Microsoft's web site (http://www.microsoft.com/downloads/details.aspx?FamilyID=92eb2edc-3433-47ca-a5f8-0483c7ddea85&DisplayLang=en). We configured the utility to generate a database with the following criteria:

- 100 users
- 100 folders
- 3 messages in the Inbox
- 3 deleted messages
- 3 message in each folder
- 5 smart folders
- 5 rules in each inbox
- 25 number of appointments
- 64 contacts

We also created Outlook message file (MSG) with HTM, GIF, and EXE attachments, copied from the Veritest E-mail Test Tool version 1.0. The following messages were included in the topology creation:

- 3 KB gif file attachment
- 11 KB htm file attachment
- 22 KB htm file attachment
- 41 KB htm file attachment
- 530 KB htm file attachment

Each was assigned with a 15% weight option when generating the messages. The remaining default messages were assigned in the following manner:

- oups1k.msg (1%)
- oups2k.msg (1%)
- oups4k.msg (1%)
- oupsWDatt.msg (1%)
- oupsXLatt.msg (1%)
- oupsBMobj.msg (5%)
- McPP1Matt.msg (5%)
- McPP100katt.msg (5%)
- McWD2Matt.msg (5%)

The resulting Exchange database measured at a total of 9.47GB. Once generated, we backed up the complete Exchange Server database and log files to our SDLT cartridge in the Quantum SDLT Tape Drive attached to our Exchange Server. These files were restored after using and evaluating each application.

Software

Ontrack PowerControls 2.0 was supplied to us on CD from Ontrack.

Microsoft's Exmerge utility was downloaded from Microsoft's web site (http://www.microsoft.com/downloads/details.aspx?FamilyID=429163ec-dcdf-47dc-96da-1c12d67327d5&DisplayLang=en).

Evaluation Criteria

After setting up our test network systems, we proceeded through the installation and functionality processes of each application. In our comparison criteria, we evaluated the following areas of each product.

Documentation
- Details and thoroughness in how the content addressed the issues.
- Online support for any unresolved issues

Ease of install and setup
- Size of the installed application
- Setup and options for each product

Ease of Use
- User interface
- Search functionality

Restoration from removable storage tapes

Storage Access Compatibility
- EDB private files
- EDB public files
- STM files
- Log files
- PST files
- Exchange 5.5 databases
- Exchange 2000 databases
- Exchange 2003 databases

Tape Support
- Microsoft NT Backup
- Veritas BackupExec

- Legato Networker
- Brightstor ArcServe

Performance

- Database extraction from tape
- Restore mailbox to main Exchange database
- Restore mailbox to PST file

Test results

This section provides the details of the testing we conducted. Please refer to the Test Methodology section of this report for complete details of how we conducted the tests.

Documentation

For Microsoft's Recovery Storage Group feature in Exchange Server, the documentation is incorporated in the Exchange Server help files. The Exmerge utility contains a 70-page Rich Text Format (RTF) document in the download. Microsoft's Knowledge Database contains several searchable entries regarding both the Recovery Storage Group function and the Exmerge utility including examples and steps of procedures.

PowerControls 2.0 also includes a thorough help file in the installation as well as a 79-page Adobe PDF document full of examples and illustrations. For additional troubleshooting, Ontrack provides a searchable knowledgebase on their web site allowing including error message descriptions and other troubleshooting tips.

Ease of install and setup

Figure 1 below is a comparison of the installation requirements for each application and the variety of operating system and external applications compatibility.

System Requirements	Microsoft Recovery Storage Group/ Exmerge Utility	Ontrack PowerControls 2.0
Windows NT 4.0		**X**
Windows 2000	**X**	**X**
Windows XP	**X**	**X**
Windows 2003	**X**	**X**
Outlook 97		**X**
Outlook 2000/2003	**X**	**X**
Exchange DLL files	**required**	**does not require**

Figure 1: System requirements for each application

For Microsoft, the Recovery Storage Group feature is already built into Exchange Server, so no additional installation is necessary. The Exmerge utility is downloaded from Microsoft's web site, extracted into the bin directory of the Exchange Server installation, and used locally on the Exchange Server. Installing Exmerge into a separate directory requires the following DLL's be placed into the installation directory.

- ExMerge.exe
- ExMerge.ini
- Dapi.dll
- Emsabp32.dll
- Emsmdb32.dll
- Emsui32.dll
- Emsuix32.dll
- Exchmem.dll
- Libxds.dll
- Mapi32.dll

We were unsuccessful in using the Exmerge utility on our remote workstation as it required the Exchange Server to be used on the same system.. Once extracted, the program and included documentation was no more than 4.05 MB in size.

PowerControls can install on Microsoft operating systems from Windows NT 4.0 to Windows 2003 Server and works with Exchange database from Exchange Server 5.5 to 2003. The installation took no more than one minute and we were able to use the application immediately after the installation process was finished. PowerControls has one outside application requirement for installation and that is Microsoft Outlook, versions 97 to 2003. The folder in which the program occupied was 3.56 MB in size.

Ease of Use

Figure 2 below is a comparison of the various capabilities and features of the applications as evaluated.

Storage and Database Types	Microsoft Recovery Storage Group/ Exmerge Utility	Ontrack PowerControls 2.0
View		
View both source and target in one interface		X
View multiple cases of sources and targets in one interface		
Integrated preview pane		X
View messages		X
View attachments		X
Sort		
Sort messages by various categories		X
Sort mailboxes by categories	X	X
Search		
Search by folder		X
Search by mailbox		X
Search by entire database		X
Search by words in subject line and/or body of message		X
Search by excluding words in conjunction with above		X
Search by sender		X
Search by recipient		X
Search by date	X	X

Figure 2: Features and capabilities comparison

Storage and Database Types	Microsoft Recovery Storage Group/ Exmerge Utility	Ontrack PowerControls 2.0
Restore		
Restore by entire database		X
Restore by entire mailbox	X	X
Restore by folder		X
Restore by message		X

Figure 3: Features and capabilities comparison (contd)

Exchange 2003 / Exmerge

Microsoft handles all of the recovery functions through the Service Management Console in Exchange Server and the wizard available in the Exmerge Utility. It is a simple tool used to recover data from a mailbox, database, or groups of databases in a single storage group, from one secondary database to the main database in production.

Figure 3 below shows the Service Management Console in Exchange 2003 where the storage groups are mounted for administration. They are listed below the Servers directory and are divided up among the Exchange servers included within the domain.

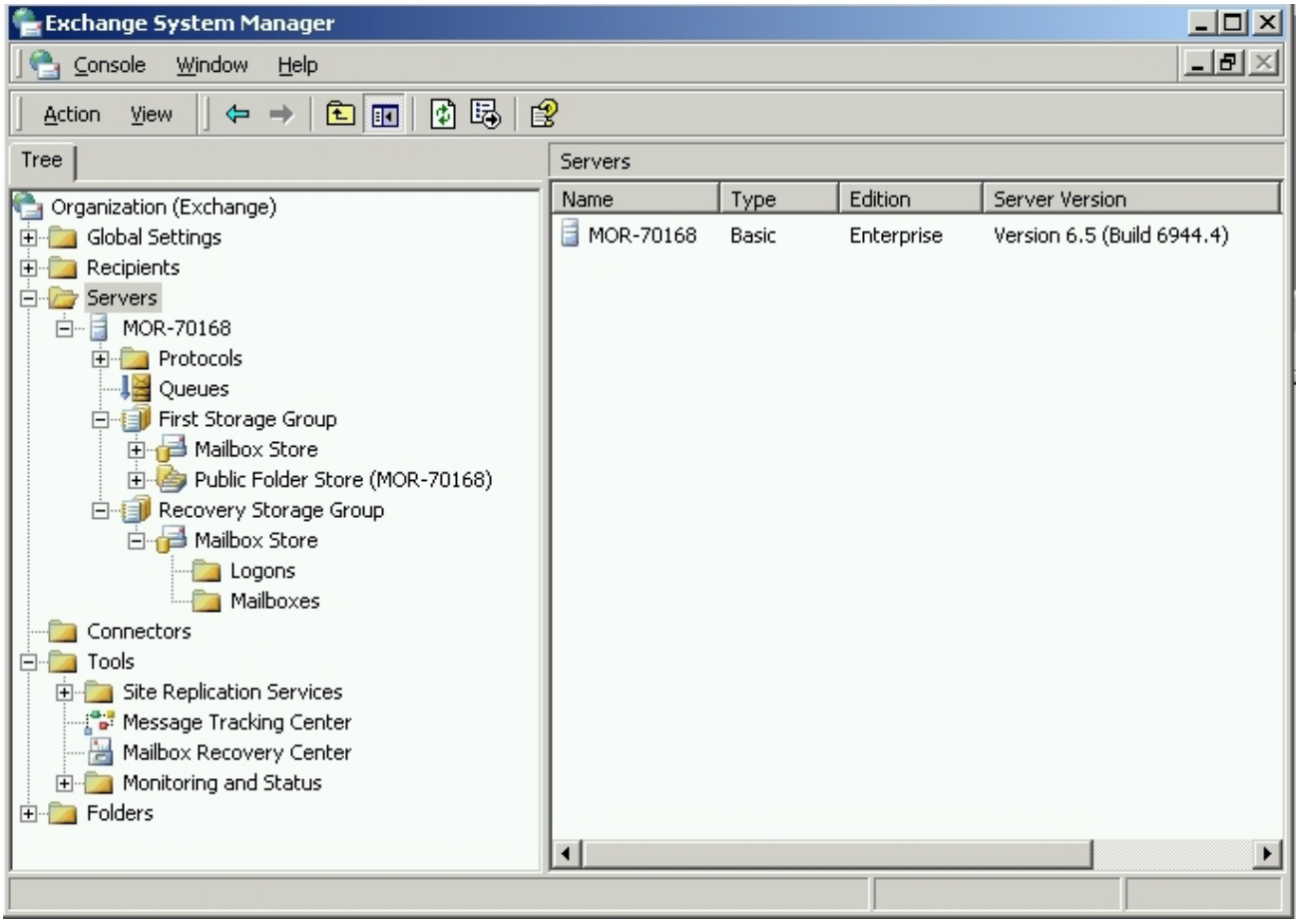

Figure 4: System Manager console in Microsoft Exchange 2003

Recovery Storage Group in Exchange requires Microsoft Active Directory to exist for each mailbox to be recovered. Hence, the Active Directory structure on the system running Exchange Server 2003 must be maintained and in the same state when the backup copy of the database was made. Another consideration is that the mailboxes needing recovery can not be deleted or purged from the system, or moved to a different database, either on the same server or other existing Exchange servers.

According to Microsoft's support documents, the Recovery Storage Group feature in Exchange 2003 is not intended for use in disaster recovery involving multiple servers or multiple storage groups. It was designed as a substitute during cases where an auxiliary forest recovery server was needed. Therefore, as Microsoft states on their web site, the two conditions that must exist to use Recovery Storage Group is when the Active Directory structure relating to the storage group and mailboxes is intact and unchanged, and when the data to be recovered is contained in a single storage group.

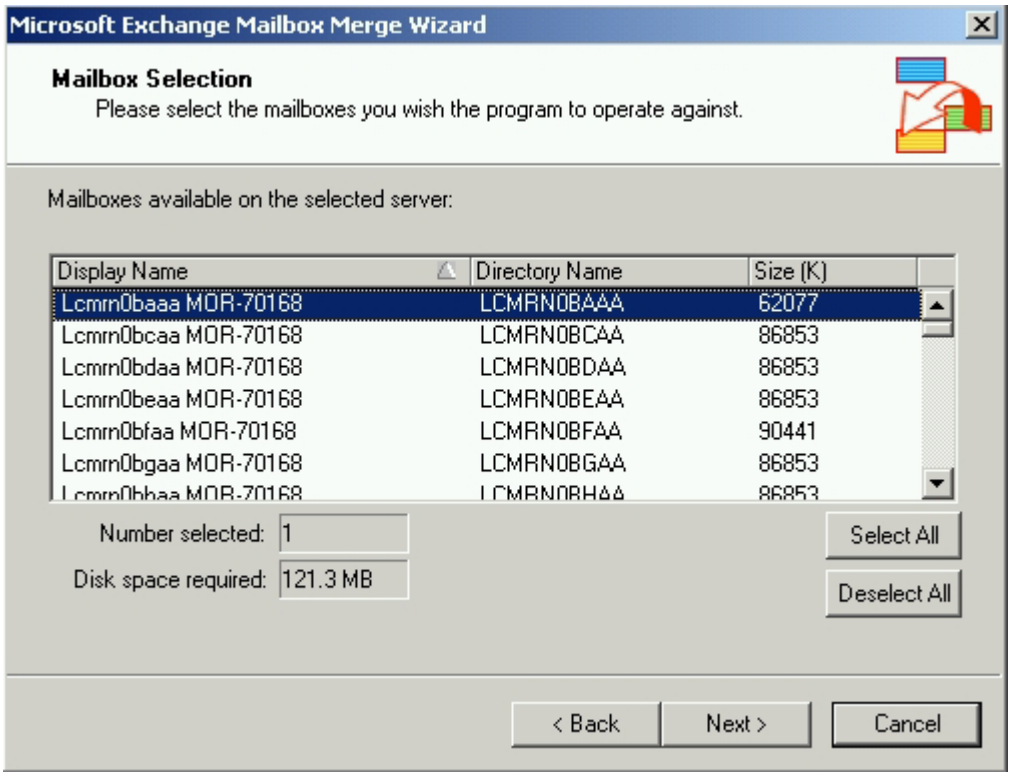

Figure 5: Exmerge Wizard listing the mailboxes to restore

Figure 4 above is a screenshot of the Exmerge Wizard during the extract process from an Exchange EDB file. The search and restoration process only allows access on the individual mailbox level with no access to the individual emails in each mailbox.

PowerControls

Figure 5 on the following page is a screen shot of the PowerControls user interface. The interface uses a three-tier layout showing the source database at the top, the target database in the middle, and the preview pane at the bottom. The preview pane does not require any additional software to be installed and can be disabled to limit the interface to a two tier system only showing the source and target databases.

Additionally, when reviewing the databases, the user has the ability to sort the mailbox lists by order of the categories listed at the top of each pane. In the example below, the messages could be sorted by the sender, subject, or date sent.

Here, restoration can be performed at the message level, by mailbox, or the entire database. The administrator can also use the search function to locate selected message to restore.

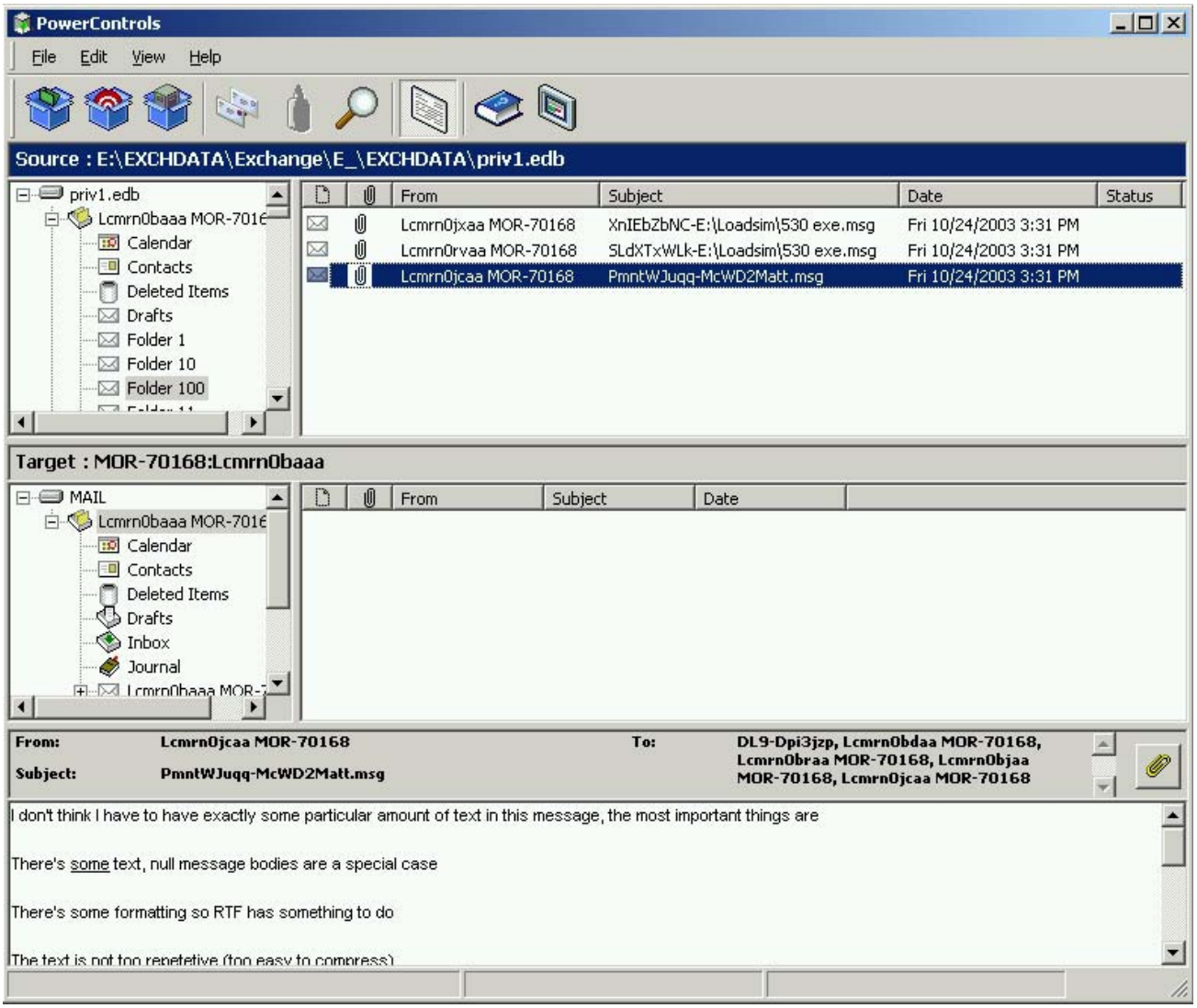

Figure 6: PowerControls 2.0 user interface

Figure 6 on the following page shows the various manners in which the administrator can search the database at the message level. The search engine allows for subject line and/or body Boolean text searches, including exclusionary parameters. Other parameters include sender and recipients names as well as date ranges.

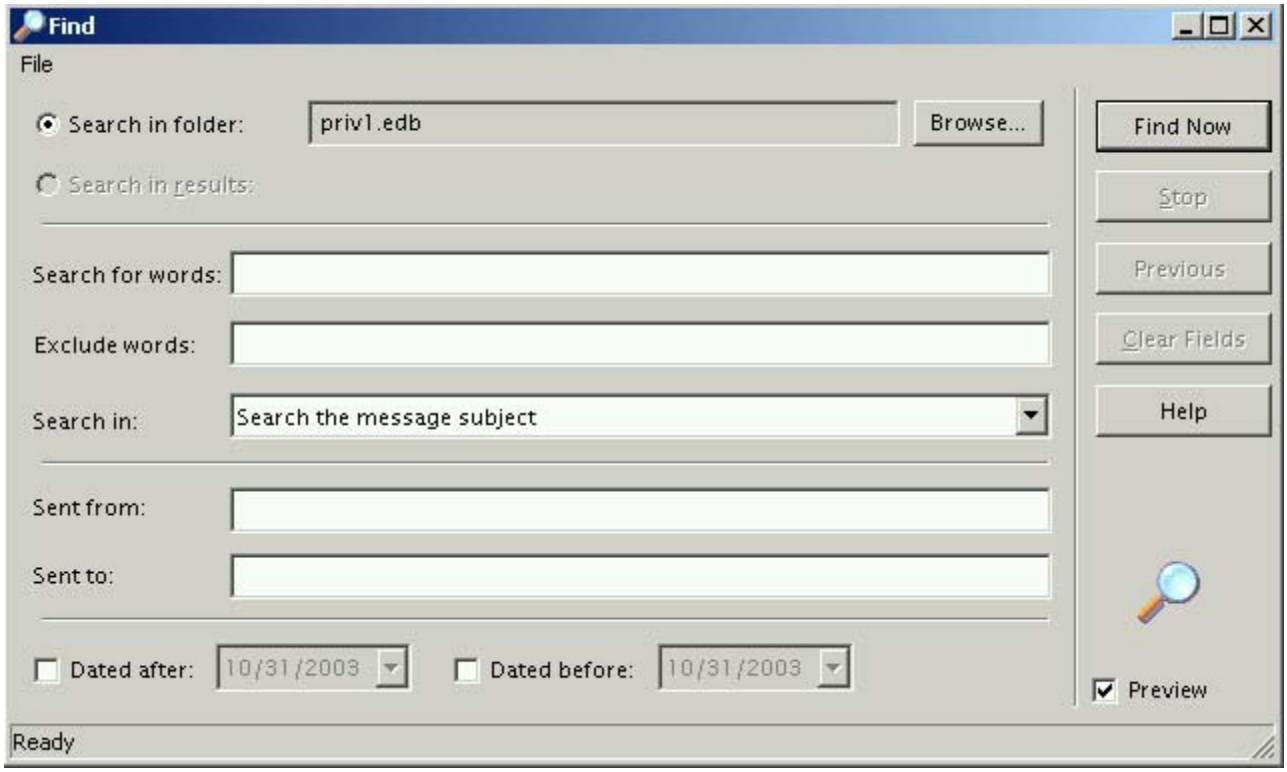

Figure 7: Search interface in PowerControls 2.0

Removable Storage Devices

Removable storage device access	Microsoft Recovery Storage Group/ Exmerge Utility	Ontrack PowerControls 2.0
Access media from SDLT tape drive	**Require Microsoft NT Backup**	**Uses ExtractWizard utility included with installation**
Individual file restore	**X**	**X**
Incremental and Differential access	**X**	**X**

Figure 8: Restoration access to removable storage devices

The Microsoft Exmerge utility does not access data on removable storage drives and relies on the Microsoft NT Backup program included in Windows 2000 Server to extract and backup exchange data.

PowerControls comes equipped with the ability to access the data on removable storage devices. PowerControls is equipped with a utility called ExtractWizard that scans the removable storage devices attached to the system, lists all catalogs on the backup cartridge and allows the administrator to select and choose which backup to restore with the PowerControls program.

Storage Access Compatibility

In Figure 11 below, we list the various Exchange Server related file types and compare the ability of each application to support them.

Storage and Database Types	Microsoft Recovery Storage Group/ Exmerge Utility	Ontrack PowerControls 2.0
EDB Private Files	**X**	**X**
EDB Public Files		**X**
STM Files	**X**	**X**
Log Files	**X**	**X**
PST Files	**X**	**X**
Exchange 5.5		**X**
Exchange 2000	**X (SP3 only)**	**X**
Exchange 2003	**X**	**X**
Read-only access (does not alter database files and maintains integrity)		**X**

Figure 9: Compatibility to support Exchange Server storage and database files types

Exchange Recovery Storage Group recovers mail from Private Store databases in Exchange 2000, Service Pack 3 and Exchange 2003. It does not support Exchange 5.5 or any Exchange2000 backups created prior to applying Service Pack 3. It does not support Public Store databases.

We also found that using PowerControls to access and extract data from the Exchange server database files did not alter them and by maintaining a read-only access. After using the Restore Storage Group feature in Exchange, we could not access the same file with PowerControls. Conversely, after using PowerControls on the database files, we could access the same databases with the Exchange 2003 Server without experiencing any errors.

Tape Format Compatibility

Figure 12 below is a comparison of each application's ability to access the various backup formats on disk or removable storage.

Tape Formats	Microsoft Recovery Storage Group/ Exmerge Utility	Ontrack PowerControls 2.0
Microsoft NT Backup (stored on disk)		X
Microsoft NT Backup (stored on tape)		X
Veritas BackupExec (stored on disk)		X
Veritas BackupExec (stored on tape)		X
Legato Networker (stored on disk)		X
Legato Networker (stored on tape)		X
Brightstor ArcServe (stored on disk)		X
Brightstor ArcServe (stored on tape)		X

Figure 10: Comparison of the compatible storage formats

PowerControls is the only application that can access backup data stored in all the formats listed above, illustrating its capability to work with the more popular standards of enterprise data security, backup, and restoration. For the Exmerge utility, the administrator would have to run the appropriate backup program to extract the data.

Performance

Figure 13 below is a comparison of the performance time to restore one mailbox to the main Exchange database and to an individual PST file. The test mailbox was 85.84MB in size.

Restoration Task	Microsoft Recovery Storage Group/ Exmerge Utility/ NT Backup	Ontrack PowerControls 2.0 and Extract Wizard
Restore mailbox to main production database	**50.27 seconds**	**32.14 seconds**
Restore mailbox to PST file	**46.36 seconds**	**15.19 seconds**

Figure 11: Comparison of the individual mailbox restoration performance times

In both restoration tasks, PowerControls was the quickest in mailbox restoration, taking approximately 63.93% of the time with Exchange 2003 Recovery Storage Group, in the restoration to main production database and 32.77% of the time restoring to a PST file.

Figure 14 below is a comparison of the performance time to restore a database from the removable storage device to a local drive. The database was measured a total of 9.47GB in size.

Application and Process	Time (MM:SS.SS)
Microsoft NT Backup	
Catalog	04:41.67
Tape Loading	01:25.77
Searching	00:51.60
Extraction	09:27.31
Total Time	**16:26.35**
PowerControls ExtractWizard	
Scanning/Catalog	05:05.35
Extraction	09:30.27
Rewinding	00:40.41
Total Time	**15:16.03**

Figure 12: Comparison of the backup database restoration performance times

Similar to the individual mailbox restoration time in Figure 13, PowerControls required the least amount of time in extracting the near 10GB database with its ExtractWizard at 15 minutes and 16.03 seconds. ExtractWizard showed the fewer process phases (3), possibly attributing to the quicker turnaround.

ExtractWizard does allow for a Pre-scan option in the scanning process option to evaluate and display an accurate time needed to restore the data, but we disabled it for the purposes of this test since Microsoft NT Backup does not possess the same feature. With Pre-scan enabled, the restoration process can take noticeably longer.

Appendix A – Equipment Disclosure

Exchange Server	
Machine Type	Dell PowerEdge 4400
Processors	2 x 1.0 GHz Intel Pentium 4
L2 Cache	256KB
Memory	2GB RAM
Disk(s)	7 x 9.2GB Quantum Ultra3 SCSI hard drives
Network Adapter(s)	Intel PRO/100 MB Ethernet network adapter
OS	Windows 2000 Server, Service Pack 4

Figure 15: Specifications of the system running Exchange Server

Workstation	
Machine Type	Hewlett Packard Pavilion 8565C
Processors	1 x 500 MHz Pentium III
L2 Cache	256KB
Memory	128 MB RAM
Disk(s)	Quantum Fireball CX 3.5 Series (20 GB)
Network Adapter(s)	Intel PRO/100 MB Ethernet network adapter
OS	Windows 2000 Professional, Service Pack 4

Figure 16: Specifications of the system running remote workstation software

Removable Storage	
Machine Type	Quantum Super DLT (Model SDLT320)
Capacity	160/320 GB
SCSI Connection	Adaptec AHA-2940 Ultra Wide PCI adapter
Cartridge	Quantum Super DLTtape I

Figure 17: Specifications of the removable storage device

Switch	
Switch	Compaq Netelligent
Configurations	100 MB at full duplex
Segments	1 Class C subnet segment

Figure 18: Specifications of the switch connecting the systems on the network

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VeriTest created the suite of industry-standard benchmark software that includes WebBench, NetBench, Winstone, and WinBench. We've distributed over 20 million copies of these tools, which are in use at every one of the 2001 Fortune 100 companies. Our Internet BenchMark service provides the definitive ratings for Internet Service Providers in the US, Canada, and the UK.

Under our former names of ZD Labs and eTesting Labs, and as part of VeriTest since July of 2002, we have delivered rigorous, objective, independent testing and analysis for over a decade. With the most knowledgeable staff in the business, testing facilities around the world, and almost 1,600 dedicated network PCs, VeriTest offers our clients the expertise and equipment necessary to meet all their testing needs.

For more information email us at info@veritest.com or call us at 919-380-2800.