

# **Mastermind Data Corporation Inc.**

Data Storage Management

*Mastermind Data Backup  
Getting Started Guide*

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# Mastermind Data Backup

## User's Guide

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## Overview

### 1.1 Benefits

- Easy Backup of
  1. Microsoft Exchange Server 2000 / 2003
  2. Microsoft SQL Server 7.0 / 2000
  3. Lotus Domino/Notes 5.0 or above
  4. Oracle 8i or above
  5. MySQL 3.2.4 or above
  6. Windows System State
  7. Outlook and Outlook Express (i.e. \*.pst, \*.dbx and \*.wab)
  8. Important personal settings, e.g. Desktop, Favorite, My Documents and History etc
  9. Other common files (e.g. \*.doc, \*.xls)
- Support backing up only changes within a file (using SmartUpload technology)
- Support backing up of open files on Windows XP/2003 (Volume Shadow Copy)
- Support backing up of Windows NTFS access privileges, Linux access privileges and modes, Mac OS X metadata and resource forks
- Easy to use, deploy and maintain

### 1.2 Features

- Full support of Microsoft Exchange individual email, contacts, calendars, tasks etc.
- Choose whether to restore "file permissions" during restore.
- For "Local Copy" backup, ability to choose whether to perform a local copy backup only and skip the offsite backup.
- Lotus Notes/Domino agent for Linux.
- Auto Upgrade Agent to automatically upgrade the client software.
- User configurable incremental / differential SmartUpload backup mode (i.e. backing up only changes within a file since the last incremental or full backup according to each user's preference).
- Allow SmartUpload backup mode to be overridden by each user individually according to backup time (e.g. enforcing full (or incremental or differential) backup of all files every Sunday or the 1<sup>st</sup> day of every month).
- Volume Shadow Copy backup (i.e. backing up files even when they are exclusively open, e.g. Outlook.pst).
- SmartUpload backup (i.e. backing up only changes within files).
- Off-line backup mode and logout backup reminder.
- Customizable backup schedule allows backups to be scheduled at any time.
- Compress and encrypt data automatically before sending them to the server (server stores only encrypted data).
- Increment backup strategy ensures that only new or updated files are sent to the backup server.
- Support both full backup (database backup) and incremental backup (transaction log backup) for Microsoft SQL Server 7.0/2000, Microsoft Exchange Server 2000/2003, Lotus Domino/Notes 5.0 and Oracle 8i or above.
- Can integrate with external "Open File Manager" to provide open file backup support to all open files.
- Access backup data anytime, anywhere by using a web browser.
- Comprehensive backup report lists all files backed up. Backup report delivered automatically via email.
- Backup data are CRC validated before they are stored on server.
- Fully user customizable data retention policy allows users to have access to deleted files using the least possible storage space on the backup server.
- Can select source backup files easily by using a backup filter, e.g. selecting all \*.doc and \*.xls in your computer in a single operation.
- Run any custom OS commands before/after a backup job.
- Run on Windows, Mac OS X, Linux, NetWare, Unix and all other platforms supporting a Java2 Runtime Environment.
- Periodic backup files validation on backup server ensures backup files are 100% valid and fully restorable when needed.

## 1.3 Security

- 128-bit point-to-point SSL communication between server and client
- Support HTTP/HTTPS Proxy and Socks v4/v5 firewall
- Data are 128-bit encrypted when stored on the backup server
- Choice of different encryption algorithms, e.g. Twofish, Triple DES, Advanced Encryption Standard (AES)
- Choice of different encryption modes, e.g. Electronic Cook Book (ECB) and Cipher Block Chaining (CBC)
- An random initializing vector, salt and iteration count will be generated by the software automatically for each file when encrypting your data
- Each backup user can restrict online access to his files to his pre-defined list of IP addresses

## 1.4 System Requirements

- **Operating System:**
  1. Windows 95 / 98 / ME / NT / 2000 / XP / 2003
  2. Linux kernel 2.2 or above \*\* (e.g. RedHat Linux 6.x or above, though the use of Linux kernel 2.6.9-34 or above is recommended)
  3. Solaris 2.x or above
  4. Mac OS X 10.2 or above
  5. NetWare 5.1 or above (with Perl v5.8.4 or above)
  6. All other operating systems that supports Java2 Runtime Environment 1.3.1 or above
- **Memory:** 128MB (minimum), 256MB (recommended)
- **Disk Space:** 100MB
- **Network Protocol:** TCP/IP (http/https)

\*\* Standard C++ libraries for backwards compatibility compiler (compat-libstdc++-x.x-y.y.y.i386.rpm) must be installed if you are not using a Linux 2.2 kernel. These libraries are required to run all Java applications.

## 2 Installing Mastermind Data Backup

Before you can start backing up data to the Mastermind Data Backup Server, you need to install the Mastermind Data Backup client onto your computer.

Start by creating an account on the control panel.

When creating an account relate the name to the business and name each computer by a number in the account to quickly identify them in reports i.e.: Masterser1 could be the first server at mastermind and mastercom1 could be the first computer and so on . The password is the encryption key so don't forget it and it is the restore key even if the customer changes the login password later.

### 2.1 Installing Mastermind Data Backup for Windows

1. Download the Mastermind Data Backup installer from your sign-up e-mail or go to [www.masterminddata.com/remote-backup-download.php](http://www.masterminddata.com/remote-backup-download.php)
2. Double click the icon to run the installer.
3. Follow on screen instructions.
4. After installation, Mastermind Data Backup will start automatically.

### 2.2 Installing Mastermind Data Backup for Mac OS X

1. Go to [www.masterminddata.com/remote-backup-download.php](http://www.masterminddata.com/remote-backup-download.php)
2. Expand the zip file.
3. Double click the pkg file icon to run the installer.
4. Follow on screen instructions.
5. After installation, the installer will need to **restart your computer**.
6. After restarting your computer, click the newly added Mastermind Data Backup icon on your desktop. You can manually drag the icon to your dock bar if you wish.

### 2.3 Installing Mastermind Data Backup for Linux

1. Please request links to the Linux download from Mastermind Data support staff.
2. Set the MasterminddataBackup\_HOME environment variable

```
# export MasterminddataBackup_HOME=/usr/local/MasterminddataBackup
```

3. Expand the client software to \$MasterminddataBackup\_HOME

```
# mkdir $MasterminddataBackup_HOME
```

```
# tar -x -C $MasterminddataBackup_HOME -zvf Mastermind Data Backup-linux.tar.gz
```

4. Install Mastermind Data Backup

```
# cd $MasterminddataBackup_HOME
```

```
# cd bin
```

```
# ./install.sh
```

5. Start the Mastermind Data automatic update program:

```
# /etc/init.d/MMbaud start
```

6. Start the Mastermind Data Backup scheduler

```
# /etc/init.d/MMbscheduler start
```

7. Run Mastermind Data Backup

```
# sh $MasterminddataBackup_HOME/bin/BackupManager.sh &
```

8. Note: If you are accessing this computer remotely, you will need to change the DISPLAY variable to point to the Xterm server you wish to use:

```
# export DISPLAY=IP_ADDRESS_OF_XTERMINAL[:0.0]
```

9. If you need to set it back to the default (for most Linux based systems):

```
# export DISPLAY=:0.0
```

## 2.4 Installing Mastermind Data Backup for Netware

1. Please request links to the Netware download from Mastermind Data support staff.

2. Expand the zip file to **SYS:\Mastermind Data Backup**

3. Install Mastermind Data Backup

```
SYS:\> SYS:\Mastermind Data Backup\aua\bin\install-aua.ncf
```

4. Start Auto Upgrade Agent

```
SYS:\> SYS:\Mastermind Data Backup\aua\bin\startup.ncf
```

5. Start backup scheduler

```
SYS:\> SYS:\Mastermind Data Backup\bin\Scheduler.ncf
```

6. Run Mastermind Data Backup

```
SYS:\> SYS:\Mastermind Data Backup\bin\BackupManager.ncf
```

### 3 Using Mastermind Data Backup

This chapter will describe all the features available in Mastermind Data Backup and outline how you can use Mastermind Data Backup to meet various backup needs.

#### 3.1 System Tray Launcher (Windows Only)

After you have successfully installed Mastermind Data Backup onto your computer, an Mastermind Data Backup icon will be added to the system tray area (next to your system clock) automatically.

This icon is the entry point to Mastermind Data Backup. Right clicking the icon will show a menu that provides the following functions:

Menu Item	What it does
Open	Run Mastermind Data Backup.
Backup	Runs a specific backup set (or all backup sets) chosen from the sub-menu in silent background mode.
Backup and Logoff	Runs a specific backup set (or all backup sets) chosen from the sub-menu in silent background mode and then logoff from Windows when finished.
Backup and Restart	Runs a specific backup set (or all backup sets) chosen from the sub-menu in silent background mode and restart Windows when finished.
Backup and Shutdown	Runs a specific backup set (or all backup sets) chosen from the sub-menu in silent background mode and shutdown the computer when finished.
Help	Shows a help dialog
Stop running backup	Interrupts a running backup set (or all backup sets) chosen from the sub-menu.
Exit	Close this system tray launcher application.

#### 3.2 Logon Dialog

Before you can use Mastermind Data Backup, you have to be authenticated by the Mastermind Data Backup Server first. The logon dialog shown below will check if you have the right to access Mastermind Data Backup by submitting the username and password you provided to the backup server.

**NOTE: Unless you have a custom deployment, the fields below will be filled in automatically, except your username and password.**

For secure communication, you can choose to communicate with Mastermind Data Backup Server in SSL (Secure Socket Layer) by selecting the [https] option.

The [Address] field shows the Mastermind Data Backup Server to which Mastermind Data Backup will connect to authenticate your username and password. You can use either a resolvable host name (e.g. backup.your-domain.com) or an IP address (e.g. 192.168.1.1).

If the Mastermind Data Backup Server is not accepting connection from the standard ports (Port 80 and 443 for http and https respectively), you can append a semi-colon ":" and the custom port number to the host name of the [Address] field (e.g. www.backup-provider.com:8080) to connect to the server using the custom port number (port 8080 in this case).

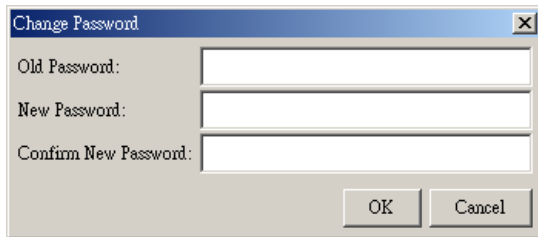
If you need to connect to the server through proxy, just enter your proxy setting in the [Proxy Setting] section. For [SOCKS] proxy, both v4 and v5 without user authentication are supported.

#### 3.3 User Profile

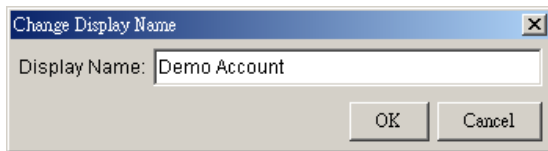
After the backup server authenticates you successfully, the Mastermind Data Backup main window appears. You can then use Mastermind Data Backup to update your user profile.

You can perform the following update to your user profile.

To change your [Password], press the [Change] button next to the password field. A Change Password dialog will appear. Enter your original password and new password into the text field of this dialog and press [OK].

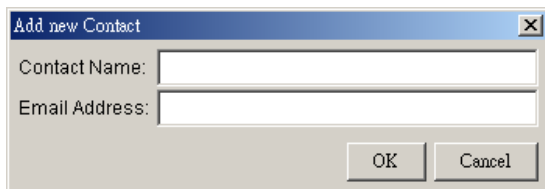
A dialog box titled "Change Password" with a close button (X) in the top right corner. It contains three text input fields: "Old Password:", "New Password:", and "Confirm New Password:". At the bottom, there are two buttons: "OK" and "Cancel".

To change your [Display Name], press the [Change] button next to the display name field. A Change Display Name dialog will appear. Enter the new display name and press [OK].

A dialog box titled "Change Display Name" with a close button (X) in the top right corner. It contains a text input field labeled "Display Name:" with the text "Demo Account" entered. At the bottom, there are two buttons: "OK" and "Cancel".

To change your [Time Zone], just select your time zone from the drop down list next to the time zone entry.

To add a new contact email to this account, press the [Add] button in the [Contact] section. A [Add New Contact] dialog will appear. Enter a name and an email address in the text field provided and then press the [OK] button.

A dialog box titled "Add new Contact" with a close button (X) in the top right corner. It contains two text input fields: "Contact Name:" and "Email Address:". At the bottom, there are two buttons: "OK" and "Cancel".

To remove a contact email, select the email that is to be removed from the email list and press the [Remove] button. Press [OK] to confirm the removal.

To update a contact email, select the email that is to be updated from the email list and press the [Properties] button. A [Update Contact Property] dialog will appear. After you have made the changes that you want, press the [OK] button.

## 3.4 Backup Logs

All backup activities are logged to backup activity log files. They are available for reviewing from Mastermind Data Backup.

### How to review backup activities?

You can review all your backup Jobs by

1. Select the [Log] tab available at the bottom of Mastermind Data Backup
2. Select the Backup Job you want to review on the [Log Controller] panel

## 4 Setting Up Backup Sets

A backup set contains all backup settings of a backup operation. This section will describe all features available within a backup set and explain how you can use each of them to achieve various tasks.

Each backup account can have multiple backup sets. Each backup set is an individual and independent entity. For example, if you want one directory to be backed up during the day and another directory to be backed up during the night, you can create two backup sets, each with a different backup schedule and backup source, to serve this need.

To create a new backup set, simply click [Backup Set] -> [New] and choose a backup set type. For example, let's create a "File Backup Set" for the rest of this chapter.

### 4.1 Backup Set Type

A backup set can be of one of the following types:

Backup Type	Description
File	Backup set type to backup common files/directories
Microsoft SQL Server	Backup set type to backup Microsoft SQL Server 7.0/2000
Oracle Database Server	Backup set type to backup Oracle 8i/9i database
Lotus Domino/Notes	Backup set type to backup Lotus Domino/Notes
Microsoft Exchange Server	Backup set type to backup Microsoft Exchange Server 2000 / 2003
MySQL	Backup set type to backup MySQL Server
System State	Backup set type to backup Microsoft Window's System State
Microsoft Exchange Mail (MAPI)	Backup set type to backup individual emails, contacts, calendars, tasks etceteras from Microsoft Exchange Server 2000 / 2003

Backup set type is defined at backup set creation and cannot be modified. If you want to change the backup set type, you have to create another backup set in the new backup set type.

### 4.2 Backup Source

A "Backup Source" defines the files/directories that are to be included in a backup set. There are two types of backup source: Selected and Deselected. Selected backup source defines files/directories that are to be included in a backup set while deselected backup source defines files/directories that are to be excluded from a backup set. Mastermind Data Backup will generate appropriate backup source setting for you automatically when you make your backup source selection on Mastermind Data Backup.

Please note that for Windows operating systems, if the "Hide protected operating files (Recommended)" setting is enabled for the file explorer, system folders/files will not be shown in the backup source. By selecting the parent folders however, all subfolders (including system folders/files) will be included in the backup set. Thus if you want to exclude system folders (e.g. recycle bin) from the backup, please select the desired folders/files directly rather than selecting the parent folder. Alternatively, you can enter the corresponding system path to the [Exclude List] of the backup set using the web interface.

From the [Standard] node available at the top of the [Backup Source] tree, you can easily select the following common folders to be backed up:

1. "My Documents" folder
2. "Outlook" and "Outlook Express" mail store folder
3. "Favorites" folder
4. "Desktop" folder

From the [Options] node available below the [Standard] node, you can easily select other common folders to be backed up as well. They include the "Application Data" folder, the "Start Menu" folder, the "Templates" folder, the "All Users' Documents" folder, the "Temporary Internet Files" folder, the "Cookies" folder, the "Font" folder, the "History" folder, the "Applications Data" folder, the "Nethood" folder, the "Printhood" folder, the "Recent" folder and the "Send to" folder.

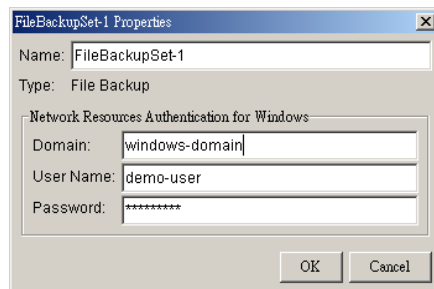
### 4.3 Mapped Network Drive

If you need to backup a mapped network drive on Windows (it will only work in Windows NT/2000/XP/2003), you must enter your Window's domain, username and password into the [Network Resources Authentication for Windows] section as shown below. It is required because scheduled backups will always run under the context of Window's "Local System" account (which does not have the privileges required to access network resources) by default. Mastermind Data Backup needs to collect your Windows username, password and domain name to authenticate itself to the windows domain controller to acquire the required access privileges to the network files to be backed up. If you don't supply a username and password, Mastermind Data Backup will have problems accessing network resources in its scheduled backup Jobs.

If you need to backup network mapped drive in scheduled backup, please do this:

Select the backup set (ex: FileBackupSet-1) from the left panel and press the [Properties] button on the right panel.

Enter your Windows domain, username and password into the dialog shown below and press [OK]



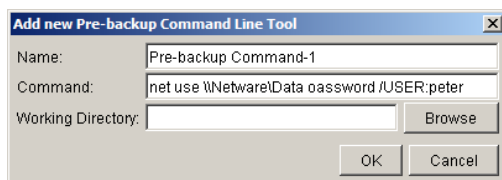
Press the [Save Setting] button on the toolbar

The steps above apply only to computers running in a Windows domain. If you don't have a windows domain with your network and you are using a workgroup or using a NetWare server, please use the "net use" command to authenticate the running backup process against the computer hosting the mapped drive. Otherwise, you will get "Access Denied" error from the backup report.

For example, if you want to backup \\SERVER\SHARE that is located on a NetWare server (or another computer in a windows workgroup) and you are getting "Network drive is not accessible" error message, please try adding the following command as a [Pre-backup command]

```
net use \\SERVER\SHARE [PASSWORD] /USER:[DOMAIN | MACHINE_NAME][USERNAME]
```

E.g.



Enter one of the following commands directly into the Pre-Backup Command:

```
net use \\Netware\Data password /USER:peter  
net use \\WorkgroupComputer1\Data password /USER:WorkgroupComputer1\peter
```

This will authenticate the current process with the NetWare server (or another computer in a windows workgroup) and backup will then run correctly.

## 4.4 Backup Schedule

A "Backup Schedule" defines the frequency and the time that backups should run automatically.

Backup schedule can be in one of the following types:

Type	Description
Daily	Backup Jobs will run everyday
Weekly	Backup Jobs will run on the specified day(s) of every week
Monthly	Backup Jobs will run on the specified day or on a day with a given criteria (e.g. first weekend, last weekday) of every month
Custom	Backup job will run once on any particular date

For each schedule type above, backup will run at the scheduled time for a maximum of the duration specified (or until all data are backed up if [Stop on backup completion] option is chosen). If a backup job does not finish within the maximum duration specified, it will be interrupted.

Please note that you can have more than one schedule within a backup set. For example, you can have a daily backup schedule that runs at 13:00 at noon and another daily backup schedule that runs at 00:00 at midnight. The combination of these schedules effectively creates a backup schedule that runs daily at 00:00 and 13:00 everyday.

## 4.5 Backup Filter

A "Backup Filter" defines the file selection rules that allow user to easily include/exclude files into/from the backup set by applying user defined criteria(s) to the file names or directory names.

There are some basic rules regarding backup filters:

- ☒☒☒ Filters are checked in creation order. Once inclusion/exclusion has been identified, the remaining filters won't be checked.
- ☒☒☒☒ Inclusion/Exclusion made by filter always takes precedence over backup source selections
- ☒☒☒☒☒ If all filters do not apply to a particular file, this file is then checked for inclusion/exclusion backup source selections

Key	Description
Name	The name of a filter
Top Directory	The top directory to which this filter is applied. Filtering rules will be applied to all files and/or directories under this directory.
Apply To	Define whether to apply the filtering rule to files and/or directories
Pattern Matching	It defines the filtering rules of a filter. A filtering rule can be of one of the following types:  [Starts With] Include/Exclude all files/directories with name starting with a certain pattern. <u>For example:</u> You can use B* to match all files with name starting with a 'B' character  [Contains] Include/Exclude all files/directories with name containing a certain pattern. <u>For example:</u> You can use *B* to match all files with name containing with a 'B' character  [Ends With] Include/Exclude all files/directories with name ending with a certain pattern. <u>For example:</u> You can use *.doc to match all files with name ending with '.doc' (all Word documents)  [Regular Expression] Include/Exclude all files/directories with name matching a regular expression.
Filter Mode	Defines whether you want to include or exclude matched files into/from the backup set. Also, for those unmatched files, you can choose to exclude (if include filter type) or include (if exclude filter type) them into/from the backup set.

### Example 1:

If you want to backup only Word, Excel and PowerPoint documents in your document directory (e.g. C:\My Documents), you should setup your backup filter as follows.

Top Directory = C:\My Documents  
Apply To = File (true)  
Matching Type = End With  
Matching Patterns = \*.doc, \*.xls, \*.ppt  
Filter Mode = Include  
Exclude all others = True

### Example 2:

If you want to backup all files, excluding all \*.exe, \*.dll and \*.tmp, in C:\Applications, you should setup your backup filter as follows.

Top Directory = C:\Applications  
Apply To = File (true)  
Matching Type = End With  
Matching Patterns = \*.exe, \*.dll, \*.tmp  
Filter Mode = Exclude  
Include all others = True

### Example 3:

If you have made your selection of files (all under C:\) from the backup source setting but you want exclude all images (e.g. \*.jpg and \*.gif) from your selection, you should setup your backup filter as follows.

Top Directory = C:\  
Apply To = File (true)  
Matching Type = End With  
Matching Patterns = \*.jpg, \*.gif  
Filter Mode = Exclude  
Include all others = false

Please note that the [Include all others] setting is not enabled because you don't want to include all other files (NOT \*.jpg, \*.gif) under C:\ into the backup set.

### Example 4: (advanced)

If you want to include everything, except the "log" directory, under C:\Applications into a backup set, you should setup your backup filter as follows.

Top Directory = C:\Applications  
Apply To = Directory (true)  
Matching Type = Regular Expression  
Matching Patterns = ^log\$  
Filter Mode = Exclude  
Include all others = True

### Example 5: (advanced)

If you want to include all directories named "log" from the backup set files with file name starting with "B" and ending with "\*.doc" under C:\My Documents into the backup set, you can use a regular expression of "^B.\*\doc\$" to do your selection. The filter backup can then be setup as follows.

Top Directory = C:\My Documents  
Apply To = File (true)  
Matching Type = Regular Expression  
Matching Patterns = ^B.\*\doc\$  
Filter Mode = Include  
Exclude all others = True

## 4.6 Pre/Post-Backup Command

The "Command Line Tool" feature has two major components, the [Pre-Backup] command and the [Post-Backup] command. You can use the [Pre-Backup] or [Post-Backup] commands to run any native OS (operating system) commands before or after running a backup job.

Both [Pre-Backup] and [Post-Backup] commands comprise of the following parameters:

Key	Description
Name	Name of this Command
Command	The command to be run (e.g. C:\My Documents\Application.exe or C:\My Documents\BatchJob.bat)
Working Directory	The directory at which this command will run

The backup set type affects the time at which [Pre-Backup] and [Post-Backup] commands run. The following table outlines when [Pre-Backup] and [Post-Backup] commands will run in different types of backup set.

Backup Set Type	When Pre-Backup Commands run?	When Post-Commands run?
File	Before uploading backup files	After uploading all backup files
Non-File Backup Sets (e.g. Microsoft SQL Server)	Before spooling backup files to temporary directory	After spooling backup files to temporary directory (i.e. before the first backup file is uploaded)

Note: You should never backup an application while it is running as this can result in inconsistent and unusable files getting backed up. Please use the "Volume Shadow Copy" feature if you're running Windows XP/2003 or make use of the Pre-Backup Command feature to shutdown your application before running a backup job and use the Post-Backup Command feature to restart your application after the backup job has completed.

### For Example

You want to stop Microsoft Outlook using the Pre-Backup Command and restart it after backup using the Post-Backup Command, create the two following text files and assigned the files to Pre-Backup and Post-Backup Command.

1. Create a text file named "OutlookClose.vbs" using notepad with the following two lines:

```
Set objOLK = createObject("Outlook.Application")
```

```
objOLK.quit
```

2. Create a text file named "OutlookStart.bat" using notepad with the following line:

```
"C:\Program Files\Microsoft Office\OFFICE11\OUTLOOK.EXE"
```

## 4.7 Temporary directory

If you are running a file backup job with SmartUpload enabled or a database type backup job, Mastermind Data Backup will generate temporary files and the directory that will be used to store all these files are defined by [Setting] -> [Temporary directory for storing backup files]. Please set this to a non-system disk partition that has enough free space to avoid problems.

You can set the [Temporary directory for storing backup files] to a mapped network drive. If you choose to do this, please use a UNC path (e.g. \\SERVER\SHARE) and don't forget to configure the [Backup Set] -> [Network Resources Authentication for Windows] setting.

To conserve the use of disk space, you can set the [Remove temporary files after backup] option to delete the temporary files automatically after a backup job has finished.

## 4.8 Transfer Block Size

Transfer block size defines the block size Mastermind Data Backup will use to transfer your backup blocks. Generally, backup jobs using a larger block size will have better performance, because of the smaller number of connections involved.

However, some firewalls or proxy servers may block out-going network traffic (HTTP/HTTPS POST method) with large block size for security reasons. If you are in a network with this type of restriction, please lower the transfer size value and try again.

To change the transfer block size of any backup set, please select the [Setting] node on the left panel to invoke the [Setting] panel on the right. You can then make changes to the [Transfer Block Size]. After you have made your changes, just press the [Save Setting] button on the toolbar.

## 4.9 Follow Symbolic Link (Linux/Unix/Mac only)

Under Unix/Linux/Mac, users can create a symbolic link to link a file/directory from another directory. This setting defines whether you want Mastermind Data Backup to traverse any symbolic links encountered on your backup path.

To change the follow symbolic link of any backup set, please select the [Setting] node on the left panel to invoke the [Setting] panel on the right. You can then make changes to the [Follow Symbolic Link]. After you have made your changes, just press the [Save Setting] button on the toolbar.

## 4.10 Microsoft's Volume Shadow Copy Service (VSS)

Microsoft Volume Shadow Copy Service (VSS) allows you to backup files that are exclusively opened. Without VSS, you will get the error message "The process cannot access the file because another process has locked a portion of the file" if you are trying to backup a file that is exclusively opened (e.g. Outlook PST file).

Please note that VSS is only available on Windows XP / 2003 and you must have administrative privileges to start the VSS service on a computer. Also VSS will only work if at least one of your partitions is formatted using NTFS.

If you are running Windows 2003, please install the Windows 2003 VSS hot fix available in <http://support.microsoft.com/default.aspx?scid=kb:en-us:887827> before running VSS.

If you are running into problems with VSS running on Windows XP / 2003, Microsoft's recommendation is to try re-registering the Volume Shadow Copy Service again. Simply run the script [Mastermind Data Backup Home]\bin\RegisterVSS.bat to do so.

For more information, please take a look at the following page for a technical introduction to Volume Shadow Copy Services (VSS):

<http://technet2.microsoft.com/windowsserver/en/library/2b0d2457-b7d8-42c3-b6c9-59c145b7765f1033.msp>

## 4.11 Encryption

Before your files are sent to the Mastermind Data Backup Server, all your files are compressed and encrypted using your choice of encryption algorithm, mode and key. The following table explains all encryption parameters available within a backup set.

Note:

Encryption settings are set at backup set creation time and cannot be modified. You need to create a new backup set if you want to change your encryption settings for a backup set.

Parameter	Description
Encryption Algorithm	<p>It defines the encrypting algorithm used to encrypt your backup files. There are three encryption algorithms available:</p> <p>[AES]           Advanced Encryption Standard algorithm            [DESede]       Triple DES algorithm            [Twofish]      Twofish algorithm</p> <p>We recommend the use of AES as it has been chosen as the encryption standard for commercial use. Please refer to references on Cryptography for more information about encryption algorithms.</p>
Encryption Mode	<p>It defines the encrypting mode used to encrypt your backup files. There are two encryption modes available:</p> <p>[ECB]           Electronic Cook Book Mode            [CBC]           Cipher Block Chaining Mode</p> <p>We recommend the use of CBC mode as it offers better security. Please refer to references on Cryptography for more information about encryption modes.</p>
Encrypting Key	<p>The key used to encrypt all files within a backup set. <b>Please write it down on paper and keep it in a safe place. If the key is lost, you will not be able to recover your files from the encrypted backup files.</b></p>

## 4.12 Retention Policy

During backup, if Mastermind Data Backup finds that you have deleted a file (or updated a file) on your computer, it will put the corresponding deleted (or updated) file already backed up on the backup server into a retention area. The retention policy setting defines how long files inside the retention area will be kept on the backup server before they are deleted automatically from the server.

Retention policy will only affect "retained" file (i.e. files that have already been deleted or updated on your computer and thus are moved to the retention area of the backup server). For those files that have not been updated on your computer, the backup of these files is kept in the data area on the backup server and won't be affected by the setting of retention policy. These backup files of unchanged files will stay on the backup server forever until the original files are removed (or updated) from your computer.

### Standard Retention Policy

The [Standard] retention policy allows you to delete retained files automatically after a user defined number of days or after a user defined number of backup Jobs. To change the retention policy setting of any backup set, please select the [Retention Policy] node on the left panel. You can then make changes to your retention policy under the [Retention Policy] section. After you have made your changes, just press the [Save Setting] button on the toolbar.

### Advanced Retention Policy

The [Advanced] retention policy allows you to configure a more flexible retention policy. It allows you to keep a set of snapshots of all backup files based on the time of the backup Jobs. For example, you can configure the advanced retention policy to keep the following sets of backup files to mimic the retention policy of the old days when you were still doing tape rotations:

- ◆ All files available within the last 7 days
- ◆ All files available on the last 4 Saturdays within the last 28 days
- ◆ All files available on the 1<sup>st</sup> day of each month within the last 3 months
- ◆ All files available on the 1<sup>st</sup> day of each quarter within the last 12 months
- ◆ All files available on the 1<sup>st</sup> day of each year within the last 7 years

To do so, you need to setup your advanced retention policy as follows:

- ◆ Type = Daily; Number of copy to keep = 7
- ◆ Type = Weekly; Frequency = Saturday; Number of copy to keep = 4
- ◆ Type = Monthly; Frequency = Day 1; Number of copy to keep = 3
- ◆ Type = Quarterly; Frequency = Day 1 of Jan, Apr, Jul, Oct; Number of copy to keep = 4
- ◆ Type = Yearly; Frequency = Date 01-01; Number of copy to keep = 7

Assuming today is 17-Jan-2006, if [Remove retention files for overlap policy] is NOT enabled, a total of 22 snapshots (provided you have run backups daily for more than 7 years) will be kept on the server accordingly, i.e.:

Daily	Weekly	Monthly	Quarterly	Yearly
16-Jan-2006	14-Jan-2006	01-Jan-2006	01-Jan-2006	01-Jan-2006
15-Jan-2006	07-Jan-2006	01-Dec-2005	01-Oct-2005	01-Jan-2005
14-Jan-2006	31-Dec-2005	01-Nov-2005	01-Jul-2005	01-Jan-2004

13-Jan-2006	24-Dec-2005		01-Apr-2005	01-Jan-2003
12-Jan-2006				01-Jan-2002
11-Jan-2006				01-Jan-2001
10-Jan-2006				01-Jan-2000

If [Remove retention files for overlap policy] is enabled, only the following snapshots are kept:

Daily	Weekly	Monthly	Quarterly	Yearly
16-Jan-2006	14-Jan-2006	<del>01-Jan-2006</del>	<del>01-Jan-2006</del>	01-Jan-2006
15-Jan-2006	07-Jan-2006	<del>01-Dec-2005</del>	<del>01-Oct-2005</del>	01-Jan-2005
<del>14-Jan-2006</del>	<del>31-Dec-2005</del>	<del>01-Nov-2005</del>	<del>01-Jul-2005</del>	01-Jan-2004
<del>13-Jan-2006</del>	<del>24-Dec-2005</del>		<del>01-Apr-2005</del>	01-Jan-2003
<del>12-Jan-2006</del>				01-Jan-2002
<del>11-Jan-2006</del>				01-Jan-2001
<del>10-Jan-2006</del>				01-Jan-2000

The weekly policy overrides the daily policy so the snapshots of 10-Jan-2006, 11-Jan-2006, 12-Jan-2006, 13-Jan-2006 and 14-Jan-2006 are removed. The monthly policy overrides the weekly policy so the snapshots of 24-Dec-2005 and 31-Dec-2005 are removed. The same applies to the monthly, quarterly and yearly policy giving a total of 11 snapshots.

### 4.13 Extra Backup (Off-line backup, Logout Reminder)

Off-line backup is basically designed for notebook users who are off-line most of the time and cannot rely on the backup schedule to backup regularly. The "Backup Interval" allows notebook users to specify the interval that they would like their data to backup. When the machine is online and this interval has elapsed, backup will run automatically. If "Backup Alert" is enabled, a popup message box will ask the user to confirm starting the backup.

The "Email Notification" setting is the number of days since the last backup that triggers the backup server to send email notification to the client to remind him to run an off-line backup.

When the "Logout Reminder" setting is enabled, a popup message box will ask the user to start a backup before logging out / shutting down Windows.

### 4.14 SmartUpload

Please refer to the SmartUpload section for more information on this topic.

### 4.15 Local Copy

If you want to save an extra copy of backup data on your local hard disk (in addition to a copy of backup data stored on the backup server) to minimize file-restoring time and/or to provide an extra safety precaution, you can do the following:

- i. Open Mastermind Data Backup from the System Tray (see previous sections for details)
- ii. Setup your backup set (see previous sections for details)
- iii. Select [Local Copy] under your backup set from the left panel
- iv. Check the [Copy to Local Hard Disk] checkbox
- v. Enter a directory to where you want an extra copy of your backup files to be stored in the [Copy to] field provided (preferably a directory under another hard disk)
- vi. (Optional) Select the [Yes] radio button if you want to store your backup files in compressed form to conserve free space usage
- vii. An extra copy of backup will be saved in the [Copy to] directory when you run your backup job

If you want to make local copy to a directory located on a NetWare server (or another computer is a windows workgroup) and you are getting "Network drive is not accessible" error message, please try adding the following command as a [Pre-backup command]

```
net use \\SERVER\SHARE [PASSWORD] /USER:[DOMAIN | MACHINE_NAME][USERNAME]
```

E.g.

```
C:\> net use \\Netware\Data password /USER:peter
```

```
C:\> net use \\WorkgroupComputer1\Data password /USER:WorkgroupComputer1\peter
```

This will authenticate the current process with the NetWare server (or another computer is a windows workgroup). Backup will then be allowed to run correctly.

### How to restore "Local Copy" files

"Local Copy" files are stored in the [Copy to] directory (under [Local Copy] setting). To restore backup files, please do the followings:

- i. Choose [Tools] -> [Unzip Local Copy]
- ii. Select the required [Backup Set] from the drop down list
- iii. Fill in the [Source Directory] (directory where "Local Copy" files are stored) and [Destination Directory] (directory to where you want "Local Copy" files to be restored)
- iv. Click [Start]

## 4.16 Using One Backup Account for Multiple Computers

Mastermind Data Backup allows you to backup multiple computers using a single backup account. To backup multiple computers, you need to create a different backup set to backup each individual computer and to configure the [Run scheduled backup on this computer] checkbox.

Since the computer that created the backup set will have its computer name associated with the backup set. The backup scheduler running on each computer will only run backup sets with the same computer name as itself. Thus, you just need to make sure that all your computer names using a single backup account are unMMue.

To allow multiple computers to be backed up under a single backup account, you are required to do the following **for each computer** that has installed Mastermind Data Backup under the same backup account:

- i. Logon to one of the computers that has Mastermind Data Backup installed under the same backup account.
- ii. Open Mastermind Data Backup and select a backup set that is not intended to run on this computer from the left panel.
- iii. Make sure that the [Run scheduled backup on this computer] checkbox on the right panel is not checked.
- iv. Repeat the previous step for the rest of the backup sets that are not intended to run on this computer.
- v. Repeat steps ii to iv for each computer that has Mastermind Data Backup installed under the same backup account.

**IMPORTANT** If you create a new backup set or want to backup another computer using the same backup account at a later date (this implies that you need to create an additional backup set under this backup account for the new computer), please make sure to repeat the procedure above (i.e. uncheck the [Run scheduled backup on this computer] checkbox for the added backup set) for each computer.

## 5 Backing Up Files

This chapter describes how files are backed up by Mastermind Data Backup to the backup server

### 5.1 How files are backed up

#### Run backup at scheduled time automatically

Once you set your backup scheduled, a backup job will be started automatically to perform backup operation for you at your absence. You can have backup running at your scheduled time as often as you want (e.g. twice a day or hourly during office hour) without requiring doing any extra work.

#### Incremental Backup

Unchanged files are already backed up to server and need not to be backed up again. Mastermind Data Backup will pick the new or updated files from your backup set files and upload only these files to the server. It significantly reduces the time required to perform the backup operation since most users update less than 5% of their total data each day.

#### Compress and encrypt data automatically

Data are compressed and encrypted before they are uploaded to the server. Not only does it reduce the storage space to keep you backup files, it also ensures the privacy of your data.

#### File Retention Policy

The built-in file retention policy allows you to access multiple versions of the same file or even deleted files from your backup set. Backup files are put into a retention area before they are removed from the server. If you want to get back a deleted file (or you want to get back the previous versions of an updated files) within the retention period, these files will always be available in the retention area. This feature is particularly useful when you have accidentally deleted a file or incorrectly updated a file within the file retention period (file retention period is user customizable).

### 5.2 Backup files directly to the backup server

You can backup your data to Mastermind Data by following instructions below.

- vi. Open Mastermind Data Backup
- vii. Right click Mastermind Data Backup icon available in the system tray and choose [Open]
  - a. Create a backup set
  - b. From the Menu, Choose [Backup Set] -> [New] -> [File Backup Set]
  - c. Enter a name for your backup set
  - d. Select the files/directories you want to backup
  - e. Set the backup schedule (Note: You can have more than one schedule in a backup set)
  - f. Set the encryption algorithm, encryption mode and encrypting key for this backup set (Hint: For the sake of simplicity, just select the [Default] radio button (your encrypting key is set to be the same as your backup account password))
- viii. Run Backup
  - a. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶) on the toolbar

- b. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server.

Note:

1. You can have more than one backup set in a backup account.
2. Please write the encrypting key down on paper and keep it in a safe place. If you lose your encrypting key, you will **not be able to restore** your backup files.

### 5.3 Backup files to removable hard disk (seed loading)

If you have a lot of data (e.g. 300GB) to backup to the backup server, it would take a considerable amount of time to perform the first full backup through the Internet. If you run into this problem, you can use the Seed Loading Utility to backup your backup set to local hard disk (instead of directly to the backup server) and then transport the backup data, using removable hard disk, to Mastermind Data. Mastermind Data's staff can then load all your backup files from your removable hard disk into your backup account. This could then save you days (even weeks) of performing your first full backup. Since subsequent backup will be incremental backup (only new or updated files will be uploaded to the server) you should have no problems uploading your backup data afterwards.

To perform seeding loading, please do the following:

- i. Open Mastermind Data Backup from the System Tray (see previous sections for details)
- ii. Setup your backup set (see previous sections for details)
- iii. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶) on the toolbar
- iv. Select [Local Hard Disk (Seed Load Utility)] to start backing up your files to local hard disk and press the [OK] button
- v. Enter a directory where you want all backup files to be stored in the [Destination Directory] field and press the [Start] button.  
  
Please make sure you have enough free space in the directory specified. If you are going to transport a removable hard disk to the Mastermind Data, please enter a directory under your removable hard disk here.
- vi. You should get the message "Backup Completed Successfully" as shown below after all backup files are spooled to the directory you specified.
- vii. Transport the data specified in the [Destination Directory] field to the Mastermind Data

## 6 Restoring Files

This chapter describes different ways files can be restored from to the backup server

**It is very important to write down your encrypting key on paper and keep it in a safe place because there will be no way to restore your backup files if you lose your encrypting key.**

### 6.1 Restore backup files from Mastermind Data Backup

You can restore your data from the backup server by following instructions below.

- i. Open Mastermind Data Backup from the System Tray (see previous sections for details)
- ii. Select the [Restore] tab at the bottom part of Mastermind Data Backup
- iii. Select the backup set from which you would like files to be restored from the left panel
- iv. Select the snapshot of your backup files that you would like to restore from the backup server by using [Show files after Job] drop down list
- v. Select the files that you would like to restore and press the [Restore Files] button on the toolbar
- vi. Use the [Browse] button to select the directory to where you want files to be restored (or simply select [Original location] to restore files to their original path)
- vii. Files will be restored automatically as shown below (a file won't be downloaded from the backup server again if an identical file exists on local path already)

### 6.2 Restore backup files from removable hard disk

If you want to restore lots of backup files from the backup server and you find it too slow to restore all your backup files from the backup server through the internet. Contact Mastermind Data and request to have your data sent on a removable hard disk (or CD/DVD). However, all backup files stored on backup server are in encrypted format. You need to decrypt them back to their original format before you can use them. To decrypt your backup files from removable media, please do the followings:

- i. Open Mastermind Data Backup from the System Tray
- ii. Select the [Tools] -> [Decrypt Files Wizard] from the menu
- iii. Use the [Browse] button to locate the "files" directory (provided by your backup provider in removable hard disk or DVD) which contains the backup files that you want to decrypt
- iv. If you have more than one backup set under the "files" directory, select the [Backup Set] which contains the backup files that you want to decrypt
- v. Select the snapshot of your backup files that you would like to restore from the removable media by using [Show files after Job] drop down list
- vi. If you want to see all the different versions of all files (shown as gray below), just choose the [Show all files] radio button on the [Decrypt Files Wizard] dialog.
- vii. Enter the directory to which you want the backup files to be restored to in the [Decrypt files to] section and enter the [Decrypting Key] (the same as the encrypting key of this backup set)
- viii. Press the [Start] button

## 7 SmartUpload Technology

The chapter describes what SmartUpload technology is and how SmartUpload can be used to backup large database files (e.g. a 10GB Outlook.pst file) without uploading the whole database file everyday.

### 7.1 Overview

SmartUpload technology is an advanced data block matching algorithm which has the intelligence to pick up changes (delta or SmartChunks) of file content between two files. Using this algorithm, daily backing up of large files (e.g. a 10GB Outlook.pst file) over low-speed internet connection is made possible because it requires only the changes of information (should be marginal) since the last backup to be sent over a low-speed internet connection to complete the backup of a large file (here we assume that the full backup of the file has been saved on the backup server already).

This is what will happen in the backup of a 10GB Outlook.pst file when it is backed up by Mastermind Data Backup with SmartUpload technology.

- i. The whole files (10GB), along with its checksum file, are backed up to the backup server. This can be done directly through the internet or indirectly using the seed loading utility on a removable hard disk.
- ii. When backup runs again later (normally the next day), Mastermind Data Backup will download a checksum listing of all data blocks of the full backup file (or last incremental backup file) from the backup server and use it to pick up all changes that have been made to the current Outlook.pst file.
- iii. Changes detected are then saved in a chunk file which is uploaded to the backup server. A new checksum file is generated and is also uploaded. (This delta file is assumed to be small because the content of PST files doesn't change a lot during daily usage)
- iv. Subsequent backups of this 10GB Outlook.pst file will go through step ii and step iii again. As explained, only a small delta file and checksum file will be uploaded to the backup server.
- v. With SmartUpload technology, daily backing up of large file over low-speed internet connection is now possible

## 8 Backup/Restore Oracle 8i/9i

This chapter will describe in details how MM Backup backup your Oracle 8i/9i and how you can restore an Oracle 8i/9i database using the backup files.

### 8.1 Requirements

- i. MM Backup must be installed onto the computer that can connect to your Oracle 8i/9i server using TCP/IP protocol.
- ii. Data from Oracle 8i/9i database will be backed up to a temporary directory before they are sent to Mastermind Data. Please make sure you have sufficient space on your computer to store these data when you run the backup job.
- iii. Database must be in archived log mode

To switch to archived log mode and enable automatic log archiving, please do the following:

- a. Set the parameters below in the PFILE to enable automatic archiving

```
log_archive_dest = [directory where archived logs will be stored]
log_archive_format = ARCH%S.LOG
log_archive_start = TRUE
```

- b. Switch to archived log mode

```
SVRMGRL> connect internal;
SVRMGRL> startup mount;
SVRMGRL> alter database archivelog;
SVRMGRL> alter database open;
```

- c. Enable Oracle JVM for Oracle 8i/9i, please do the following:

1. Please make sure shared pool size is larger than 50MB and java pool size is larger than 20MB in the PFILE. For example:

```
java_pool_size = 20971520
shared_pool_size = 52428800
```

2. Run the scripts below

For Oracle 8i

```
SVRMGRL> connect internal
SVRMGRL> @?/javavm/install/initjvm.sql;
SVRMGRL> @?/rdbms/admin/catalog.sql;
SVRMGRL> @?/rdbms/admin/catproc.sql;
SVRMGRL> @?/javavm/install/initdbj.sql;
```

For Oracle 9i

```
SQL> connect sys/change_on_install as sysdba
SQL> @?/javavm/install/initjvm.sql;
SQL> @?/xdk/admin/initxml.sql;
SQL> @?/xdk/admin/xmlja.sql;
SQL> @?/rdbms/admin/catjava.sql;
```

For Oracle 10g

Oracle JVM is enabled by default. No additional steps required.

- iv. JAVASYSPRIV role is granted to system account

You can grant this role to system account by executing:

```
SQL> grant JAVASYSPRIV to system;
```

## 8.2 Overview

MM Backup will backup your Oracle database by taking the following steps.

- i. Connect to the Oracle database using SQL\*NET over TCP/IP
- ii. Run all Pre-Commands of this backup set
- iii. If the backup type to run is [Database Backup type],
  - d. all data files in each of the tablespace(s) selected are copied to the temporary directory specified by this backup set
  - e. if there are temporary files in the database, the script to re-create the temporary files are generated to a file located in the temporary directory specified by this backup set
  - f. all non-default initialization parameters will be spooled to an initializing file located in the temporary directory specified by this backup set
  - g. all control files will be copied to the temporary directory specified by this backup set
  - h. all archived log files will be copied to the temporary directory specified by this backup set
- iv. If the backup type to run is [Archived Log Backup type],
  - i. all archived log files will be copied to the temporary directory specified by this backup set
- v. Run all Post-Commands of this backup set
- vi. Upload all files copied to the temporary directory to the Mastermind Data Backup Server
- vii. Remove temporary files from the temporary directory if [Setting] -> [Temporary Directory for storing backup files] is enabled

**Note:**

If your Oracle database is running on Windows, please install MM Backup onto the computer running the Oracle database if MM Backup is to backup this Oracle database. This would shorten the time required to backup the Oracle database.

## 8.3 How to backup an Oracle Database

Please follow the instructions below to backup your Oracle database to the Mastermind Data Backup Server.

- viii. Install MM Backup Advanced onto your computer
- ix. Open MM Backup  
Right click MM Backup icon available in the system tray and choose [Open]
- x. Create a backup set
  - j. From the Menu, Choose [Backup Set] -> [New] -> [Oracle Database Backup Set]

- k. Enter a name for your backup set

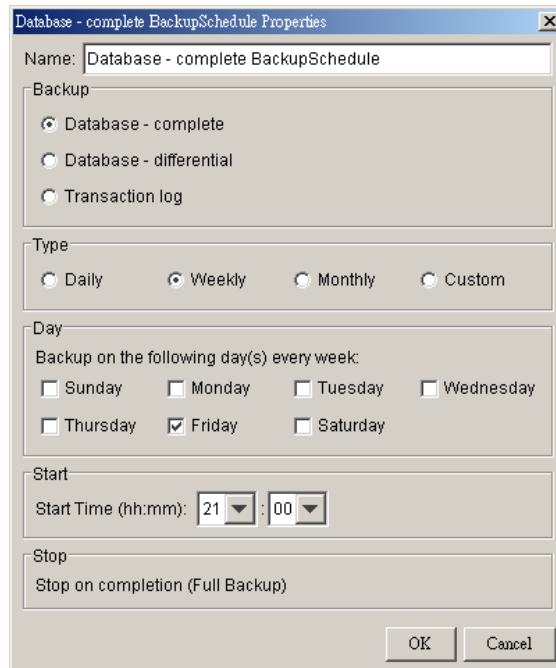
The screenshot shows a dialog box titled "Add new Oracle Database Backup Set". The "Backup Set" section contains the following fields: "Name" (OracleBackupSet-1), "Type" (Oracle Database Server Backup), "Oracle Database Server" section with "Login ID" (system), "Password" (empty), "Host" (empty), "Port" (1521), and "SID" (empty). Navigation buttons at the bottom include "< Previous", "Next >", and "Cancel".

- l. Enter the system password, the Oracle Database Server Host Name, TNS Port and SID
- m. Select the tablespace(s) you want to backup

The screenshot shows the "Backup Source" section of the dialog box. It contains a tree view of Oracle Database Server tablespaces: SYSTEM, OEM\_REPOSITORY, RBS, TEMP, USERS, and INDX. Below the tree is a text field for "Temporary disk space used for storing spool files" with the value "C:\Backup\OracleDB" and a "Change" button. Navigation buttons at the bottom include "< Previous", "Next >", and "Cancel".

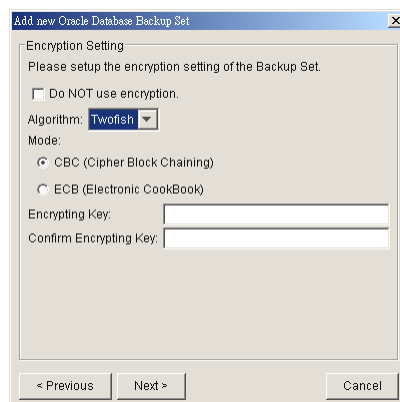
- n. Enter a temporary location to store the database file(s) before they are sent to the Mastermind Data Server
- o. Set the backup schedule for database backup and archived log backup

The screenshot shows the "Backup Schedule" section of the dialog box. It contains a list of backup schedules with the following text: "Database (Tablespaces, Control & Init File, Archived Logs) Backup" and "Archived Logs BackupSchedule (Type: Archived Logs, Weekly - M...". Below the list are "Add", "Remove", and "Properties" buttons. Navigation buttons at the bottom include "< Previous", "Next >", and "Cancel".



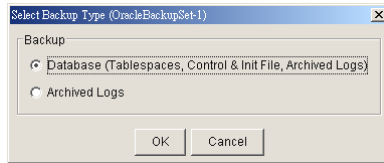
Note: You can have more than one schedule in a backup set, i.e. you can perform intra-day transaction log backup by adding more than one daily transaction log backup schedule to your backup set.

- p. Set the encryption algorithm, encryption mode and encrypting key for this backup set

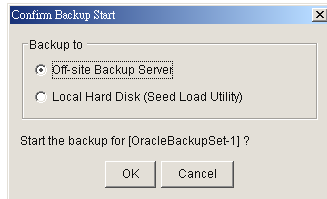


Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.

- xi. Run Backup
  - q. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)
  - r. Select the backup type (e.g. Database Backup, Archived Log Backup) you would like to perform



- s. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server.



## 8.4 How to restore an Oracle Database

Please follow the instructions below to restore your Oracle 8i/9i databases from an Mastermind Data Backup Server.

- xii. Download the backup files from the Mastermind Data Backup Server  
Please refer to the [Quick Start - Backup File] section for information on how to download backup files from Mastermind Data Backup Server.
- xiii. Put all data files back to their original locations
- xiv. Control files, data files and archived logs are stored on Mastermind Data Backup Server along with their full path information. You just need to put all these files back to their original locations when performing a database restore.
- xv. Put the PFILE back to its default location  
Oracle 8i: \$ORACLE\_HOME/dbs/init<SID>.ora  
Oracle 9i: \$ORACLE\_HOME/admin/<SID>/pfile/init.ora
- xvi. Restore Database  
(if Oracle 8i) Use Server Manager to restore you database by doing the following:
  - t. Run Oracle Server Manager (svrmgrl)
  - u. Connect to the target database
  - v. Startup mount
  - w. Reapply all transactions from the archived log files
  - x. Open database

Oracle 8i Example:
<pre>\$ svrmgrl SVRMGRL&gt; connect internal SVRMGR&gt; startup mount;</pre>

```
ORACLE instance started.
Total System Global Area          95874448 bytes
Fixed Size                        64912 bytes
Variable Size                     52744192 bytes
Database Buffers                  40960000 bytes
Redo Buffers                      2105344 bytes
Database mounted.

SVRMGRL> recover database using backup controlfile
ORA-00279: change 419671 generated at 06/14/03 02:51:49 needed for thread 1
ORA-00289: suggestion : /data/ora815/vin/archive/ARCH0000000225.LOG
ORA-00280: change 419671 for thread 1 is in sequence #225
ORA-00278: log file '/data/ora815/vin/archive/ARCH0000000224.LOG' no longer needed for this
recovery
Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
AUTO
Log applied.
.
.
.
ORA-00279: change 547222 generated at 06/18/03 19:58:26 needed for thread 1
ORA-00289: suggestion : /data/ora815/vin/archive/ARCH0000000384.LOG
ORA-00280: change 547222 for thread 1 is in sequence #384
ORA-00278: log file '/data/ora815/vin/archive/ARCH0000000383.LOG' no longer needed for this
recovery
ORA-00308: cannot open archived log '/data/ora815/vin/archive/ARCH0000000384.LOG'
ORA-27037: unable to obtain file status
Linux Error: 2: No such file or directory
Additional information: 3

SVRMGR> recover database using backup controlfile until cancel
ORA-00279: change 547222 generated at 06/18/03 19:58:26 needed for thread 1
ORA-00289: suggestion : /data/ora815/vin/archive/ARCH0000000384.LOG
ORA-00280: change 547222 for thread 1 is in sequence #384
Specify log: {<RET>=suggested | filename | AUTO | CANCEL}
CANCEL
Media recovery cancelled.
SVRMGR> alter database open resetlogs;
Statement processed.
```

(if Oracle 9i) Use Recovery Manager to restore you database by doing the following:

- y. Run Oracle Server Manager (rman)
- z. Connect to the target database
  - aa. Startup mount
  - bb. Reapply all transactions from the archived log files to the last sequence
  - cc. Open database

```
Oracle 9i Example:
C:\>rman nocatalog
Recovery Manager: Release 9.2.0.1.0 - Production
Copyright (c) 1995, 2002, Oracle Corporation. All rights reserved.

RMAN> connect target
connected to target database (not started)

RMAN> startup mount
connected to target database (not started)
Oracle instance started
database mounted

Total System Global Area          269556596 bytes
Fixed Size                        453492 bytes
Variable Size                     243269632 bytes
Database Buffers                  25165824 bytes
Redo Buffers                      667648 bytes

RMAN> recover database until sequence=63 thread=1;

Starting recover at 24-JUN-03
allocated channel: ORA_DISK_1
channel ORA_DISK_1: sid=11 devtype=DISK

starting media recovery

archive log thread 1 sequence 56 is already on disk as file
C:\ORACLE\ORADATA\VIN\ARCHIVE\1_56.DBF
archive log filename=C:\ORACLE\ORADATA\VIN\ARCHIVE\1_56.DBF thread=1 sequence=56
```

```
archive log filename=C:\ORACLE\ORADATA\VIN\ARCHIVE\1_57.DBF thread=1 sequence=57
archive log filename=C:\ORACLE\ORADATA\VIN\ARCHIVE\1_58.DBF thread=1 sequence=58
archive log filename=C:\ORACLE\ORADATA\VIN\ARCHIVE\1_59.DBF thread=1 sequence=59
archive log filename=C:\ORACLE\ORADATA\VIN\ARCHIVE\1_60.DBF thread=1 sequence=60
archive log filename=C:\ORACLE\ORADATA\VIN\ARCHIVE\1_61.DBF thread=1 sequence=61
archive log filename=C:\ORACLE\ORADATA\VIN\ARCHIVE\1_62.DBF thread=1 sequence=62
media recovery complete
Finished recover at 24-JUN-03

RMAN> alter database open resetlogs;

database opened
```

## 9 Backup/Restore Microsoft SQL Server 7.0 / 2000

This chapter will describe in details how to use MM Backup to backup your Microsoft SQL Server 7.0 / 2000 server and how you can restore your Microsoft SQL Server 7.0 / 2000 server from the backup files.

### 9.1 Requirements

- xvii. MM Backup must be installed onto the computer running Microsoft SQL Server.
- xviii. Data from Microsoft SQL Server will be backed up to a temporary directory before they are sent to Mastermind Data Backup Server. Please make sure you have sufficient space on your computer to store these data when you run the backup job.

### 9.2 Overview

MM Backup will backup your Microsoft SQL Server database(s) by taking the following steps:

- xix. Before running any backup activities, MM Backup will run all Pre-Commands of the backup set.
- xx. For each database that is to be backed up, MM Backup will issue a database / transaction log backup command to Microsoft SQL Server to backup each database to a Microsoft SQL Server database backup file (\*.bak file) and save it in the temporary directory you specified.
- xxi. After all \*.bak files have been spooled to the temporary directories, MM Backup will run all Post-Commands of the backup set.
- xxii. Upload all files copied to the temporary directory to the Mastermind Data Backup Server.
- xxiii. Remove temporary files from the temporary directory if [Setting] -> [Temporary Directory for storing backup files] is enabled

### 9.3 How to backup Microsoft SQL Server database(s)

Please follow the instructions below to backup your Microsoft SQL Server databases using MM Backup.

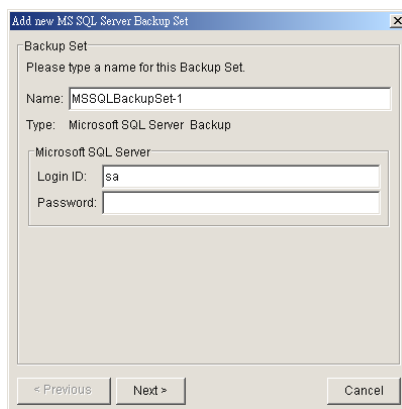
xxiv. Open MM Backup

Right click MM Backup icon available in the system tray and choose [Open]

xxv. Create a backup set

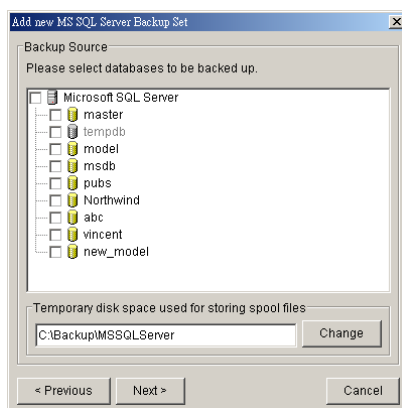
dd. From the Menu, Choose [Backup Set] -> [New] -> [MS SQL Server Backup Set]

ee. Enter a name for your backup set



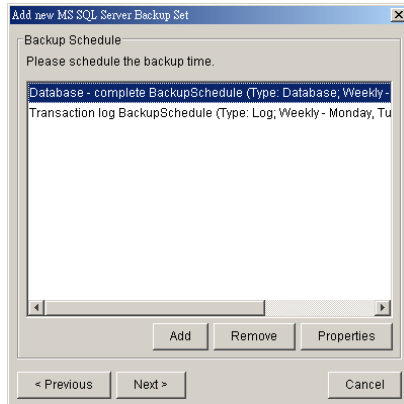
ff. Enter the Microsoft SQL Server administrator username and password

gg. Select the database(s) you want to backup



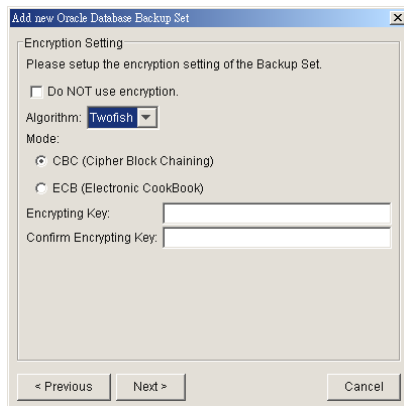
hh. Enter a temporary location to store the backup files before they are sent to an Mastermind Data Backup Server

ii. Set the backup schedule for full database backup and transaction log backup



(Note: You can have more than one schedule in a backup set, i.e. you can perform intra-day transaction log backup by adding more than one daily transaction log backup schedule to your backup set)

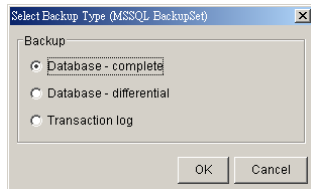
- jj. Set the encryption algorithm, encryption mode and encrypting key for this backup set



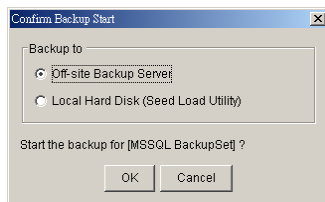
(Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.)

xxvi. Run Backup

- kk. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)
- ll. Select the backup type (e.g. Complete, Differential, Transaction Log) you would like to perform



mm. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server.



## 9.4 How to restore Microsoft SQL Server database(s)

Please follow the instructions below to restore your Microsoft SQL Server databases from an Mastermind Data Backup Server.

xxvii. Download the backup files (.bak) from the Mastermind Data Backup Server

Please refer to the [Quick Start - Backup File] section for information on how to download backup files from Mastermind Data Backup Server.

xxviii. Open Microsoft SQL Enterprise Manager

You can open Microsoft SQL Enterprise Manager from [Start Menu] -> [Program] -> [Microsoft SQL Server] -> [Enterprise Manager]

xxix. (Optional) Restore "master" database

You need to restore "master" database if you:

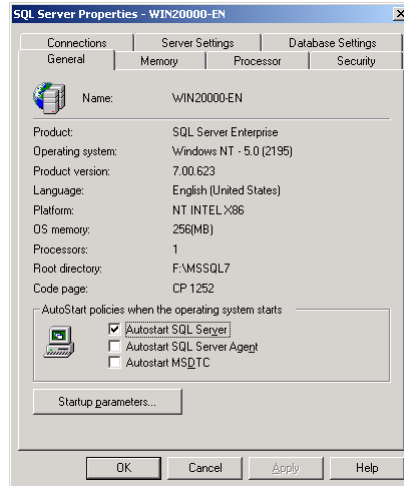
- nn. are rebuilding all your databases from scratch
- oo. have changing any server-wide or database configuration options
- pp. have added logins or other login security-related operations.
- qq. have created or removed logical backup devices.
- rr. have configured the server for distributed queries and remote procedure calls, such as adding linked servers or remote logins.

You do not need to restore your master database if you just want to restore a user database. For more information on Microsoft SQL Server "master" database, please visit <http://www.microsoft.com/sql/>.

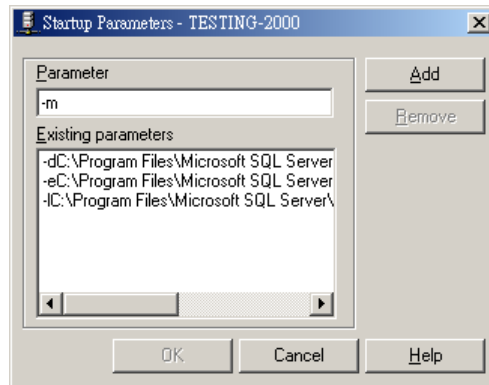
To restore "master" database, please do the following:

- ss. Start Microsoft SQL Server in "Single User Mode"
  - 1. Right click your Microsoft SQL Server and select [Properties]

2. Press the [Startup Parameters] button

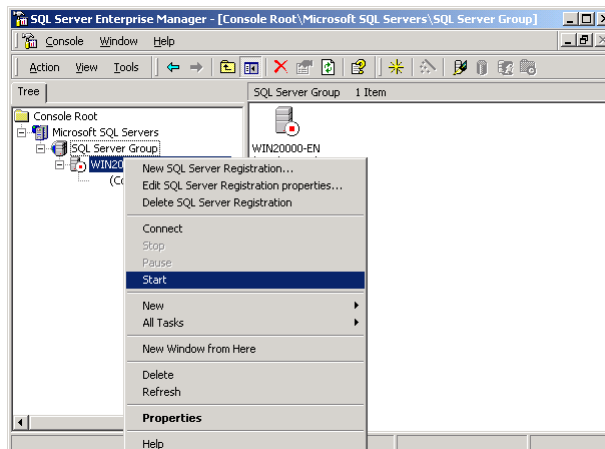
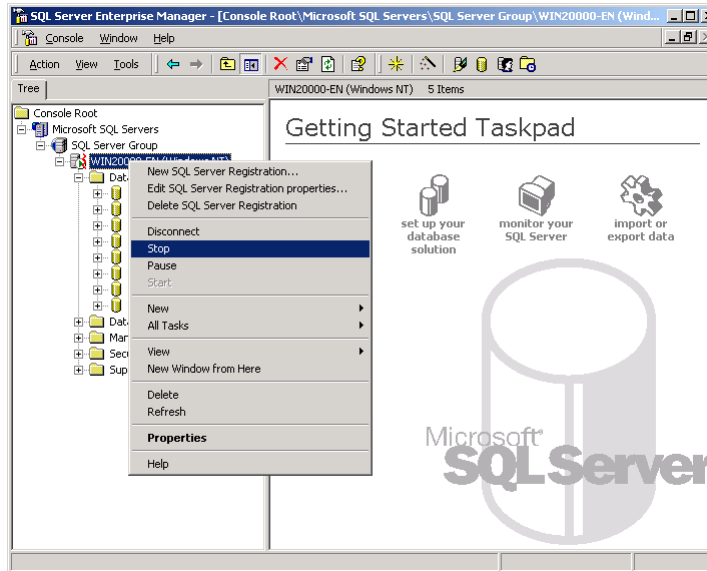


3. Add a "-m" parameter to the [Startup Parameters]



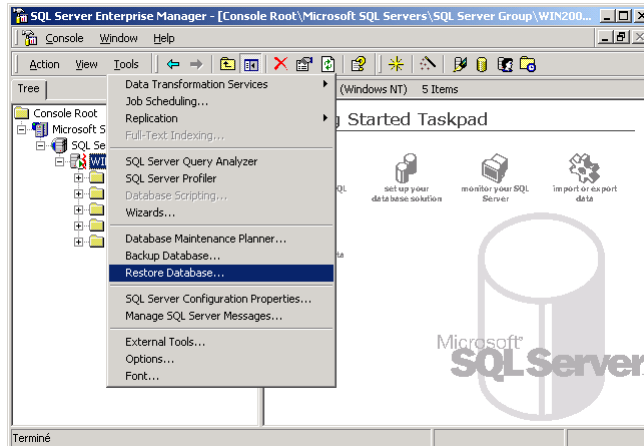
4. Restart Microsoft SQL Server

From [Enterprise Manager], right click your Microsoft SQL Server and select [Stop] and then [Start].

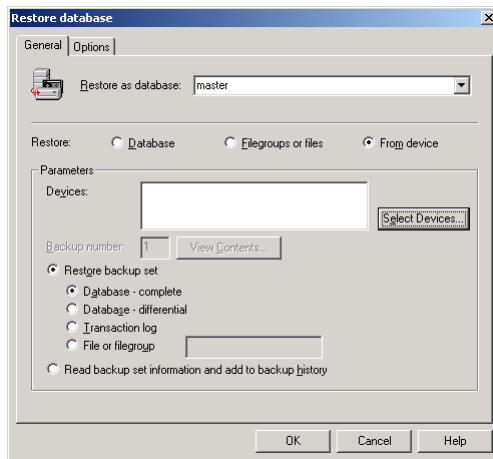


tt. Restore "master" database

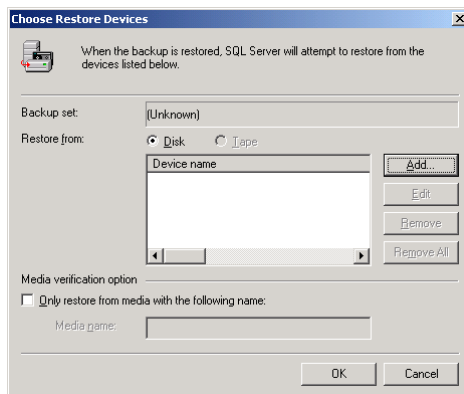
5. From [Enterprise Manager] -> [Tools] -> [Restore Database]



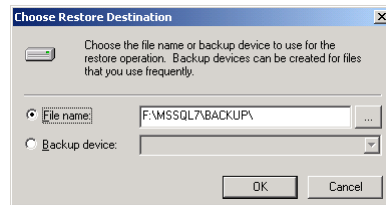
6. Select [master] in the [Restore as database] drop down list
7. Select the [From device] radio button.
8. Press the [Select Devices] button.



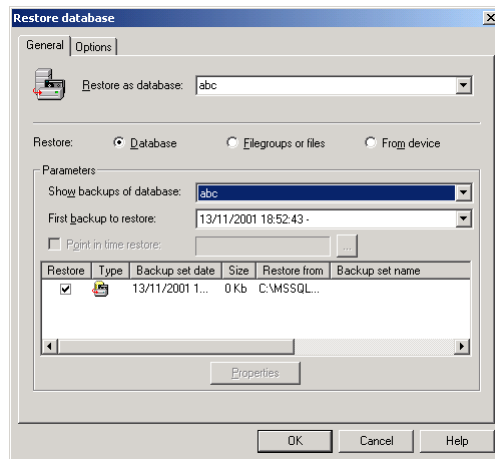
9. From the [Choose Restore Devices], press the [Add] button.



10. From the [Choose Restore Destination] panel, press the [...] button to choose your master backup (\*.bak) from your backup files



11. Press the [OK] button, to start restoring the "master" database.
- uu. Restart Microsoft SQL Server in "Normal Mode"
12. Remove "-m" parameter from the [Startup Parameters] as in previous step
  13. Restart your Microsoft SQL Server as in previous step
- xxx. (Optional) Restore "model", "msdb" and "distribution" database
- You need to restore "model" database if you have changed the database template of your SQL Server.
- You need to restore "msdb" database if you have changed the scheduling information or you want to restore the backup and restore history of your databases.
- You need to restore "distribution" database if you are running the replication components of SQL Server.
- You do not need to restore these databases if you just want to restore a user database. For more information on Microsoft SQL Server "model", "msdb" and "distribution" database, please visit <http://www.microsoft.com/sql/>.
- You need to restore each of these databases one by one. To restore any of these databases, please do the following:
- vv. From [Enterprise Manager] -> [Tools] -> [Restore Database]
  - ww. Select the database to be restored in the [Restore as database] drop down list
  - xx. Select the [From device] radio button.
  - yy. Press the [Select Devices] button
  - zz. Press the [...] button to choose your backup files (\*.bak) for the database to be restored
  - aaa. Press the [OK] button
- xxxi. Restore user database(s)
- For each of the database you would like to restore,
- bbb. From [Enterprise Manager] -> [Tools] -> [Restore Database]
  - ccc. Select the database to be restored in the [Restore as database] drop down list
  - ddd. Select the [Database] radio button.



eee. From the [Show backups of database] drop down list, select the database to be restored

fff. From the [First backup to restore] drop down list, select the snapshot of the database you would like to restore to.

You can restore your database to the snapshot of your database at any point of the time between the time you did your full backup and the time you did your last subsequent backup.

ggg. Change the [Restore From] entry

If you backup files (\*.bak) are not in the default directory, you need to update the full path to your backup files by pressing the [Properties] button.

hhh. Press the [OK] button

xxxii. All database(s) restored successfully

## 10 Backup/Restore Lotus Domino / Notes

This chapter will describe in details how to use MM Backup to backup your Lotus Domino server / Notes client 5 / 6 / 6.5 and how you can restore your Lotus Domino server / Notes client 5 / 6 / 6.5 from the backup files.

### 10.1 Requirements

- xxxiii. MM Backup must be installed onto the computer running Lotus Domino server / Notes client.
- xxxiv. Data from Lotus Domino server / Notes client will be backed up to a temporary directory before they are sent to Mastermind Data Backup Server. Please make sure you have sufficient disk space on your computer to store these data when you run the backup job.
- xxxv. Lotus Domino server must runs with archive transaction logging enabled  
To set up transaction logging in archive style, please do the following:
  - iii. Ensure that all databases to be logged reside in the Domino data directory, either at the root or in subdirectories.
  - jjj. From the Domino Administrator, click the Configuration tab.
  - kkk. In the "Use Directory on" field, choose the server's Domino Directory.
  - lll. Click Server Configuration, and then click Current Server Document.
  - mmm. Click the Transactional Logging tab.
  - nnn. Complete these fields, and then save the document.

Field	Enter
Transactional Logging	Choose Enabled. The default is Disabled.
Log path	Path name location of the transaction log. The default path name is \LOGDIR in the Domino data directory, although it is strongly recommended to store the log on a separate, mirrored device, such as a RAID (Redundant Array of Independent Disks) level 0 or 1 device with a dedicated controller. The separate device should have at least 1GB of disk space for the transaction log. If you are using the device solely for storing the transaction log, set the "Use all available space on log device" field to Yes.
Logging style	Choose Archive. The default is Circular.
Maximum log space	The maximum size, in MB, for the transaction log. Default is 192MB. Maximum is 4096MB (4GB). Domino formats at least 3 and up to 64 log files, depending on the maximum log space you allocate.
Use all available space on log device	Choose one: <ul style="list-style-type: none"> <li>• Yes to use all available space on the device for the transaction log. This is recommended if you use a separate device dedicated to storing the log. If you choose Yes, you don't need to enter a value in the "Maximum log space" field.</li> <li>• No to use the default or specified value in the</li> </ul>

	"Maximum log space" field.
Automatic fixup of corrupt databases	<p>Choose one:</p> <ul style="list-style-type: none"> <li>• Enabled (default). If a database is corrupt and Domino cannot use the transaction log to recover it, Domino runs the Fixup task, assigns a new DBIID, and notifies the administrator that a new database backup is required.</li> <li>• Disabled. Domino does not run the Fixup task automatically and notifies the administrator to run the Fixup task with the -J parameter on corrupt logged databases.</li> </ul>
Runtime / Restart performance	<p>This field controls how often Domino records a recovery checkpoint in the transaction log, which affects server performance.</p> <p>To record a recovery checkpoint, Domino evaluates each active logged database to determine how many transactions would be necessary to recover each database after a system failure. When Domino completes this evaluation, it:</p> <ul style="list-style-type: none"> <li>• Creates a recovery checkpoint record in the transaction log, listing each open database and the starting point transaction needed for recovery</li> <li>• Forces database changes to be saved to disk if they have not been saved already</li> </ul> <p>Choose one:</p> <ul style="list-style-type: none"> <li>• Standard (default and recommended). Checkpoints occur regularly.</li> <li>• Favor runtime. Domino records fewer checkpoints, which requires fewer system resources and improves server run time performance.</li> <li>• Favor restart recovery time. Domino records more checkpoints, which improves restart recovery time because fewer transactions are required for recovery.</li> </ul>

Notes:

You can only run transaction log backup if you have transaction logging enabled and you are using archive mode. This command does not apply if you have transaction logging enabled not in archive mode or if transaction logging is not enabled at all. If you try to issue it, you will receive an error message.

## 10.2 Overview

MM Backup will backup your Lotus Domino server / Notes client by taking the following steps:

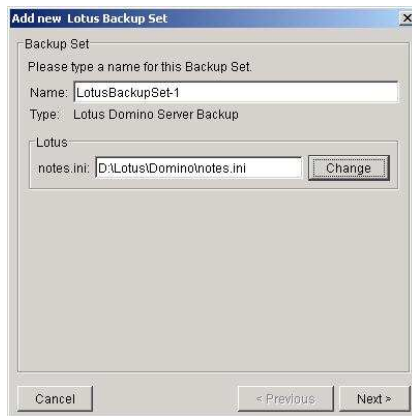
- xxxvi. Run all Pre-Commands of this backup set
- xxxvii. If the backup type to run is [Database Backup type],
  - ooo. all file(s) / database(s) selected are copied to the temporary directory specified by this backup set
  - ppp. the notes.ini file, if selected, will be copied to the temporary directory
  - qqq. only filled log extents will be copied to the temporary directory, and the Domino server is notified of their availability for reuse (for Domino server only)

- xxxviii. (for Domino server only) If the backup type to run is [Transaction Log Backup type],
  - rrr. only filled log extents will be copied to the temporary directory, and the Domino server is notified of their availability for reuse
- xxxix. Run all Post-Commands of this backup set
- xli. Upload all files copied to the temporary directory to the Mastermind Data Backup Server
- xlii. Remove temporary files from the temporary directory if [Setting] -> [Temporary Directory for storing backup files] is enabled

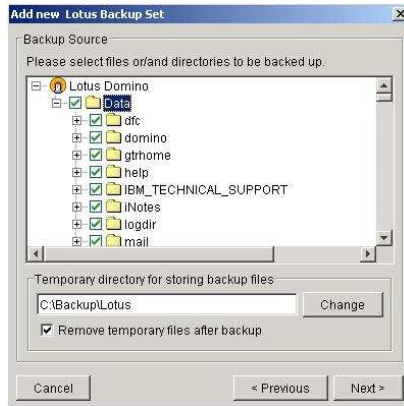
## 10.3 How to backup Lotus Domino / Notes database(s) / file(s) on Windows

Please follow the instructions below to backup your Lotus Domino server / Notes client databases / files using MM Backup.

- xlii. Open MM Backup
  - Right click MM Backup icon available in the system tray and choose [Open]
- xliii. Create a backup set
  - sss. From the Menu, Choose [Backup Set] -> [New] -> [Lotus Backup Set]
  - ttt. Enter a name for your backup set

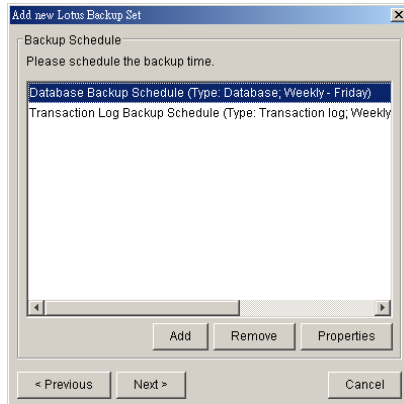


- uuu. Select the Backup Set Type (Lotus Domino Server Backup / Lotus Notes Client Backup)
- vvv. Select the database(s) / file(s) you want to backup



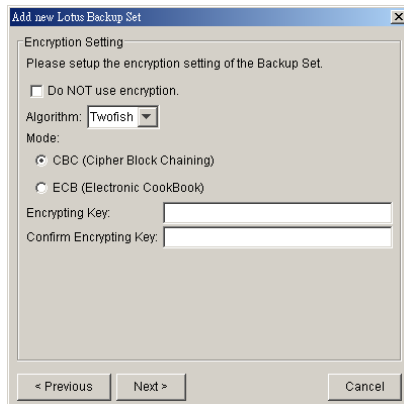
www. Enter a temporary location to store the backup files before they are sent to an Mastermind Data Backup Server

xxx. Set the backup schedule for Database Backup



yyy. Set the backup schedule for Transaction Log Backup (for Domino server only)  
(Note: You can have more than one schedule in a backup set, i.e. you can perform intra-day transaction log backup by adding more than one daily transaction log backup schedule to your backup set)

zzz. Set the encryption algorithm, encryption mode and encrypting key for this backup set

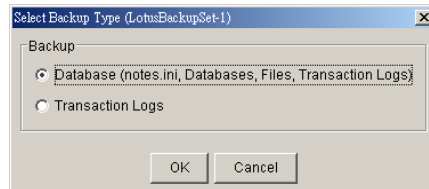


(Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.)

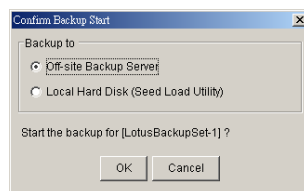
xliv. Run Backup

aaaa. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)

bbbb. Select the backup type (e.g. Database, Transaction Log) you would like to perform (for Domino server only)



cccc. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server.



## 10.4 How to restore Lotus Domino / Notes database(s) / file(s) on Windows

Please follow the instructions below to restore Lotus Domino server / Notes client database(s) / file(s) from an Mastermind Data Backup Server.

xlvi. Install Lotus Domino server / Notes client back to its original folder (if required)

xlvi. Install MM Backup

Please refer to the [Installation] section for information on how to install MM Backup onto your computer.

xlvi. Shutdown Lotus Domino Server

xlvi. If you want to perform a full domino restore (restore all databases and files):

dddd. Download the backup files to be restored from the Mastermind Data Backup Server and save them back to its original location. It includes notes.ini, all backup files from the lotus domino data directory and all archived transaction logs

eeee. Modify the "DominoRecover.bat" located under the bin directory of the MM Backup installation to reflect your setup. You need to specify the lotus executable directory.

For example change the PROGRAM\_DIR to:

```
PROGRAM_DIR=C:\Lotus\Domino
```

ffff. Run "DominoRecover.bat" and press 'Y' to continue.

For example: `C:\program files\MMb\bin\DominoRecover.bat`

This will run media recovery for all databases (\*.nsf and mail.box) found under the Lotus data directory (e.g. C:\Lotus\Domino\Data). You should see something similar to the screen below.

```
Media Recovery Example:
C:\program files\MMb\bin>DominoRecover.bat
Media Recovery Utility for Lotus Domino 5.0 or above

Please make sure that you have done the following:
1. Reinstall Lotus Domino on this computer in the same directory
2. Restore Notes.ini to the Lotus Domino installation directory
   (e.g. C:\Lotus\Domino)
3. Restore Domino Data directory back to the directory defined
   in Notes.ini (e.g. C:\Lotus\Domino\Data)
4. Restore all archived transaction logs to the directory defined
   in Notes.ini (e.g. C:\Lotus\Domino\Data\logdir)

Continue ? (Y) or (N) y
Running media recovery ...
Please wait, creating new transaction logs in directory: C:\logdir\
02/12/2003 14:39:19 Recovery Manager: Restart Recovery complete. (0/0
databases needed full/partial recovery)
Media Recovery Replay (122 MB): 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
02/12/2003 14:39:22 Recovery Manager: Media Recovery complete for
C:\Lotus\Domino\Data\admin4.nsf, last update applied .

Backup file C:\Lotus\Domino\Data\admin4.nsf recovered.

.....
Media Recovery Replay (122 MB): 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
02/12/2003 14:40:57 Recovery Manager: Media Recovery complete for
C:\Lotus\Domino\Data\statrep.nsf, last update applied .

Backup file C:\Lotus\Domino\Data\statrep.nsf recovered.

C:\program files\MMb\bin>
```

gggg. All content of all database(s) are now rolled forward to the last committed transaction found in the last archived transaction log.

hhhh. Restart Lotus Domino server

xlix. If you just want to restore a single database:

iiii. Download the database file to be restored from the Mastermind Data Backup Server and save them back to its original location.

jjjj. (optional) If you need to perform media recovery on this database, please download all archived transaction logs and save them back to its original location

kkkk. Modify the "DominoRecover.bat" located under the bin directory of the MM Backup installation to reflect your setup.

For example we will recover the "admin4.nsf" and have restored the file to C:\restore\notesdata, change the tags to:

```
PROGRAM_DIR=C:\Lotus\Domino
INPUTFILE=C:\restore\notesdata\admin4.nsf
RESTOREDB=C:\Lotus\Domino\Data\admin4.nsf
RECDATE=18/01/2007
RECTIME=00:02
```

llll. Run "DominoRecover.bat".

You should see something similar to the screen below.

```
Media Recovery Example:
C:\program files\MMb>DominoRecover.bat
Media Recovery Utility for Lotus Domino 5.0 or above

Running media recovery ...
Restart Analysis (0 MB): 100%
18/01/2007 14:42:15 Recovery Manager: Restart Recovery complete. (0/0
databases needed full/partial recovery)
Media Recovery Replay (122 MB): 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
18/01/2007 14:42:17 Recovery Manager: Media Recovery complete for
C:\Lotus\Domino\data\admin4.nsf, last update applied .

Backup file C:\Lotus\Domino\data\admin4.nsf recovered.

C:\Lotus\Domino>
```

mmmm. All content of the database are now rolled forward to the last committed transaction found in the last archived transaction log.

nnnn. Restart Lotus Domino Server

## 10.5 How to backup Lotus Domino / Notes database(s) / file(s) on Linux

Please make sure that the user running MM Backup have sufficient privileges to read and write to the "notesenv" file located in the "bin" subdirectory of where MM Backup is installed. This file is used by MM Backup to store the location of the domino/notes application executables. e.g. use chmod to set read, write & execute permissions

```
# cd $MM Backup_HOME/bin  
# chmod 777 notesenv
```

Please follow the instructions below to backup your Lotus Domino server / Notes client databases / files using MM Backup.

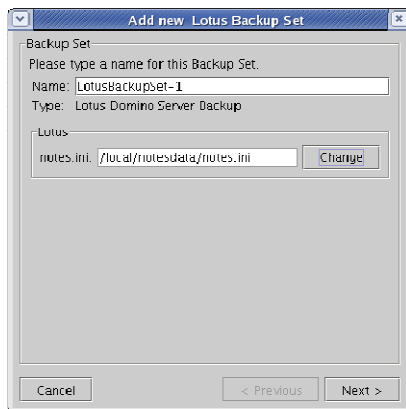
- i. Open MM Backup by typing the following in a terminal

```
# cd $MM Backup_HOME  
# ./bin/BackupManager.sh
```

- li. Create a backup set

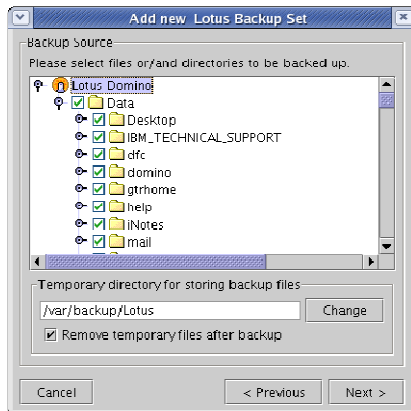
oooo. From the Menu, Choose [Backup Set] -> [New] -> [Lotus Backup Set]

pppp. Enter a name for your backup set



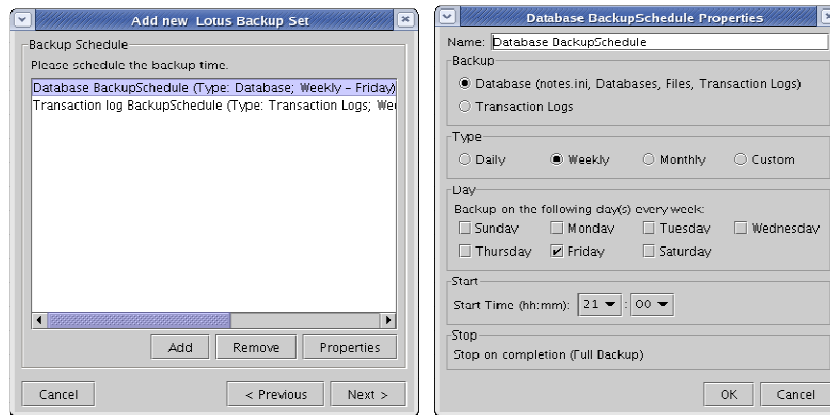
qqqq. Select the location of the "note.ini" file. The default path for this will be in the /local/notesdata folder.

rrrr. Select the database(s) / file(s) you want to backup



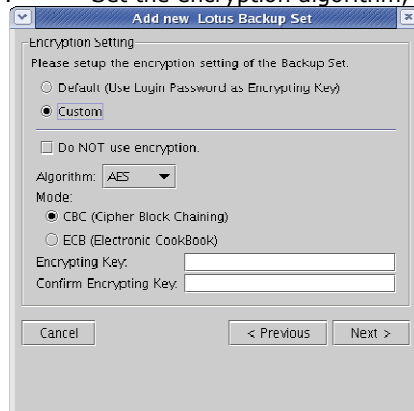
ssss. Enter a temporary location to store the backup files before they are sent to an Mastermind Data Backup Server. Please make sure that the user running MM Backup have sufficient privileges to read and write to this location and sufficient space is available.

tttt. Set the backup schedule for Database Backup



uuuu. Set the backup schedule for Transaction Log Backup (for Domino server only)  
(Note: You can have more than one schedule in a backup set, i.e. you can perform intra-day transaction log backup by adding more than one daily transaction log backup schedule to your backup set)

vvvv. Set the encryption algorithm, encryption mode and encrypting key for this backup set

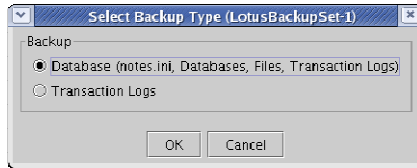


(Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.)

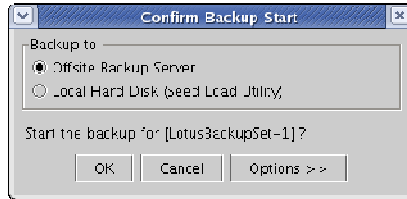
lii. Run Backup

www. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)

xxxx. Select the backup type (e.g. Database, Transaction Log) you would like to perform (for Domino server only)



yyyy. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server.



zzzz. You should get something similar to the screen shot below.

## 10.6 How to restore Lotus Domino / Notes database(s) / file(s) on Linux

Please follow the instructions below to restore Lotus Domino server / Notes client database(s) / file(s) from an Mastermind Data Backup Server.

liii. Install Lotus Domino server / Notes client back to its original folder (if required)

liv. Install MM Backup

Please refer to the [Installation] section for information on how to install MM Backup onto your computer.

lv. Shutdown Lotus Domino Server

lvi. If you want to perform a full domino restore (restore all databases and files):

aaaaa. Download the backup files to be restored from the Mastermind Data Backup Server and save them back to its original location. It includes notes.ini, all backup files from the lotus domino data directory and all archived transaction logs. If you encounter any access problems, please try restoring using the "root" user.

bbbbb. Make sure that the owner and group permissions of the restored files are the notes user

For example: `# chown -R notes:notes /local/notesdata`

This will assign the owner and group to all files and directories within /local/notesdata.

ccccc. Modify the "DominoRecover.sh" located under the bin directory of the MM Backup installation to reflect your setup. You need to specify the data directory and the lotus executable directory.

For example change the DATA\_DIR and LOTUS tags to:

```
DATA_DIR=/local/notesdata
LOTUS=/opt/ibm/lotus
```

dddd. Make sure the current user is the notes user before running the "DominoRecover.sh".

eeee. Run "DominoRecover.sh" and press 'Y' to continue.

For example: `#!/usr/local/MMb/bin/DominoRecover.sh`

This will run media recovery for all databases (\*.nsf and mail.box) found under the Lotus data directory (e.g. /local/notesdata). You should see something similar to the screen below.

```
Media Recovery Example:
bash-3.00$ cd /usr/local/MMb/bin
bash-3.00$ ./DominoRecover.sh
Media Recovery Utility for Lotus Domino 5.0 or above

Please make sure that you have done the following:
1. Reinstall Lotus Domino on this computer in the same directory
2. Restore Notes.ini to the Lotus Domino installation directory
   (e.g. /local/notesdata)
3. Restore Domino Data directory back to the directory defined
   in Notes.ini (e.g. /local/notesdata)
4. Restore all archived transaction logs to the directory defined
   in Notes.ini (e.g. /local/notesdata/logdir)

Continue ? (Y) or (N) y

Running media recovery ...
directory /local/notesdata// already exists
Please wait, creating new transaction logs in directory: /local/notesdata/logdir/
02/01/2007 11:38:43 AM Recovery Manager: Restart Recovery complete. (0/0 databases
needed full/partial recovery)
02/01/2007 11:38:45 AM Recovery Manager: Assigning new DBIID for
/local/notesdata/names.nsf (need new backup for media recovery).
Media Recovery Replay (0 MB): 100%
02/01/2007 11:38:45 AM Recovery Manager: Media Recovery complete for
/local/notesdata/dfc/dfc100.nsf, last update applied .

Backup file /local/notesdata/dfc/dfc100.nsf recovered.
Media Recovery Replay (0 MB): 100%
02/01/2007 11:38:46 AM Recovery Manager: Media Recovery complete for
/local/notesdata/help/decdoc.nsf, last update applied .

...

Backup file /local/notesdata/iNotes/help70_iwa_en.nsf recovered.
Media Recovery Replay (0 MB): 100%
02/01/2007 11:38:50 AM Recovery Manager: Media Recovery complete for
/local/notesdata/mail/notes.nsf, last update applied .

Backup file /local/notesdata/mail/notes.nsf recovered.
bash-3.00$
```

ffff. All content of all database(s) are now rolled forward to the last committed transaction found in the last archived transaction log.

ggggg. Restart Lotus Domino server

lvii. If you just want to restore a single database:

hhhhh. Download the database file to be restored from the Mastermind Data Backup Server and save them back to its original location.

iiiiii. (optional) If you need to perform media recovery on this database, please download all archived transaction logs and save them back to its original location

jjjjj. Modify the "DominoRecover.sh" located under the bin directory of the MM Backup installation to reflect your setup.

For example we will recover the "admin4.nsf" and have restored the file to /restore/local/notesdata, change the tags to:

```
DATA_DIR=/local/notesdata
LOTUS=/opt/ibm/lotus
INPUTFILE=/restore/local/notesdata/admin4.nsf
RESTOREDB=/local/notesdata/admin4.nsf
RECDATE=18/01/2007
RECTIME=22:41
```

kkkkk. Make sure the current user is the notes user before running the "DominoRecover.sh".

IIII. Run "DominoRecover.sh".

You should see something similar to the screen below.

```
Media Recovery Example:
bash-3.00$ cd /usr/local/MMb/bin
bash-3.00$ ./DominoRecover.sh
Media Recovery Utility for Lotus Domino 5.0 or above

directory /local/notesdata// already exists

Recovering backup file ...

Restart Analysis (0 MB): 100%
18/01/2007 03:35:56 PM Recovery Manager: Restart Recovery complete. (0/0 databa ses
needed full/partial recovery)
Media Recovery Replay (1 MB): 30% 50% 80% 100%
18/01/2007 03:35:57 PM Recovery Manager: Media Recovery complete for /local/res
tore/local/notesdata/admin4.nsf, last update applied .

Backup file /local/restore/local/notesdata/admin4.nsf recovered.

Taking database /local/notesdata/admin4.nsf offline ...

Restoring database /local/notesdata/admin4.nsf
from recovered backup file /local/restore/local/notesdata/admin4.nsf ...
Database file /local/notesdata/admin4.nsf restored from /local/restore/local/not
esdata/admin4.nsf

Bringing database /local/notesdata/admin4.nsf online ...

Program completed successfully.
bash-3.00$
```

mmmmm. All content of the database are now rolled forward to the last committed transaction found in the last archived transaction log.

nnnnn. Restart Lotus Domino Server

## 11 Backup/Restore Microsoft Exchange Server

This chapter will describe in details how to use MM Backup to backup your Microsoft Exchange Server 2000 / 2003 and how you can restore your Microsoft Exchange Server 2000 / 2003 from the backup files.

### 11.1 Requirements

- lviii. Microsoft Exchange Server 2000 with Services Pack 3 and post-SP3 update rollup installed. Please refer to <http://www.microsoft.com/exchange/> for more information.  
or  
Microsoft Exchange Server 2003.
- lix. MM Backup must be installed onto the computer running Microsoft Exchange Server 2000 / 2003.
- lx. Data from Microsoft Exchange Server will be backed up to a temporary directory before they are sent to Mastermind Data Backup Server. Please make sure you have sufficient space on your computer to store these data when you run the backup job.

### 11.2 Overview

A Microsoft Exchange Server 2000/2003 stores its data in Windows Active Directory as well as in its databases. To fully backup a Microsoft Exchange Server 2000/2003, you need to backup the following components:

**lxi. Windows System State**

The Windows System State contains the information about your Windows system, including Windows Active Directory. A Microsoft Exchange Server 2000 / 2003 stores some of its configuration, e.g. email accounts and mailbox properties, inside Windows Active Directory. It is important that Windows Active Directory is backup properly when backing up a Microsoft Exchange Server.

Active Directory is stored inside a Windows Server running as Windows domain controller. If your Exchange Server is a domain controller, you can simply backup the Windows System State of your Exchange Server. If your Exchange Server is running as a member server, you will need to install another copy of MM Backup onto the domain controller to backup the Windows System State of inside the domain controller.

For more information on Active Directory, please refer to <http://www.microsoft.com/windows2000/technologies/directory/ad/default.asp>

**lxii. Microsoft Information Store**

Exchange Server stores all emails and documents inside its databases, which are grouped together as storage groups inside Microsoft Information Store. It is important that Microsoft Information Store is fully backup when backing your Exchange Server.

**lxiii. Microsoft Site Replication Service**

Microsoft Site Replication Service is installed automatically when exchange server site replication feature is enabled. Microsoft Site Replication stores its runtime and configuration information inside its own database. If you are running your Exchange Server with Site Replication Service enabled, please make sure that you backup the site replication database as well.

**lxiv. Microsoft Key Management Service (Exchange 2000 only)**

Similarly, if you have setup your Exchange Server with Key Management Services enabled, please make sure that you backup the key management database as well.

MM Backup will backup your Microsoft Exchange Server by taking the following steps:

- lxv. Run all Pre-Commands of this backup set

lxvi. If the backup type to run is [Database Backup type],

ooooo. Windows System State will be backed up to a temporary directory specified in its backup set

ppppp. All exchange database(s) selected are backed up to a temporary directory specified in its backup set

lxvii. If the backup type to run is [Transaction Log Backup type],

qqqqq. New transaction log extents generated since last backup will be copied to the temporary directory

lxviii. Remove transaction log extents backed up from the Exchange Server

lxix. Run all Post-Commands of this backup set

lxx. Upload all backup files from the temporary directory to an Mastermind Data Backup Server

lxxi. Remove temporary files from the temporary directory if [Setting] -> [Temporary Directory for storing backup files] is enabled

## 11.3 How to backup Microsoft Exchange Server

Please follow the instructions below to backup your Microsoft Exchange Server 2000 / 2003 using MM Backup:

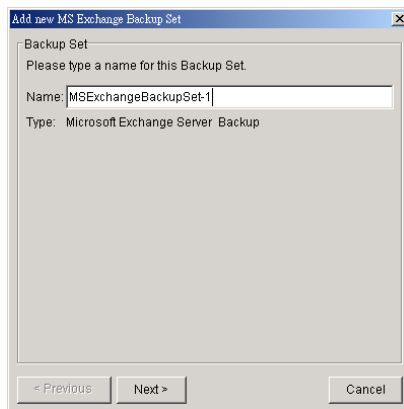
lxxii. Open MM Backup

Right click MM Backup icon available in the system tray and choose [Open]

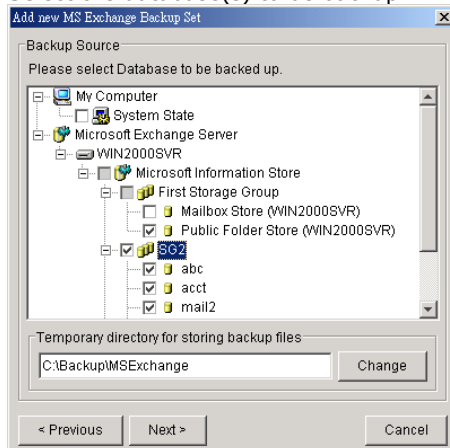
lxxiii. Create a backup set

rrrrr. From the Menu, Choose [Backup Set] -> [New] -> [MS Exchange Backup Set]

sssss. Enter a name for your backup set



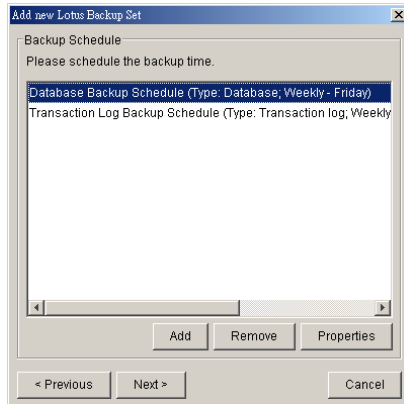
ttttt. Select the database(s) to be backup



If this Exchange Server is also a domain controller of this Active Directory, select the [System State] checkbox as well. Otherwise, please install MM Backup to the domain controller of this Active Directory and select the [System State] checkbox on that computer

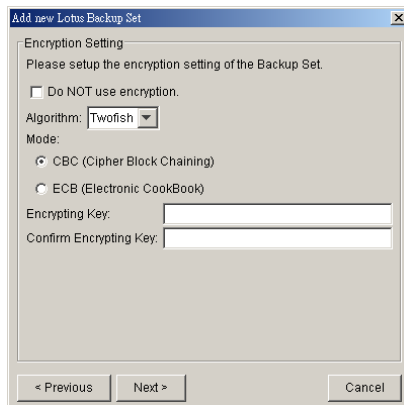
uuuuu. Enter a temporary directory for storing the backup files before they are sent to an Mastermind Data Backup Server

vvvvv. Set the backup schedule for Database Backup



wwwww. Set the backup schedule for Transaction Log Backup  
(Note: You can have more than one schedule in a backup set, i.e. you can perform intra-day transaction log backup by adding more than one daily transaction log backup schedule to your backup set)

xxxxx. Set the encryption algorithm, encryption mode and encrypting key for this backup set

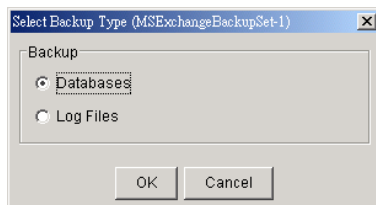


(Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.)

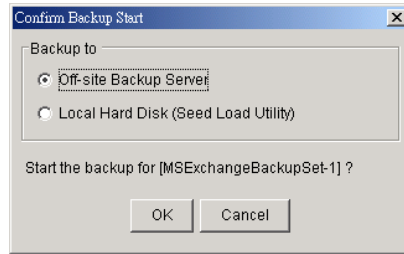
Ixxiv. Run Backup

yyyyy. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)

zzzzz. Select the backup type (e.g. Database, Log Files) you would like to perform



aaaaa. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server and press the [OK] button



bbbbbb. You should get something similar to the screen shot below.

## 11.4 How to restore Microsoft Exchange Server

Please follow the instructions below to restore Microsoft Exchange Server 2000 / 2003 from an Mastermind Data Backup Server.

lxxv. Prepare the system for your Exchange Server (if required)

Install the original version of Windows and Exchange Server (with the same level of service pack installed as in the original system) back to your computer

lxxvi. Restore Windows Active Directory (if required)

If you have re-installed Windows, please download the Windows System State backup file, named [SystemState.bkf], from Mastermind Data Backup Server and then use [NTBackup.exe] to restore your Windows System State to its backup time from the backup file by following the instructions below:

cccccc. Run [NTBackup.exe] from [Start] -> [Run]

dddddd. Press the [Restore Wizard] button and then press the [Next] button

eeeeee. Press the [Import] button and use the [Browse] button to select the backup file [SystemState.bkf] downloaded

ffffff. Select the checkbox next to the description that matches your backup file

gggggg. Press the [Next] button and then the [Finish] button

lxxvii. Install MM Backup (if required)

Please refer to the [Installation] section for information on how to install MM Backup onto your computer.

lxxviii. Startup the [Microsoft Information Store] services from Windows Services

lxxix. Restore exchange database(s) from backup:

hhhhhh. Download the database backup files to be restored from the Mastermind Data Backup Server (or find the cached copy available in the temporary directory defined in your backup set) and save them to your hard disk (please make sure the directory structure is the same as it appears on the browser), namely:

```
->[C:]
-->[backup]
---->[ABC]
----->[Microsoft Information Store]
----->[First Storage Group]
```

```

----->[Mailbox Store(ABC)]
----->Priv1.edb
----->Priv1.stm
----->[Public Folder Store(ABC)]
----->Pub1.edb
----->Pub1.stm
----->E0000001.log
    
```

iiiiii. If the database to be restored exists on your computer already, please dismount it from the services using [Start] -> [Program] -> [Microsoft Exchange] -> [System Manager]

jjjjj. Use [ExchangeRestore.exe] from the [bin] directory under the installation directory of MM Backup (e.g. C:\Program Files\MM Backup\bin\ExchangeRestore.exe) to restore the exchange database(s).

Simply run [ExchangeRestore.exe] to print the usage

```

ExchangeRestore.exe Usage:
C:\Program Files\MM Backup\bin> ExchangeRestore.exe

Microsoft Exchange Server 2000/2003 Backup Recovery Utility

Usage:
ExchangeRestore DIR=path SERVER=server TEMP=tempDir [SERVICE=service [STORAGE=storage [DATABASE=database]]]

DIR          Directory containing all backup files
SERVER       Name of Exchange Server to be restored
TEMP        Temporary directory to be used during restore
            Please specific a path with plenty of free space
SERVICE    Name of Exchange Service to be restored. It must be either
            "Microsoft Information Store", "Microsoft Key Management Service"
            or "Microsoft Site Replication Service"
STORAGE     Name of storage group to be restored
DATABASE    Name of database to be restored

Examples:
1. To restore an exchange server:
   ExchangeRestore DIR="C:\Backup" SERVER="ExchangeServer" TEMP="C:\Temp"

2. To restore the information store:
   ExchangeRestore DIR="C:\Backup" SERVER="ExchangeServer" TEMP="C:\Temp"
   SERVICE="Microsoft Information Store"

3. To restore an exchange storage group:
   ExchangeRestore DIR="C:\Backup" SERVER="ExchangeServer" TEMP="C:\Temp"
   SERVICE="Microsoft Information Store" STORAGE="StorageGroup1"

4. To restore an exchange database:
   ExchangeRestore DIR="C:\Backup" SERVER="ExchangeServer" TEMP="C:\Temp"
   SERVICE="Microsoft Information Store" STORAGE="StorageGroup1"
   DATABASE="Database1"

where
"C:\Backup"      is the directory containing all backup files
"ExchangeServer" is the server name of an exchange server
"C:\Temp"       is the temporary directory to be used
"StorageGroup1" is the name of a storage group
"Database1"     is the name of a database
    
```

kkkkkk. (Example 1) To restore all databases from backup available in [F:\Backup] to an exchange server named [WIN2000SVR] using the temporary directory [F:\Temp], you can use this command:

```

E:\Program Files\MM Backup\bin> ExchangeRestore DIR="F:\Backup" TEMP="F:\Temp"
SERVER="WIN2000SVR"
    
```

```

Exchange Server Recovery Example:
E:\Program Files\MM Backup\bin> ExchangeRestore DIR="F:\Backup" TEMP="F:\Temp"
SERVER="WIN2000SVR"

Microsoft Exchange Server 2000/2003 Backup Recovery Utility

[Start] Exchange Server - 'WIN2000SVR'
[Start] Service - 'Microsoft Information Store'
[Start] Storage Group - 'First Storage Group'
[Start] Database - 'Mailbox Store (WIN2000SVR)'
Restoring file 'E:\Program Files\Exchsrvr\mdbdata\priv1.edb' ...
Restoring file 'E:\Program Files\Exchsrvr\mdbdata\priv1.stm' ...
    
```

```
[End] Database - 'Mailbox Store (WIN2000SVR)'
[Start] Database - 'Public Folder Store (WIN2000SVR)'
Restoring file 'E:\Program Files\Exchsrvr\mdbdata\publ.edb' ...
Restoring file 'E:\Program Files\Exchsrvr\mdbdata\publ.stm' ...
[End] Database - 'Public Folder Store (WIN2000SVR)'
[Start] Restoring transaction log - 'First Storage Group'
Restoring Log File 'F:\Temp\restore.tmp\First Storage Group\E00000B3.log' ...
Restoring Log File 'F:\Temp\restore.tmp\First Storage Group\E00000B4.log' ...
[End] Restoring transaction log - 'First Storage Group'
[Start] Applying transaction log ...
[End] Applying transaction log
[End] Storage Group - 'First Storage Group'
.....
[Start] Storage Group - 'SG2'
[Start] Database - 'acct'
Restoring file 'E:\Program Files\Exchsrvr\SG2\acct.edb' ...
Restoring file 'E:\Program Files\Exchsrvr\SG2\acct.stm' ...
[End] Database - 'acct'
[Start] Restoring transaction log - 'SG2'
Restoring Log File 'F:\Temp\restore.tmp\SG2\E0100072.log' ...
Restoring Log File 'F:\Temp\restore.tmp\SG2\E0100073.log' ...
[End] Restoring transaction log - 'SG2'
[Start] Applying transaction log ...
[End] Applying transaction log
[End] Storage Group - 'SG2'
[End] Exchange Server - 'WIN2000SVR'
E:\Program Files\MM Backup\bin>
```

IIIIII. (Example 2) To restore the database named [mail] in storage group [SG5] from backup available in [F:\Backup] to an exchange server named [WIN2000SVR] using the temporary directory [F:\Temp], you can use this command:

**E:\Program Files\MM Backup\bin> ExchangeRestore DIR="F:\Backup" TEMP="F:\Temp" SERVER="WIN2000SVR" SERVICE="Microsoft Information Store" STORAGE="SG5" DATABASE="mail1"**

Exchange Server Recovery Example:
<pre>E:\Program Files\MM Backup\bin&gt; ExchangeRestore DIR="F:\Backup" TEMP="F:\Temp" SERVER="WIN2000SVR" SERVICE="Microsoft Information Store" STORAGE="SG5" DATABASE="mail"  Microsoft Exchange Server 2000/2003 Backup Recovery Utility  [Start] Storage Group - 'SG5' [Start] Database - 'mail' Restoring file 'E:\Program Files\Exchsrvr\SG5\mail.edb' ... Restoring file 'E:\Program Files\Exchsrvr\SG5\mail.stm' ... [End] Database - 'mail' [Start] Restoring transaction log - 'SG5' Restoring Log File 'F:\Temp\restore.tmp\SG5\E0300012.log' ... Restoring Log File 'F:\Temp\restore.tmp\SG5\E0300013.log' ... [End] Restoring transaction log - 'SG5' [Start] Applying transaction log ... [End] Applying transaction log [End] Storage Group - 'SG5'  E:\Program Files\MM Backup\bin&gt;</pre>

mmmmmm. Repeat the same procedure for each database to be restored to the Exchange Server.

nnnnnn. You can use [Start] -> [Program] -> [Administrative Tools] -> [Event Viewer] to check if there are any errors generated from the exchange databases restoring activities.

lxxx. However, if ExchangeRestore.exe still cannot mount the restored files and returns with strange errors, e.g. bad signature, or null errors. Then Exchange server might have incorrectly spooled the backup files in the first place. Please try to mount the restored database and log files manually by the following instructions:

oooooo. In MS Exchange System Manager, dismount both the Mailbox Store and Public Folder Store from the server.

pppppp. Copy all the restored database files to the MDBDATA folder (By default, the MDBDATA folder is located under C:\Program Files\Exchsrvr\)

Mailbox Store:  
- priv1.edb

- priv1.stm
- Public Folder Store:
- pub1.edb
  - pub1.stm

qqqqq. Run "eseutil /r" to apply the transaction log files to bring the database to a consistent state, e.g.:

```
C:\Program Files\Exchsrvr\MDBDATA> ..\bin\eseutil /r e00
```

The above command will try to bring all the databases handled by the transaction log files starting with "e00" located in "C:\Program Files\Exchsrvr\MDBDATA" into clean shutdown state.

rrrrr. Run "eseutil /p" to repair the database files, e.g.:

```
C:\Program Files\Exchsrvr\MDBDATA> ..\bin\eseutil /p priv1.edb  
C:\Program Files\Exchsrvr\MDBDATA> ..\bin\eseutil /p pub1.edb
```

sssss. Mount both Mailbox Store and Public Folder Store to the Server through the MS Exchange System Manager.

lxxxi. Completed

## 12 Backup/Restore Windows System State

This chapter will describe in details how to use MM Backup to backup Windows System State and how you can restore your Windows System State from backup.

### 12.1 Requirements

- lxxxii. Microsoft Windows XP Professional / 2003
- lxxxiii. MM Backup must be installed onto the computer containing the system state you want to backup
- lxxxiv. Windows system state will be backed up to a temporary file before it is sent to OBS. Please make sure you have sufficient space on your computer to store the temporary file when you run the backup job.

### 12.2 Overview

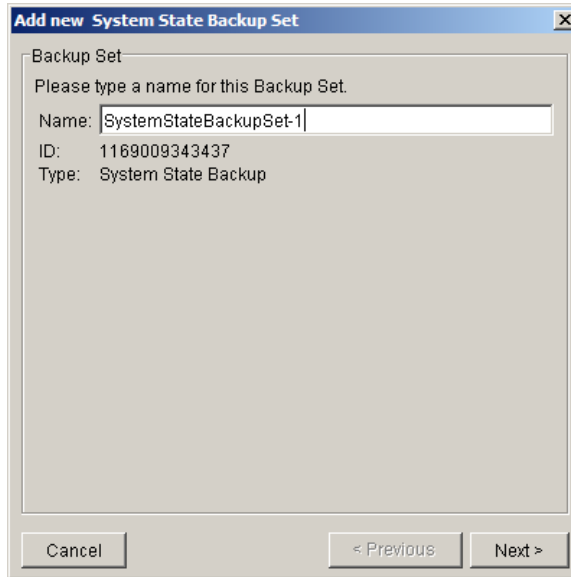
MM Backup will backup your Microsoft Exchange Server by taking the following steps:

- lxxxv. Run all Pre-Commands of this backup set
- lxxxvi. Windows System State will be backed up to a temporary directory specified in its backup set
- lxxxvii. Run all Post-Commands of this backup set
- lxxxviii. Upload the Windows System State backup files from the temporary directory to an Mastermind Data Backup Server
- lxxxix. Remove the Windows System State temporary backup files from the temporary directory if [Setting] -> [Temporary Directory for storing backup files] is enabled

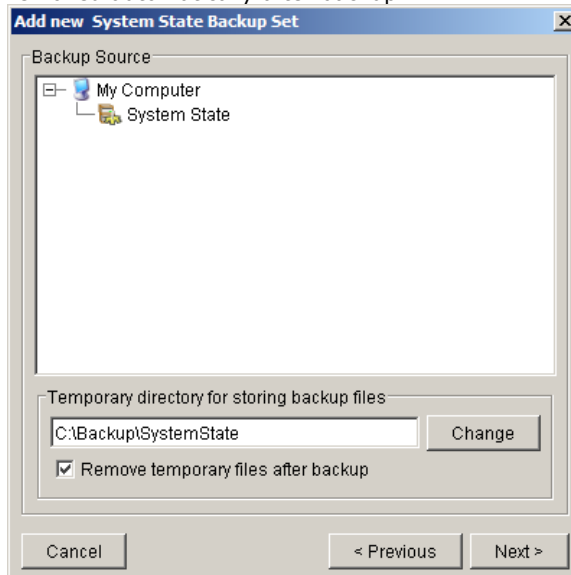
### 12.3 How to backup Windows System State

Please follow the instructions below to backup Windows System State using MM Backup:

- xc. Open MM Backup
  - Right click MM Backup icon available in the system tray and choose [Open]
- xc. Create a backup set
  - ttttt. From the Menu, Choose [Backup Set] -> [New] -> [System State Backup Set]
  - uuuuu. Enter a name for your backup set

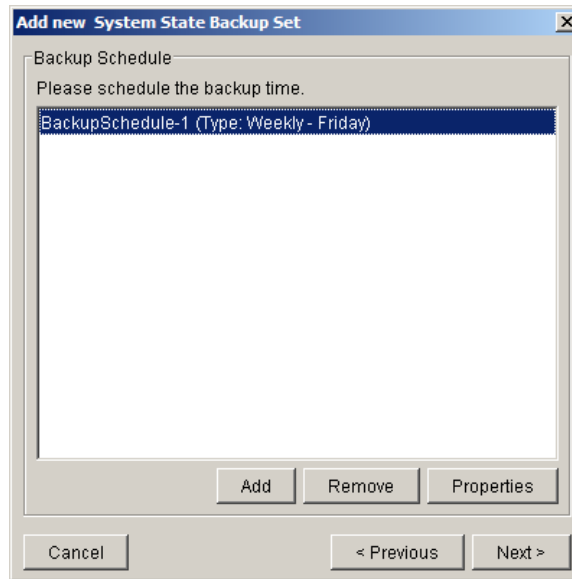


vvvvv. Use the [Change] button to configure the [Temporary directory for storing backup files] setting and check the [Remove temporary files after backup] if you want temporary files to be removed automatically after backup

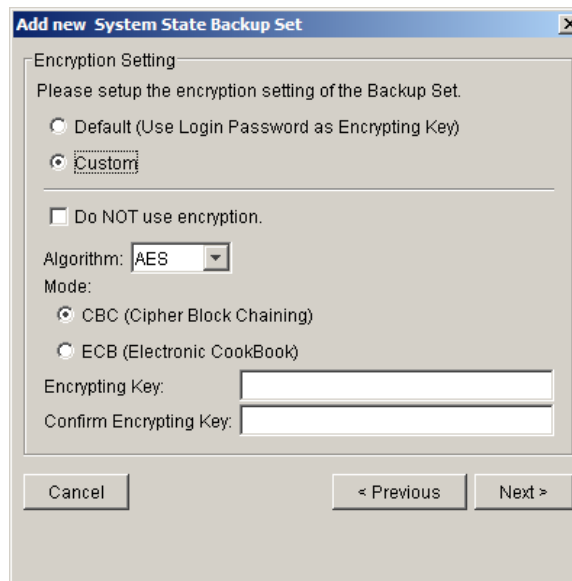


wwwww. Enter a temporary directory for storing the backup files before they are sent to an Mastermind Data Backup Server

xxxxx. Set the backup schedule for this backup set



yyyyyy. Set the encryption algorithm, encryption mode and encrypting key for this backup set

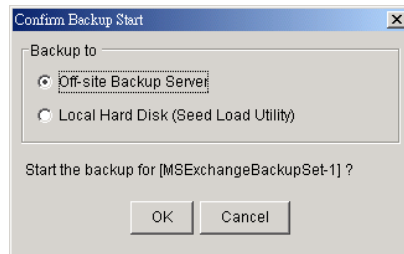


(Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.)

xcii. Run Backup

zzzzzz. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)

aaaaaaa. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server and press the [OK] button



bbbbbbb. You should get something similar to the screen shot below.

## 12.4 How to restore Windows System State

Please follow the instructions below to restore Windows System State from an Mastermind Data Backup Server.

xciii. Install MM Backup (if required)

Please refer to the [Installation] section for information on how to install MM Backup onto your computer.

xciv. Restore the Windows System State Backup File (i.e. SystemState.bkf) from the backup server

xcv. Use [NTBackup.exe] to restore your Windows System State to its backup time from the backup file by following the instructions below:

ccccccc. Run [NTBackup.exe] from [Start] -> [Run]

ddddddd. Press the [Restore Wizard] button and then press the [Next] button

eeeeeee. Press the [Import] button and use the [Browse] button to select the backup file [SystemState.bkf] downloaded

ffffff. Select the checkbox next to the description that matches your backup file

ggggggg. Press the [Next] button and then the [Finish] button

xcvi. Completed

## 13 Backup/Restore Individual Brick Level Backup for Microsoft Exchange Server

### 13.1 Requirements

xcvii. Microsoft Exchange Server 2000 with Services Pack 3 and post-SP3 update rollup installed. Please refer to <http://www.microsoft.com/exchange/> for more information.  
or  
Microsoft Exchange Server 2003.

xcviii. MM Backup must be installed onto the computer running Microsoft Exchange Server 2000 / 2003.

### 13.2 Overview

Brick Level Backup for Microsoft Exchange Server is not designed to fully protect an Exchange server, but to facilitate easy backup and fast restore of individual emails, contacts, calendars, tasks etc. The brick level restore cannot fully recover the Information Store after a disaster. If used, a brick level backup must be utilized in conjunction with full Information Store Backup, in order to fully protect the exchange server.

### 13.3 Granting Privileges

Brick Level Backup requires "Full Mailbox Access" permission for the user running MM Backup. Normally, MM Backup can acquire the permission on it's own but if you encounter 'Access Denied' errors you need to manually grant access privileges to the user running MM Backup using one of the following instructions below:

#### **For one specific mailbox**

Use the following procedure to grant access to an Exchange 2000 or an Exchange 2003 mailbox:

- 1 Start Active Directory Users and Computers.
- 2 On the View menu, ensure that the Advanced Features check box is selected.
- 3 Right-click the user whose mailbox you want to give permissions to and choose Properties.
- 4 On the Exchange Advanced tab, click Mailbox Rights.
- 5 Notice that the Domain Admins and Enterprise Admins have both been given Deny access to Full Mailbox access.
- 6 Click Add, click the user or group who you want to have access to this mailbox, and then click OK.
- 7 Be sure that the user or group is selected in the Name box.
- 8 In the Permissions list, click Allow next to Full Mailbox Access, and then click OK.
- 9 Click Ok all the way out.
- 10 Restart the Microsoft Exchange Information Store.

## **For mailboxes located within a specific mailbox store**

Use the following procedure to grant access to an Exchange 2000 or an Exchange 2003 mailbox found on a specific mailbox store:

- 1 Start Exchange System Manager.
- 2 Drill down to your server object within the appropriate Administrative Group. Expand the server object and find the required mailbox store within the appropriate Storage Group. Right-click it and choose Properties.
- 3 In the Properties window go to the Security tab.
- 4 Click Add, click the user or group who you want to have access to the mailboxes, and then click OK.
- 5 Be sure that the user or group is selected in the Name box.
- 6 In the Permissions list, click Allow next to Full Control, and then click OK.
- 7 Click 'Apply' and 'OK'
- 8 Restart the Microsoft Exchange Information Store.

## **For mailboxes located within a specific server**

- 1 Start Exchange System Manager.
- 2 Drill down to your server object within the appropriate Administrative Group. Right-click it and choose Properties.
- 3 In the Properties window go to the Security tab.
- 4 Click Add, click the user or group who you want to have access to the mailboxes, and then click OK.
- 5 Be sure that the user or group is selected in the Name box.
- 6 In the Permissions list, click Allow next to Full Control, and then click OK.
- 7 Click Ok all the way out.
- 8 Restart the Microsoft Exchange Information Store.

## 13.4 How to backup Individual Brick Level Backup

Please follow the instructions below to backup all individual items within your Microsoft Exchange Server 2000 / 2003 using MM Backup:

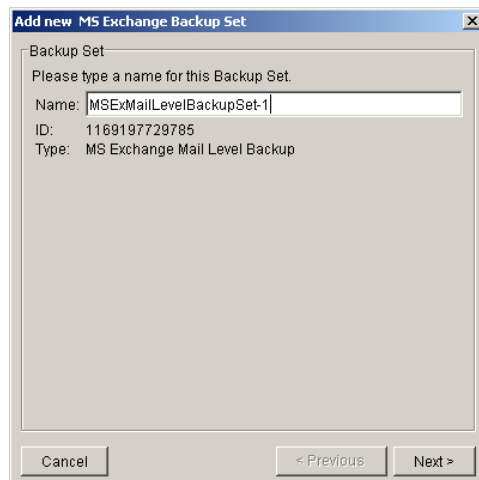
xcix. Open MM Backup

Right click MM Backup icon available in the system tray and choose [Open]

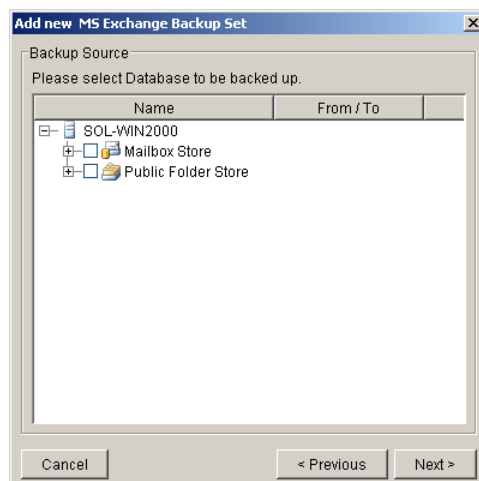
c. Create a backup set

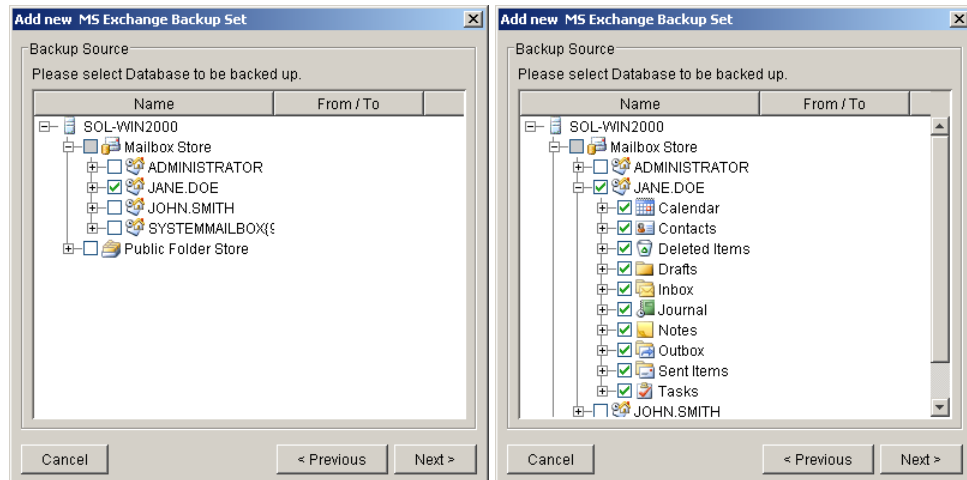
hhhhhh. From the Menu, Choose [Backup Set] -> [New] -> [MS Exchange Mail Level Backup Set]

iiiiiii. Enter a name for your backup set



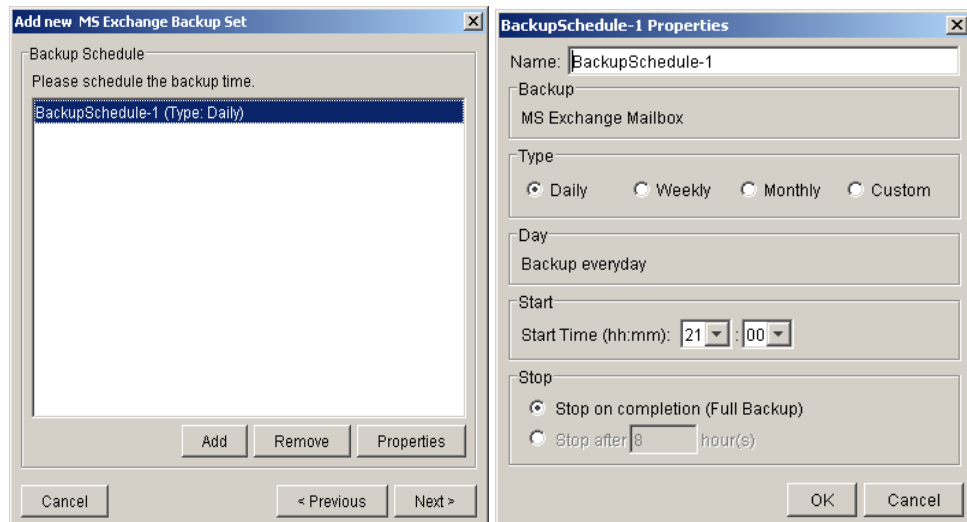
jjjjjj. Select the email account(s) to backup



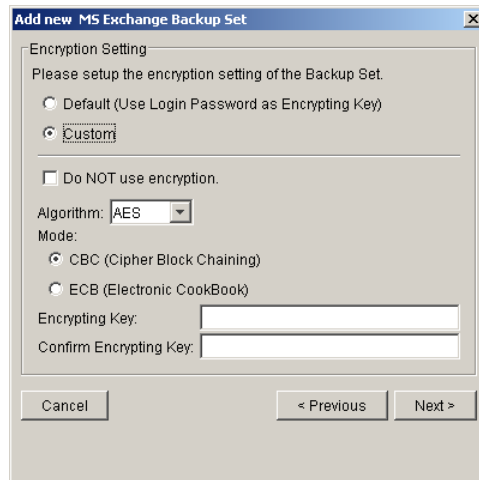


You can drill down to select individual items.

kkkkkkk. Set the backup schedule



IIIIII. Set the encryption algorithm, encryption mode and encrypting key for this backup set

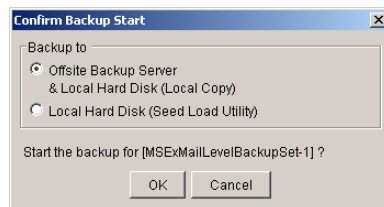


(Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.)

ci. Run Backup

mmmmmm. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)

nnnnnn. Select [Mastermind Data Backup Server] to start backing up your files to an Mastermind Data Backup Server and press the [OK] button



## 13.5 How to restore Individual Brick Level Backup

Please follow the instructions below to restore individual emails, contacts, calendars, tasks etc. from an Mastermind Data Backup Server back into your exchange server. Please note that individual brick level can only be restored using the MM Backup client.

cii. Open MM Backup

Right click MM Backup icon available in the system tray and choose [Open]

ciii. Choose the [Restore] tab and select the items you want to restore

civ. Press the [Restore Files] button

cv. Press [Start]

cvi. Restore complete. Please logon to exchange to get the restored items.

## 14 Backup/Restore MySQL Server

This chapter will describe in details how to use MM Backup to backup your MySQL server and how you can restore your MySQL server from the database backup files.

### 14.1 Requirements

- cvi. MM Backup must be installed onto the computer running MySQL server.
- cviii. Data from MySQL server will be backed up to a temporary directory before they are sent to Mastermind Data Backup Server. Please make sure you have sufficient space on your computer to store these data when you run the backup job.
- cix. There must be a MySQL account can be used to connect from localhost.

Add two new MySQL accounts for Backup Manager

```
mysql> GRANT ALL PRIVILEGES ON *.* TO 'root'@'localhost'  
-> IDENTIFIED BY 'some_pass';  
mysql> GRANT ALL PRIVILEGES ON *.* TO 'root'@'localhost.localdomain'  
-> IDENTIFIED BY 'some_pass';  
mysql> FLUSH PRIVILEGES;
```

They are superuser accounts with full privileges to do anything with a password of some\_pass.

### 14.2 Overview

MM Backup will backup your MySQL server by taking the following steps:

- cx. Run all Pre-Commands of this backup set
- cxii. All database(s) (either local or external) selected are backed up to a temporary directory specified in its backup set
- cxiii. Run all Post-Commands of this backup set
- cxiiii. Upload all backup files from the temporary directory to an Mastermind Data Backup Server
- cxv. Remove temporary files from the temporary directory if [Setting] -> [Temporary Directory for storing backup files] is enabled

## 14.3 How to backup MySQL server on Windows

Please follow the instructions below to backup your MySQL server using MM Backup:

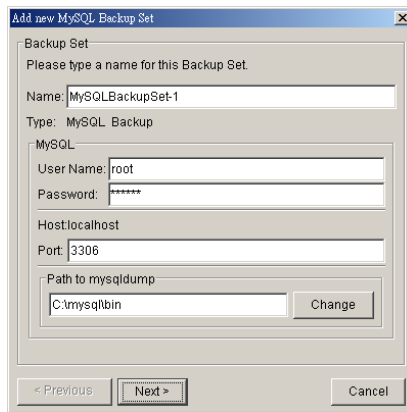
cxv. Open MM Backup

Right click MM Backup icon available in the system tray and choose [Open]

cxvi. From the Menu, Choose [Backup Set] -> [New] -> [MySQL Backup Set]  
Create a backup set

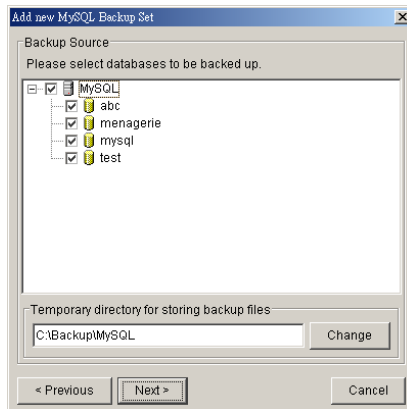
ooooooo. From the Menu, Choose [Backup Set] -> [New] -> [MySQL Backup Set]

ppppppp. Enter a name for your backup set



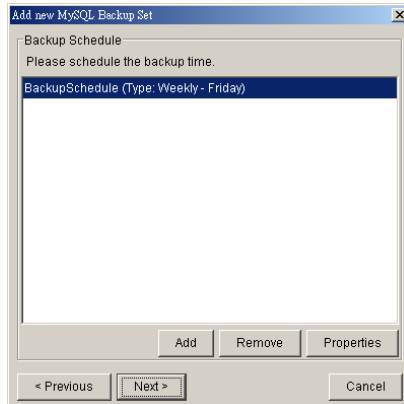
qqqqqqq. Enter the root password, the MySQL server TCP/IP port number and the path to MySQL backup utility (mysqldump)

rrrrrrr. Select the database(s) to be backup

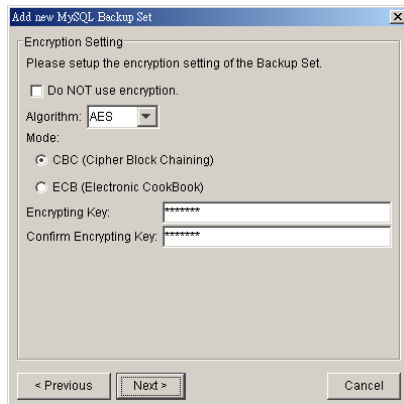


sssssss. Enter a temporary directory for storing the backup files before they are sent to an Mastermind Data Backup Server, e.g. C:\Backup\MySQL

ttttttt. Set the backup schedule for Database Backup



uuuuuu. Set the encryption algorithm, encryption mode and encrypting key for this backup set

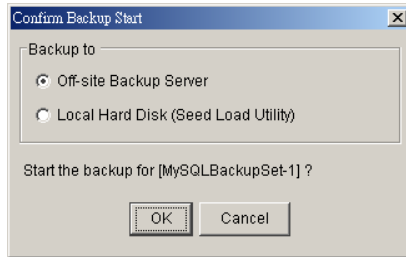


(Hint: For maximum security, please select AES (Advanced Encryption Standard) Algorithm, CBC (Cipher Block Chaining) mode and use an encrypting key with more than 8 characters.)

cxvii. Run Backup

vvvvvv. Select the backup set you want to run on the left panel and press the [Start Backup] button (▶)

wwwwwww. Select [Off-site Backup Server] to start backing up your files to an Mastermind Data Backup Server and press the [OK] button



## 14.4 How to backup MySQL server on Linux (command line mode)

If you want to setup MM Backup to backup MySQL server running on Linux using command line mode, please do the followings:

cxviii. Create a backup account on OBS

cxix. Logon to the web interface of OBS using the backup account created in the previous step (doesn't matter if it is not from the Linux server running the MySQL server to be backed up)

cxx. Create a new backup set by pressing the [Backup Set] -> [Add] button

cxxi. Select the [Backup Set] -> [Type] -> [MySQL Database Server] radio button and press the [Update] button (which can be found at the bottom of the page)

cxxii. Setup all [Backup Set] -> [Database Backup Setting]

Settings	Descriptions
MySQL Username (e.g root)	A MySQL user account that has backup access to the databases to be backed up (e.g. root). Please refer to the <a href="#">[Requirements]</a> section for details
MySQL Password	Password of the MySQL user account being used
Host	IP address / Hostname of the MySQL Server, e.g. localhost
MySQL Connection TCP/IP Port	TCP/IP port used to access the MySQL Server (default: 3306)
Path to MySQL backup utility (mysqldump)	Full path to where mysqldump can be found (e.g. /usr/bin/mysqldump)
Temporary Spooling Directory	A temporary directory to be used to store all MySQL database dump files before they are uploaded to the backup server
Enable Delete Temp. File	Whether to delete the temporary MySQL database dump files after they are uploaded to the backup server

cxxiii. Setup the [Backup Set] -> [Backup Source] setting

- Add an "MySQL" entry to the [Backup Source] if you want to backup all databases under this MySQL Server
- Add two entries, "MySQL/database1" and "MySQL/database2", to the [Backup Source] if you

want to backup both "database1" and "database2" under this MySQL Server

(Please use "\" instead of "/" if the MySQL server to be backed up is running on Windows instead of Linux)

cxxiv. Setup the [Backup Set] -> [Backup Schedule] by pressing the [Add] link next the the "Backup Schedule" sub-title

cxxv. Install MM Backup onto the Linux server running MySQL server (Please refer to the [\[2.1 Installation of MM Backup\]](#) section for details. The command line mode installation instructions are available on the web interface)

cxxvi. Completed

If you have started up the MM Backup backup scheduler in the previous step, selected databases will be backed up automatically at scheduled time

## 14.5 How to restore MySQL server

Please follow the instructions below to restore MySQL server from an Mastermind Data Backup Server.

cxxvii. Download the database backup files to be restored from the Mastermind Data Backup Server

Please refer to the Restoring files section for information on how to download backup files from Mastermind Data Backup Server.

cxxviii. Restore the database named [db\_name] from the database backup file [db\_name.sql]:

xxxxxxx. Connect to the MySQL server

(Windows) C:\> mysql  
(Linux) [root@server ~]# mysql

yyyyyyy. Create the database to be restored

mysql> CREATE DATABASE IF NOT EXISTS db\_name

zzzzzzz. Restore the database backup file back into the MySQL server

mysql> use db\_name ;  
mysql> source db\_name.sql ;

If db\_name.sql is not located in the current directory, please specify the full path to the db\_name.sql file in the command above.

cxxix. Repeat the same procedure for each database to be restored to the MySQL Server.

cxx. Completed