User Guide

BACKUP UTILITY

User Guide –this guide explains how the Backup Utility works. It describes the basic concepts and terms you need to be familiar with in order to create and run backup jobs, tailored to your backup needs.

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Overview

The Backup Utility is a tool for selecting a set of files or directories whose content is copied from a source location to a destination location. A destination location can be located on the host machine itself, or on an external host machine whose location is accessible via a URL. Usually backups are performed to devices that store data in a location external to the host machine so that data can be recovery even if the host machine is destroyed or otherwise nonoperational, but the utility does not mandate that. The utility does not allow the destination directory to be a source directory; this prevents infinite copy cycles. If a destination directory is contained in a source directory, that directory is skipped from the backup or restore operation.

The Backup Utility can be thought of as a more sophisticated file copy utility that lets you select source files or directories. When a directory is selected then all files and directories nested below the selected directory are also automatically included.

In order to start the backup (or copy) operation, a destination directory needs to be specified before the backup operation is performed. If no destination directory has been selected when the backup operation begins, you will be prompted to supply the destination directory.

A job specifies a set of selected files and directories and optionally a destination directory and other job options. Job options are such things as option *file replacement policy*: 1.) always replace destination, or 2.) replace destination based on source/destination file date comparison. A backup is performed by selecting the files and directories to be backed, setting job execution options and then by performing the backup. The selected file and options can be saved as a named job. Jobs are specified from the Backup process perspective. The Restore process perspective is empirically derived from the specification of the backup, hence there is no need to have a separate restore process specification. When you are ready to perform the backup, you will be given the option to perform the operation for either backup or restore purposes.

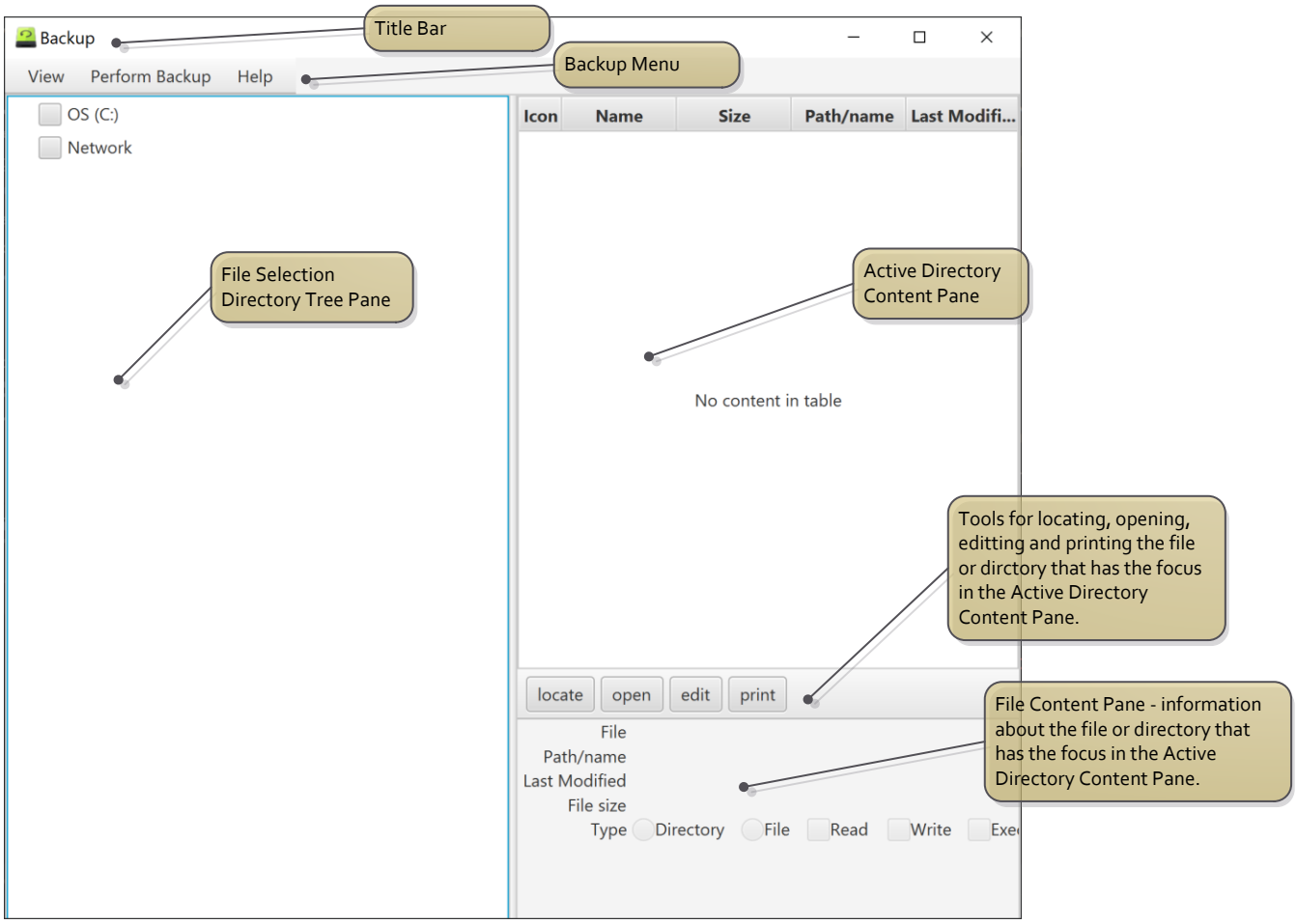
It perfectly fine to have multiple jobs using the same destination path. When you run a backup operation, all files that match a selected file or contained in a selected directory are consider in the backup operation. That file will be backed up if the replacement policy is always, and that same file will optionally be backed up if the replacement policy is by date and the last modified date of the source is greater than the last modified date of the destination if the file already exists in the destination. This feature often speeds up backup time when the number of selected file and directories that changed since the last backup is small compared to the number of selected files. A backup operation itself never deletes files. It either adds a file to the destination or replaces the file at the destination. It doesn't delete files. If a file was deleted from its source since a backup was last run, it will not be deleted from the destination the next time the backup is run. There's one exception to this rule: When a date path is automatically appended, a revolving backup scheme is implemented and older data path directories and its content can be deleted

The utility can also store backed up content in an encrypted format. The utility requires the use of the same password for both encrypting and decrypting content. The utility does not save the encryption password; if you lose or forget the password, you will not be able to restore the encrypted content.

It is important to recognize when using a backup utility, the utility doesn't understand your backup needs. When you're backing up data, you are making a redundant copy for the purpose of recovering

the data if the original source somehow becomes corrupt and you need to recover files back to some previously saved state. You backup files for a number of reason; and there are tradeoffs in the speed or overhead that they encumber, the storage space it requires and the ease at which it is possible to restore to a previous stable defined state. This backup utility provides support for a number of backup services that provide a rich set of backup services that fulfill different backup needs. For example, for most users, backing up pictures and music files has different backup needs then for backing up financial data. Financial data usually may need to be backup more frequently then picture and music files. You might want to encrypt the financial data content when it is stored at the destination directory. That's a particular important consideration when storing data in the clouds. It's also an important consideration if you store backup data on a thumb drive. What if you lose the thumb drive? So the ability to store backup content in an encrypted format can be useful in many different scenarios.

Backup File Selection View



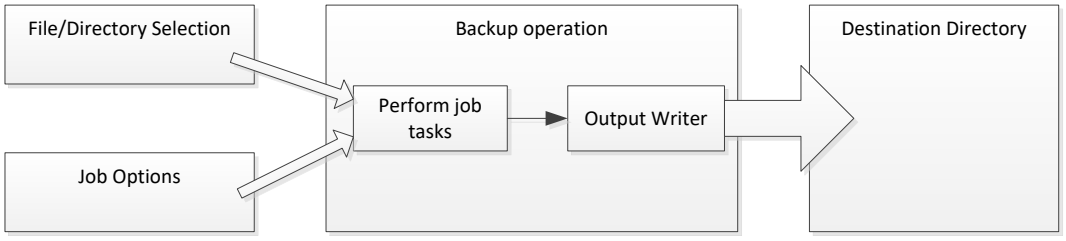
The above screen shot shows the backup file selection window. This is also the first window you see when the backup utility is first started.

File Selection Directory Tree Pane

The Directory Tree Plane provides a file system view of all storage devices associated with your computer. It can be a drive on a device, an attached external USB storage device or a network location. When you click on a directory in the Directory Tree Plane for the first time, the contents of directory is read and the selected node with now contain a directory expansion ▶ button. If you click on the directory expansion button, the directory tree will be expanded to include the contents of that directory. A further click on the button will collapse or hide the view of the contents below it. The directory expansion button acts in a toggle fashion for expanding or collapsing the nodes in the directory tree pane. The expansion button does not change the status of selected directories or files. The checkbox must be clicked in order to select or deselect a file or a directory node.

Each entry in the directory Tree Plane has a checkbox preceding its name. By clicking on a checkbox, you are selecting either a file or a directory to be included in the backup process. Selected items will have a checkbox that contain the checked character ✓. If the selected item is a directory, then all the content contained in that directory and all of it descending child directory content is will be copied to the destination. If the checkbox contains the dash character ▪, it means that some child or ancestral item below this directory is selected, but not all of them. Please note that selecting each individual item contained in directory is equivalent to just selecting the directory in the first place. If the checkbox does not contain a ✓ or ▪ means that the item and none of the it's ancestral node are selected. The checkbox indicator character automatically changes to reflect the current state of selected directory items.

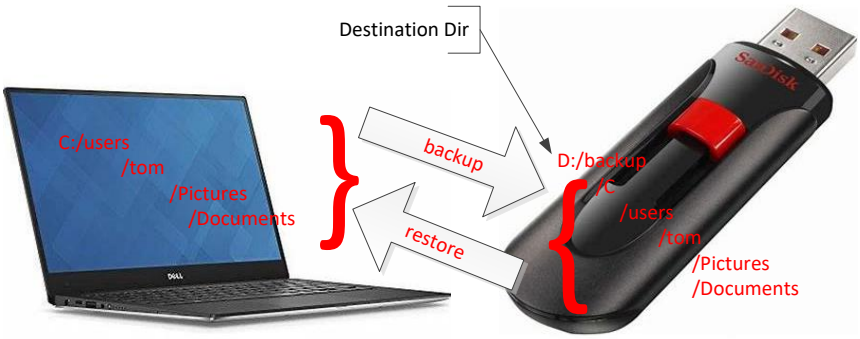
The following diagram conceptually illustrates the backup process:



The "Perform job tasks" uses information contain in the "File/Directory Selection" and "Job Options" window to determine which files and directories are involved in the backup operation and techniques to apply when performing the backup operations. The job option can also effect the format of how the backed up content is stored in the destination directory. For example, it can be store as a corresponding child node, the entire backed up content could be placed in a single individual jar file or the entire backup content could be placed in a version control repository. The enabling of certain job options determines how the backup utility will store output. This guide explains how each of the various job options effect how the backup/restore operation is performed.

For most backup job settings selected files get backed up to the destination directory and restored from a destination directory as illustrated in the following drawing. Basically the selected items get mapped

to a corresponding path in the destination. The drive letter designation gets mapped to a directory with the same name as the drive letter. For windows environments, the C: drive gets mapped to the C directory since the use of ":" is not allowed as a file or directory name character.



Title Bar

Besides containing the application icon and name, the title bar also contains the name of the current job. The name "$adhoc$" means that the current settings has not been saved as a job. In other words, the current job is an adhoc backup process. This can be handy, when you want to use the backup utility as a onetime use copy utility.

Backup Menu

View Menu

The view menu is used to select either the file selection window or the job window. The file selection window lets you see with files and directories are selected, and the job window lets you see the selected job options in effect for the current job.

Backup/Restore Menu

When you click on this menu Item you will be directed to Backup/Restore View.

Help Menu

The help menu contains two items "Help" and "About". If you click on the "Help" item you will get this help document. If you click on the "About" item you will get information about the Backup Utility project.

Active Directory Content Pane

The Active Directory Pane shows you content information about the currently selected or active directory

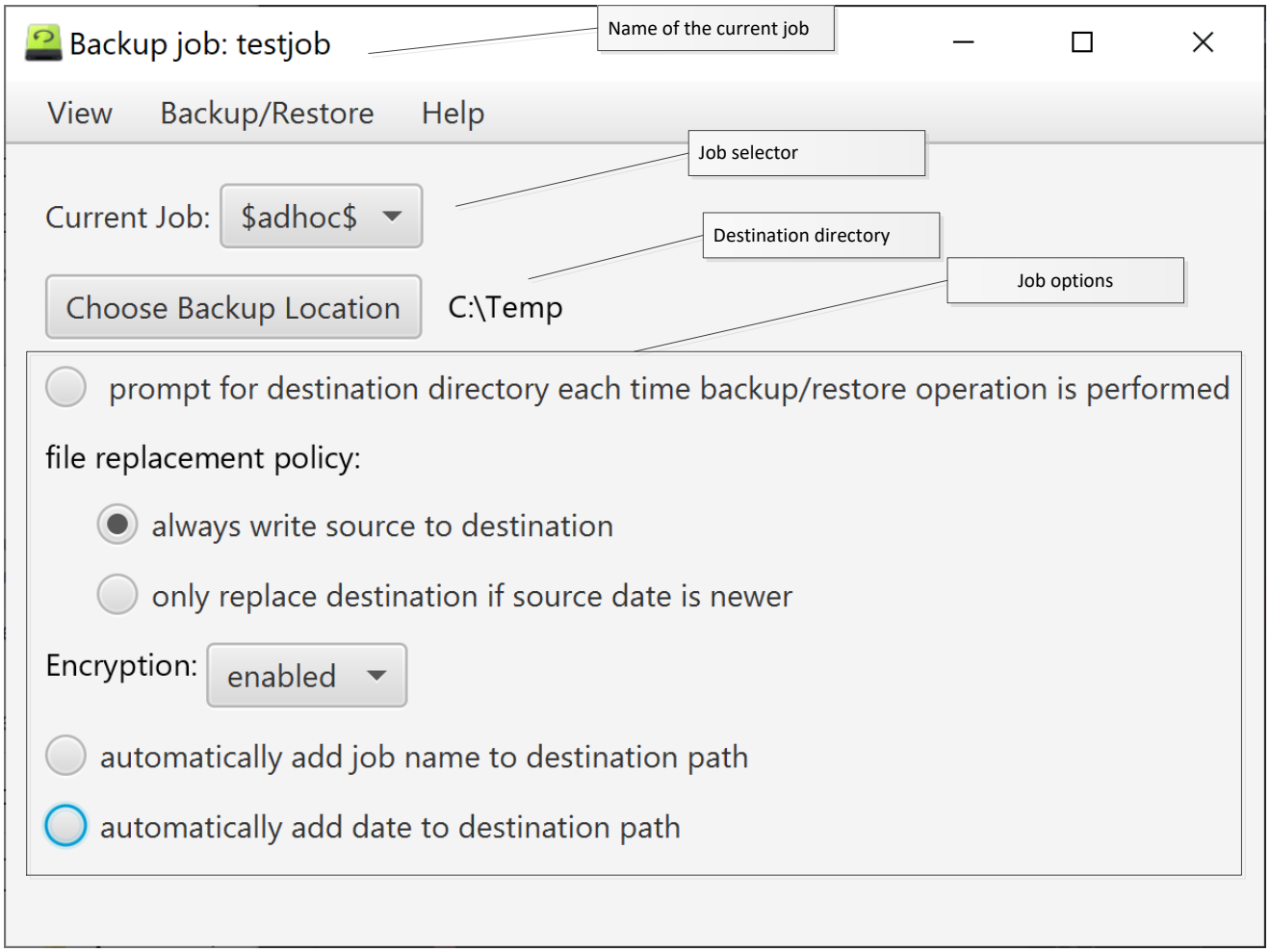
File Content Pane

This pane show you detailed information about the currently selected file in the Active Directory Content Pane. The tools menu does it operation on this file.

Tools Buttons

The tool bar contain a set of buttons for view or manipulating the currently selected file. Depending on your system configuration and mime bindings the various methods: locate, open, edit and print may be applicable for this file type and appropriate tool will perform it operation on the selected file. Locate will bring up a file explore with the directory positioned at the parent directory containing the current active content. Edit will bring up the editor that is bound to this mimes extension type. Print write cause the current active content to be printed. Again, not all mime types will support all the tool operations. If that happens, you'll get an error message letting you know that the given mime type for the current selected resource is not bound to an application that can perform the requested operation.

Current Job View



Job Selector

The Job selector is a drop down list which contains the jobs created by the user. To save the current selected files and directory as a job, select the "<new> item in the drop down list. It'll be the first element in the list. You will then be prompted to assign a name used for referencing this job. If you cancel out from assigning the job a name, then no new job will be created.

The BackupJobs directory stored in the user's home directory (i.e. C:/Users/Tom/BackupJobs) is where job information is store. Job information is stored in two files: one for store file selection data and the other for storing job option data. The file names are: {*jobname*}.xml and {*jobname*}_nodes.xml. The job name "$adhoc$" is used to refer to the current job which hasn't been assigned a job name.

Choose Backup Location

If backup location has already been chosen its path with be shown. The radio button "prompt for destination directory …" toggles the job state where the destination will be by dynamically queried for each time the backup/restore operation is performed if the radio button is enabled. The job itself is not required to have the backup location specified in the job. Jobs that are run that don't have a destination directory assigned to them will be prompted to enter the destination directory when the backup is performed.

File Replacement policy

This option deletes with conditions when a selected directory of file will be written to the output directory. If the option "always write source to destination" is enabled, it means that the source content is always copied to the destination, even if the file technically hasn't been changed since its last backup. The option "only replace if source date is newer" means that if the destination already has a file with the same name and location, the source will only be copy to the destination if the date of the source file is newer than the date of already existing item. The advantage of this technique is that it can greatly reduce the number of files that have to be physically copied from the source storage device to the destination storage device.

Encryption

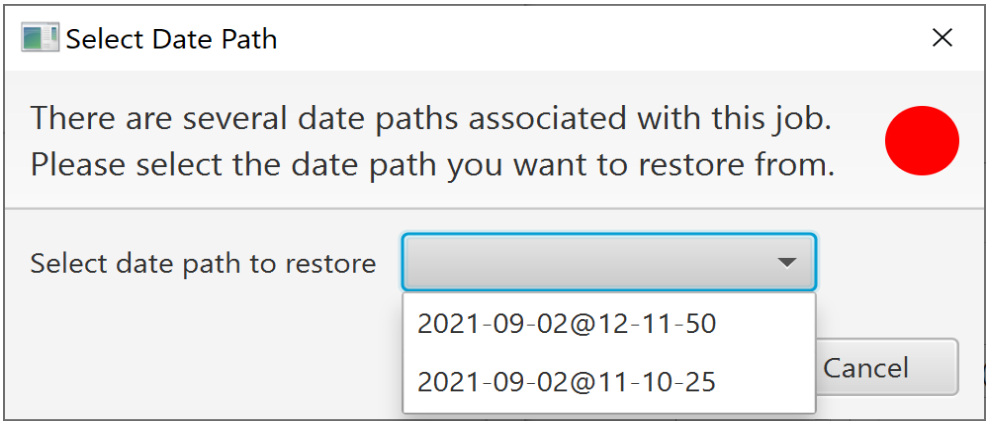
Encryption is implemented using industry standard cryptographic algorithms. When Encryption is enabled, file content with be encrypted prior to being stored in the destination. Please note that it's just the file content that gets encrypted. The path to the file and its name are all stored in the destination directory using clear text. That is somewhat of a weakness when a very high level security is needed, but for most practical situation security situations this isn't a serious breach anyway. A future version of the Backup Utility with provide an option so that even the path structure itself is encrypted. When encryption is enabled, an encryption password must be supplied to the utility before an encrypted job will begin. You will be prompted for the password when the encrypted job begins. Please note that the backup utility does not store any supplied passwords. If you forget the password you used to encrypt the content, the Backup Utility will not be able to decrypt your content.

Add Job Name

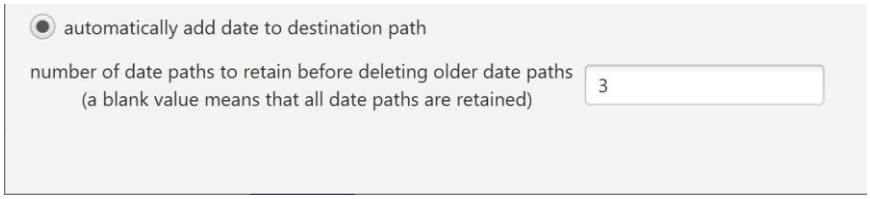
If the "automatically add job name to destination path" is checked, then at runtime the job name is appended the destination directory

Add Date Path

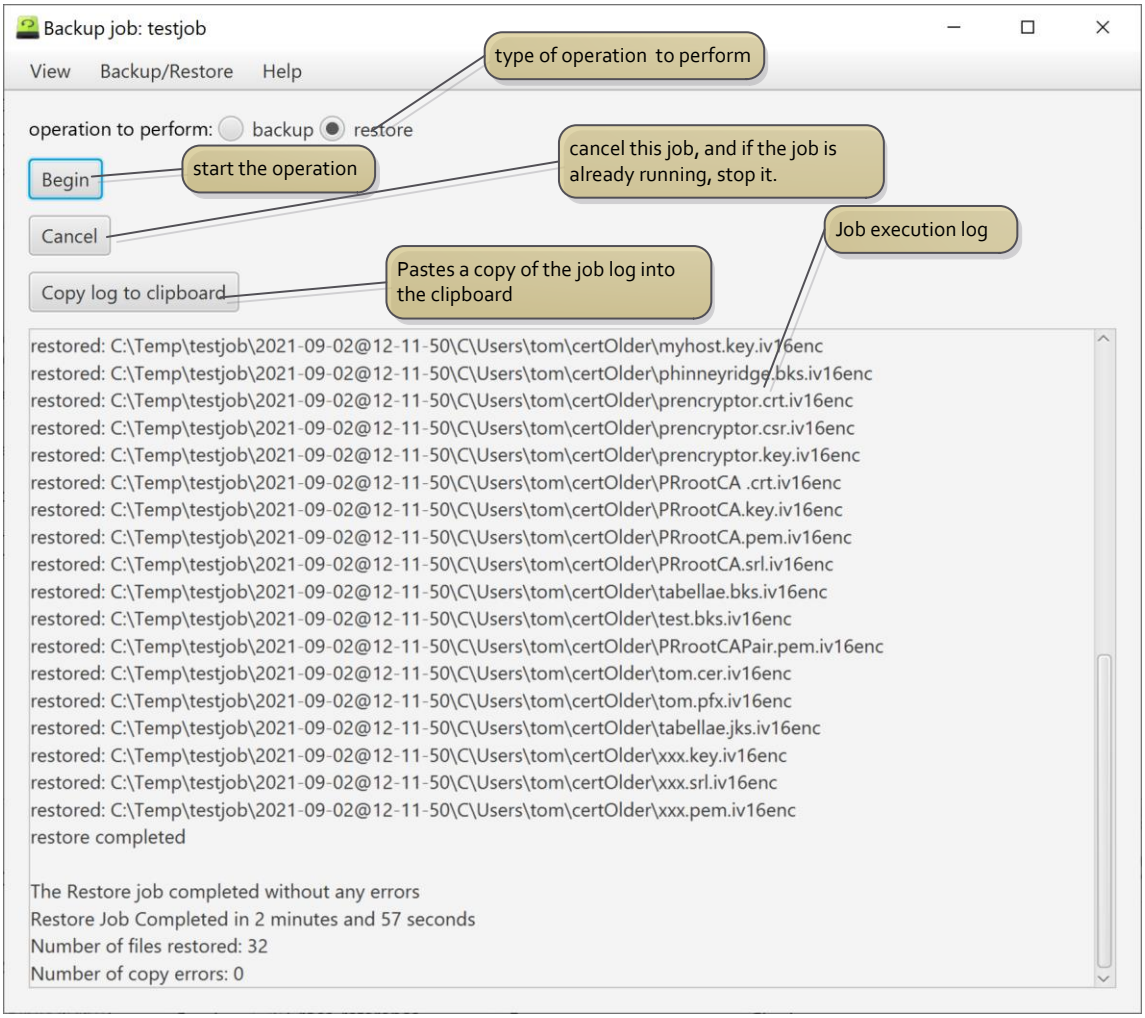
If the “automatically add date path to destination path” is checked, then a date path directory is used. Date paths have the format “yyyy-MM-dd@HH-mm-ss”. For backup operations, a new date path is created using the time the backup begin. For restore operations, you will be queried to select what date path you want to restore from if more than one date path directory exists.



When a date path option is selected. You will also see that you have the option to set the number of date path directories to retain. If the value is set as <empty>, then all date path directories are retained. If value is a number, then the utility will retain at most this many date path directories, before deleting older date paths directories. This is often referred to as a revolving backup scheme. You’re saving the last *n* copies.



Backup/Restore View



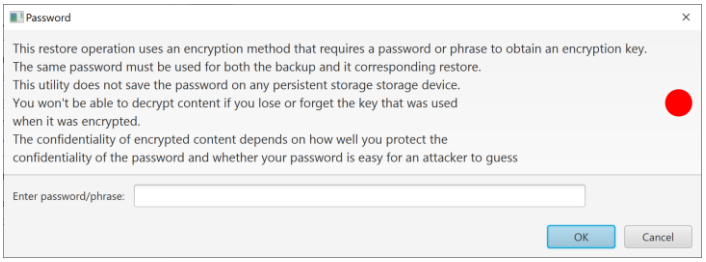
This window is brought up every time the Backup/Restore menu item is clicked. This is the window where the current active job can be started. This is also the window where you select whether you want the backup or the restore modality used when the operation is performed. Although jobs are defined from the backup perspective, the restore perspective is implicitly derived based on the set of currently selected file and job options. For a Restore operation, the destination directory is where the source originates from and the selected folders are where they need to be moved to. Files that appear in the destination directory are only copied if they are one of the selected target files. If a file is not part of any selected file or file path the file is skipped from the restore process. If the restore job is encrypted enabled, only encrypted file content in the destination directory will be considered for restore purposes.

If you accidentally clicked on the Backup/Restore menu accidentally. Don't worry the operation doesn't begin on till you click on the Begin button. If that happens you can just click on cancel and you'll return to the File Selection View window. Cancelling a backup procedure my leave the destination directory in a

somewhat undefined state. For most backup modalities, simply by restarting the job and letting it run to normal completion puts the backup of file content back into a defined state.

The job name *$adhoc$* is the name given to an active job that hasn't been assigned a name. It means that the current activity job is not being persistently saved under a job name, and it's perfectly valid to create a job and execute it without saving it under a job name. If you're going to run the same job more than once, it best to save the job by assigning it a persistent job name. The current job can be save to a name by clicking on the <new> item in the current Job Selector (see Current Job View) You will be given the opportunity to assign a new name to the current active job, or you may elect to cancel out of the operation by clicking on the Cancel button.

If you begin a job that has encryption enabled, you will be required to supply an encryption password. You can either enter it in the Current Job Pane window or you will be asked for the encryption when you first run the job with encryption enable and no password supplied the following dialogue will appear:



You will not be allowed to copy any data from the password field. You can however paste data for the clipboard into the field. The backup utility does not store your password. If password is lost or forgotten, you will not be able to restore the decrypted content. It's up to the user to handle the storage of passwords separate from the service that used that password. The confidentiality strength depends on how well the user keeps the password not accessible, and on the ease of an intruder being able to do brute force attack using commonly used passwords. There are readily available key management tools that would generate random phase phrase and allow you easy access to any of the keys by name. The collection of key are themselves all keep confidential by a single master key. These tools usually allows both access existing keys by name or creating new name/key pairs.