Kleo Bare Metal Backup For Servers

Contents

What's Included on the CD?

The CD includes the LiveCD Carroll-Net Server Recovery Kit (the "CnSRK"). It's a bootable recovery CD with hundreds of specialized tools for recovering servers from disaster.

And the CD includes Kleo Bare Metal Backup for Servers. Kleo is the best most complete backup. It includes a backup of the Operating System, device drivers and all the installed programs. Best of all, you can completely recover a server without the need of original operating system disks or the need to hunt down obscure device drivers and programs that might be obsolete but still critical to your server.

How to Install the Carroll-Net Server Recovery Kit (the "CnSRK")

The Carroll-Net Server Recovery Kit is available for download from the Carroll-Net website. The downloadable image is an ISO-9660 file, suitable for creating bootable CD's or USB Thumb Drives. If you'd prefer, Carroll-Net can provide you with completed CD or USB Thumb Drives.

You can download the ISO from http://carroll.net/Kleo/downloads.

If you prefer, you can order a CD or USB Thumb Drive from Carroll-Net at http://carroll.net/Kleo/order

CD Setup

The basics of how to create a bootable CD are pretty straightforward. Download the ISO file, and burn the file to a blank CD-R disc.

These instructions assume you are running Windows XP, Server 2003 or Vista

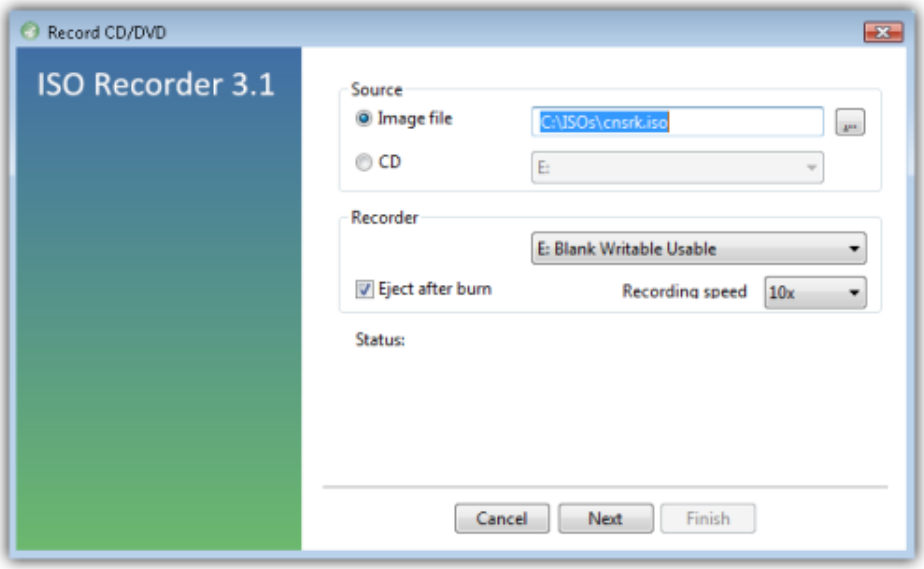
First, download the ISO file, and save it to your hard drive.

Next, you'll need a program to burn CD-R disc. There are dozens of excellent utilities available from the Internet. We recommend ISO Recorder http://isorecorder.alexfeinman.com/isorecorder.htm

Insert an unformatted CD into your burner.

Open Windows Explorer, browse to your ISO file

Right-click and choose "Copy Image to CD/DVD".



USB Thumb Drive Setup

Transferring an ISO to a USB Thumb drive has a few more steps than creating a bootable CD. The process is download the ISO. You then format the Thumb drive, extract ISO contents to it and make the Thumb drive bootable.

These instructions assume you are running Windows Vista

First, download the ISO file, and save it to your hard drive.

The rest of these steps can be run from a command prompt. Run CMD.exe and change into the folder you saved the ISO. Be sure to run CMD.exe as Administrator.

Second, format your USB thumb drive (this example assumes Thumb is G: drive)

```
format.exe  G:  /fs:fat32  /v:cnsrk  /q
```

Third, extract the ISO contents to the Thumb drive. We recommend using 7-Zip -- http://www.7-zip.org

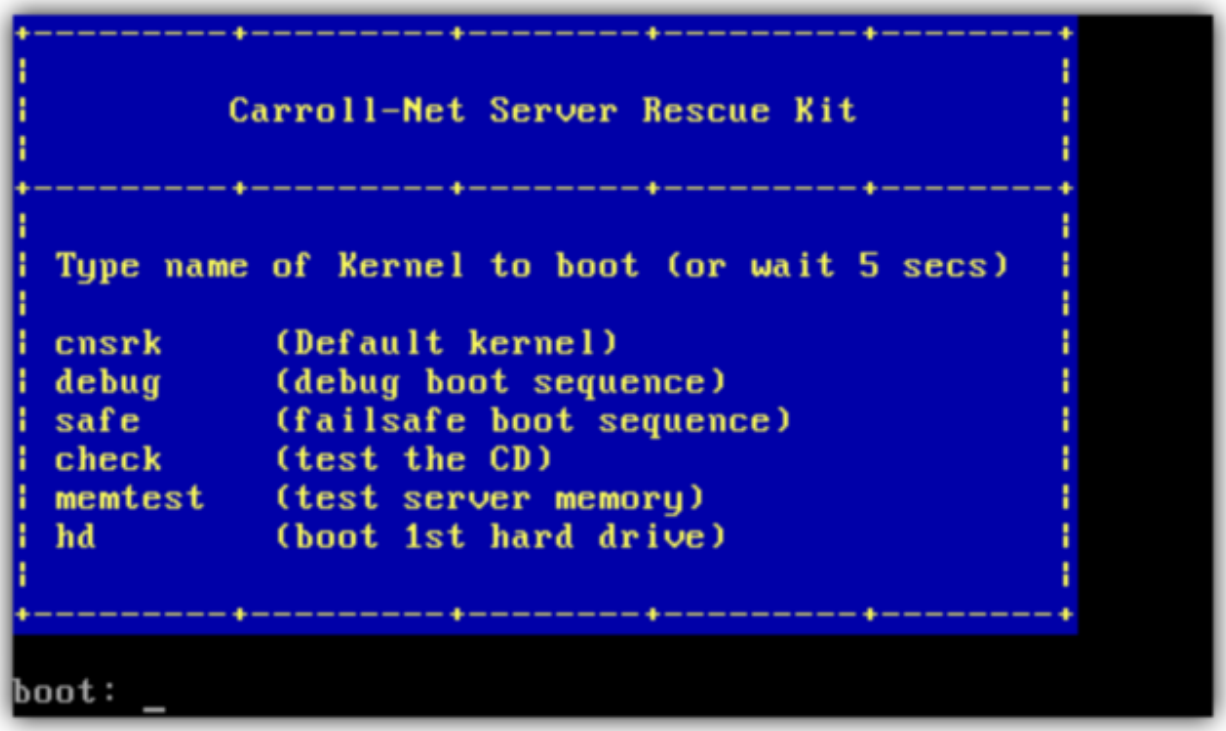
```
7z.exe  -x cnsrk.iso  -oG:
```

Finally, install a master boot record on the G: drive. You can use the Win32 version of syslinux that's provided in the ISO


```
G:\win32\syslinux.exe  -ma  -d/syslinux  G:
```

Boot the Carroll-Net Server Recovery Kit (the CnSRK)

Booting a CD or USB Thumb drive should work without special steps on most servers. But if your server is older, or you're trying to experiment with the CnSRK on a laptop, you may need to change your BIOS settings. Pay special attention to the boot order or you'll be scratching your head wondering why that shiny new CD or USB Thumb drive doggedly refuses to boot.



The splash screen lists the boot choices you have. The first column lists choices you can select to change how the system boots. To activate one of the labeled choices, type it's name at the boot prompt and press enter. The system will automatically boot the default in 5 seconds, unless you press a key.

The boot choices are:

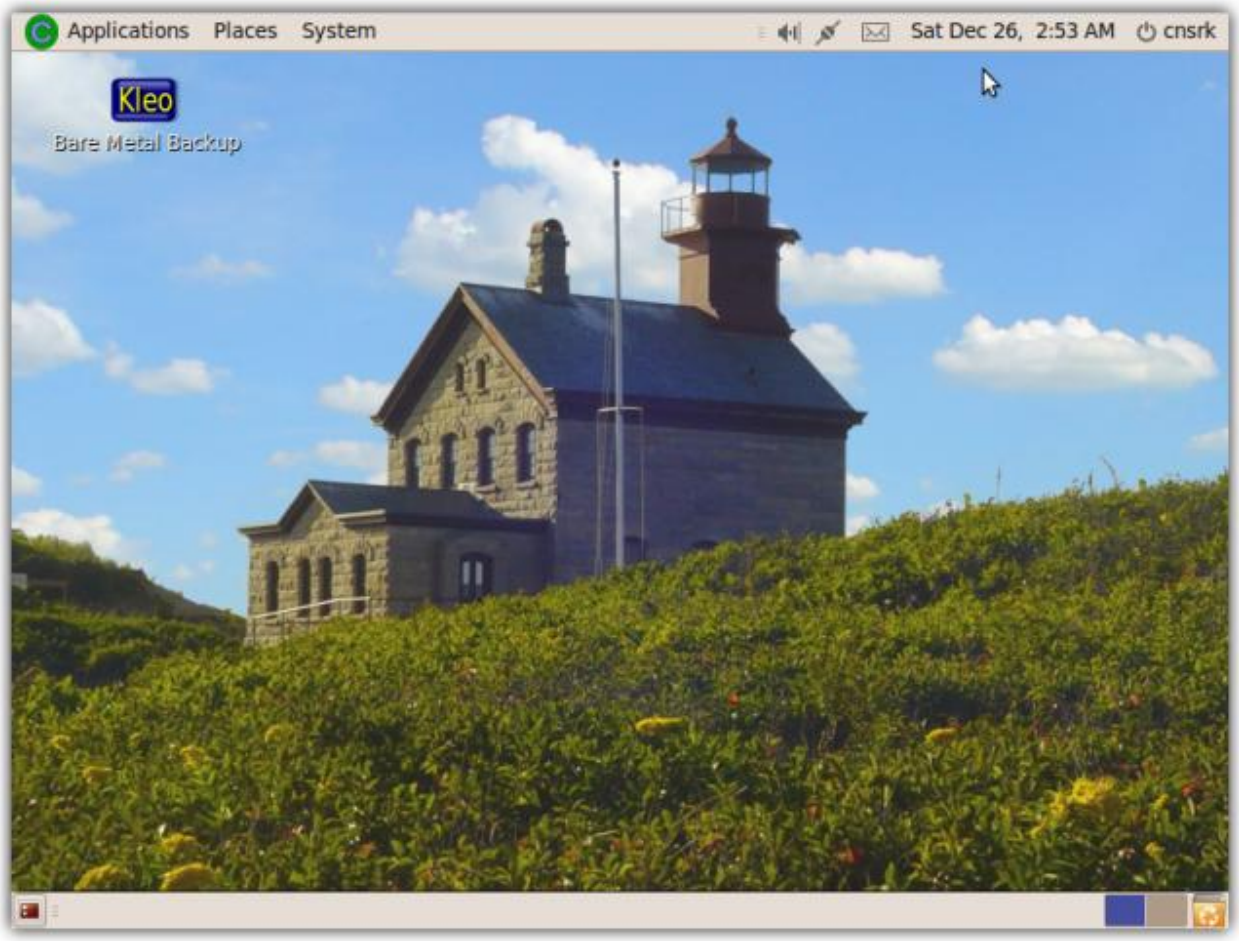
cnsrk	The default boot choice. The boot process will scan your system and automatically detect your server components. This is the right choice for most servers.
debug	This option causes the boot process to show detailed information as bootup progresses. It's useful to select this option if the boot process appears to hang up and you want to know why.
safe	This option disables much of the automatic detection system. It's useful to try this choice if you suspect the detection system may be incorrectly identifying server components.
check	This option doesn't actually boot, but instead tests the boot media for flaws and defects. It's useful if you suspect the CD or USB Thumb Drive might be defective.
memtest	This option causes the server to run a battery of memory diagnostics. It's useful if you

	suspect the memory, CPU or motherboard of your server might be malfunctioning. This boots Memtest86+ version 2.11. See http://www.memtest.org.
hd	This option gives you the ability to boot a computer that you suspect has a corrupted master boot record, but is an otherwise healthy hard drive. It will boot the first hard drive of the server.

It's perfectly safe to reboot if you think you made a wrong choice – either press Ctrl-Alt-Del or just turn off the server. As a matter of fact, since the CnSRK makes no changes to your server and installs nothing on your hard drive, it's perfectly safe to reboot almost anytime.

Note: The obvious exception is if you've initiated an operation intended to recover your server – for example, it's generally not recommended to reboot your server during Kleo Recover operation.

Here's what a successfully booted CnSRK looks like….



The screen layout is GNOME. It's incredibly simple to use with an intuitive easy to navigate interface. There are dozens of great books available and websites that can answer any questions you have. The official User's Guide is available online at http://library.gnome.org/users/user-guide/2.28/user-guide.html.

Introduction to CnSRK Security

Once booted, you're automatically logged in. But your accounts lacks the privileges necessary to alter your server. This is to protect you from inadvertently making changes you didn't intend. You need to elevate your privileges to perform some functions.

The command you need to know is **`sudo`**

To launch an elevated privileged shell, open a terminal window, click **Applications Menu → Accessories → Terminal**, and type

```
$ sudo bash
```

You can also prefix any command with **`sudo`** to raise privileges just for that command

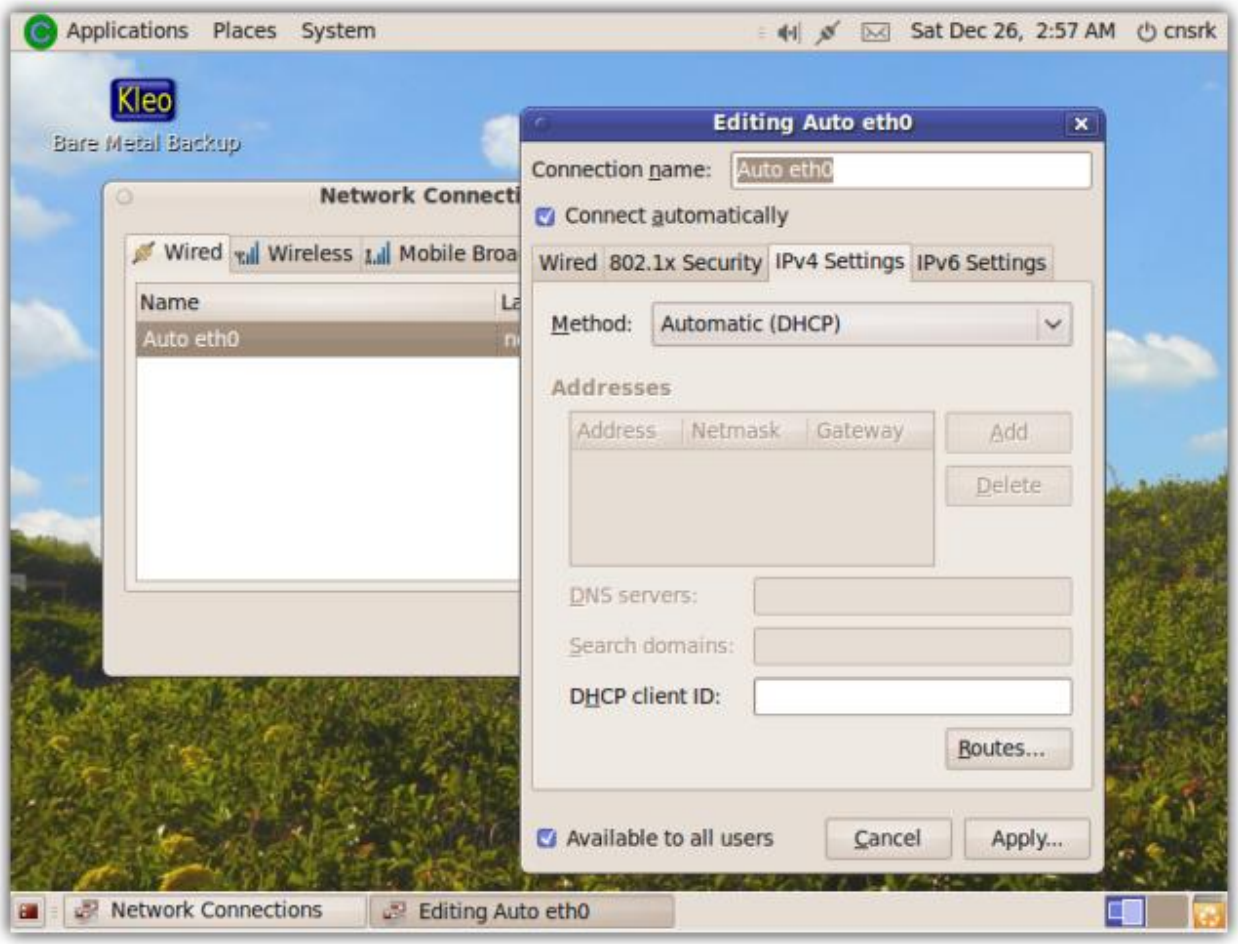
```
$ sudo parted -l
```

Note: Kleo is automatically launched with elevated privileges. It always has full ability to backup and recover your hard drive.

Connect the CnSRK to your Network

One of the first things you'll want to do after starting the CnSRK is to connect to your network. The CnSRK comes with support for dozens of Ethernet and wireless network cards. In most cases, the CnSRK will detect your network and connect automatically. These directions are for those cases where it can't connect on it's own, and might need some help from you.

You'll find the network icon on the top menu bar, just left of the Email icon. It's light grey to indicate unconnected, and dark grey to indicate an active network connection.



You can configure networking either by right clicking the icon on the top bar, or by clicking the **System Menu → Preferences → Network Connections**. You'll find options to configure DHCP which is the default, options to specify an IP Address and to add routes. It's all pretty straight forward, so just click through the screens and experiment until you get the desired results.

Use the CnSRK to Browse Drives

A lot of server recovery is centered around exploring drives. There are several great tools included in the Carroll-Net Server Recovery Kit for disks, but two stand out from the rest. You'll find them an invaluable addition to your recovery efforts and you'll find yourself using them over and over.

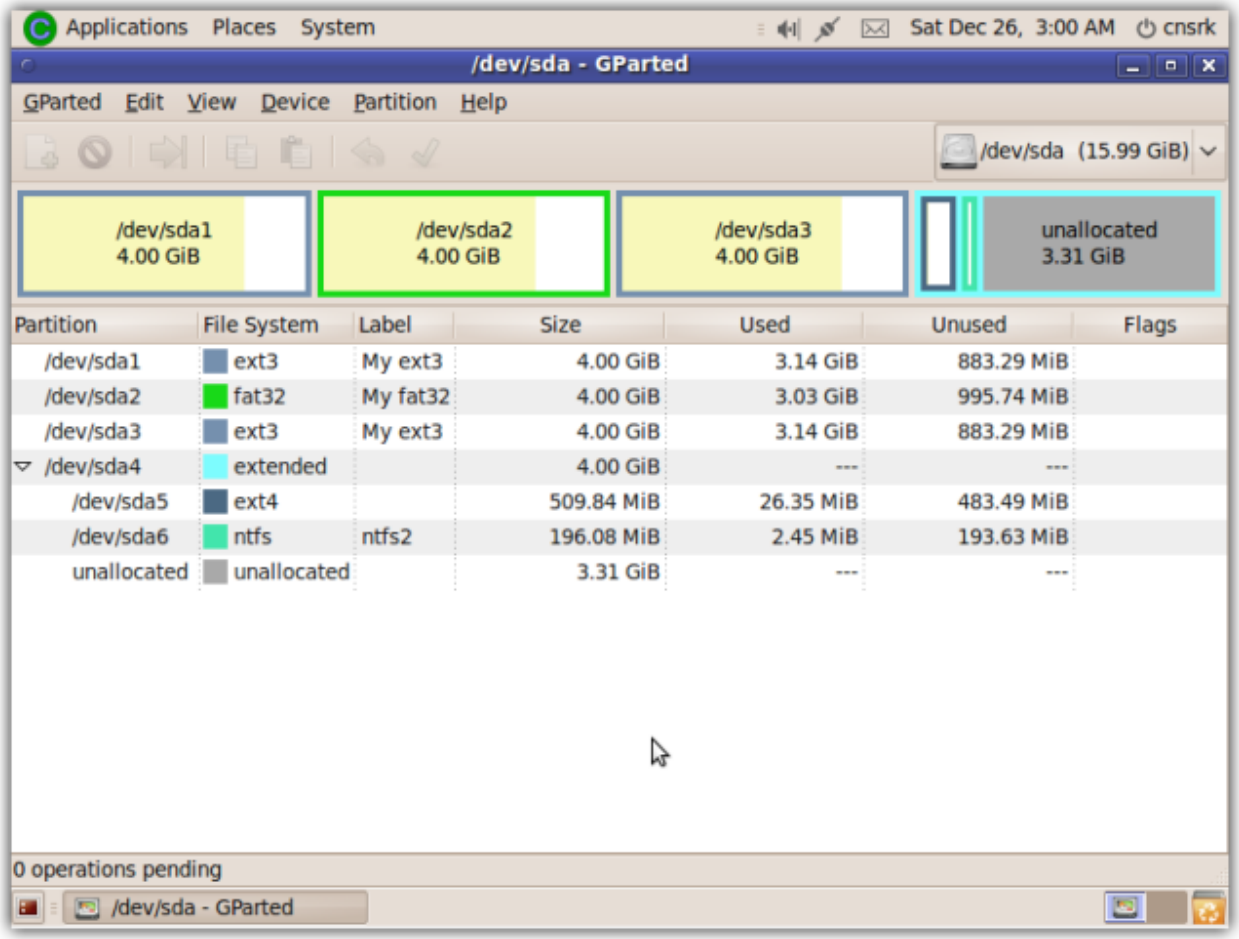
The first is the Palimpsest Disk Utility. This is a great tool for gathering details about hard drives. All the technical information you require is organized in simple easy to understand format. You can launch this program by clicking **System → Administration → Disk Utility.**

Probably the most useful feature of Palimpsest is it's mount capability. Mounting partition's enables you to drill down into a filesystem and recover individual files. This is incredibly useful when you're dealing with recovering critical data from a disk drive that's failed.

To mount a partition, select the partition from the explorer on the left. Then click **Edit → Mount**. Immediately, you'll see a new disk icon appear on the CnSRK desktop which you can click to explore files.

Note: Be careful when browsing mounted filesystems. Not only can you see and copy files, but you can also change and erase them.

The second great filesystem tool you'll find is the Gnome Partition Editor -- GParted. This is a world class partition editor – better than any you've ever used. With it you can create, delete, move, resize and verify partitions on your hard drive. This is an amazing tool that once you experiment with, you'll wonder how you ever did without it. You can launch this program by clicking **System → Administration → GParted.**



Note: It's hard to imagine improving on such a uniquely powerful tool and in light of this, the Kleo development team decided to embedded it within the application. We all owe a hearty vote of thanks to the folks at GNU who created such a great application.

GParted has an very well done website, with tons of useful tips & tricks. You'll find it at http://gparted.sourceforge.net/. You'll also find a brief tutorial on GParted in Appendix A.

Kleo Backup

Prepare for Kleo Backups

Kleo is a powerful tool for Backup and Recovery. With it, you can create Bare Metal Backups that can be recovered with no additional software. No need to chase down operating system disks, device drivers or application installation disks.

The most important preparation is to decide where to store your backups. Kleo can store backups to an external hard drive or to another server across your network. Kleo supports network backups to another Windows Server using CIFS, to a Unix server using NFS or to an SSH server.

Kleo backups are compressed two ways. First only used data blocks are backed up. This eliminates wasting space storing empty blocks. And second, the backup is zipped.

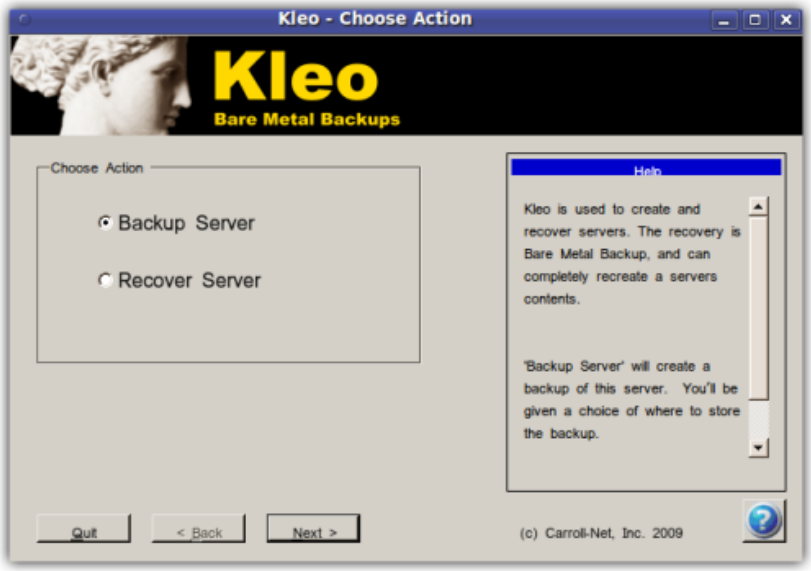
To make sure the backups will fit, the backup is broken into 2 GB chunks, with each chunk numbered. Be sure if you copy your backups, you preserve all the chunks. A recovery will fail if one of the chunks are missing.

Kleo Backup to Network

Kleo is a Wizard application that walks you through each step. The Backup to Network process works like this; 1) pick what to backup, 2) pick the network option, 3) scout the network for a suitable target, 4) login to target, 5) pick the folder on the target to save to, 6) confirm your choices and start the backup.

Note: From any page, if you click **Cancel**, it will cancel the operation, and bring you back to the first page. If you click **Back**, it will move you backwards in the process one step.

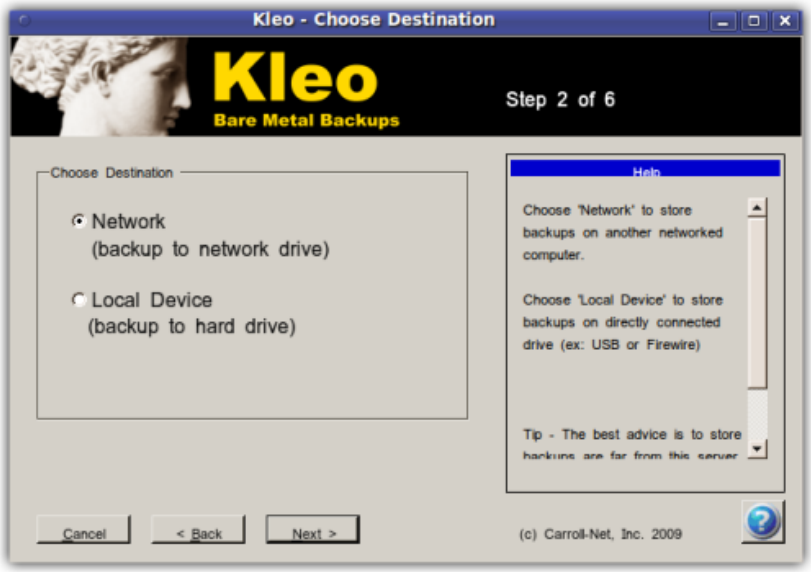
We'll walk through a sample Backup to Network and demonstrate typical answers.



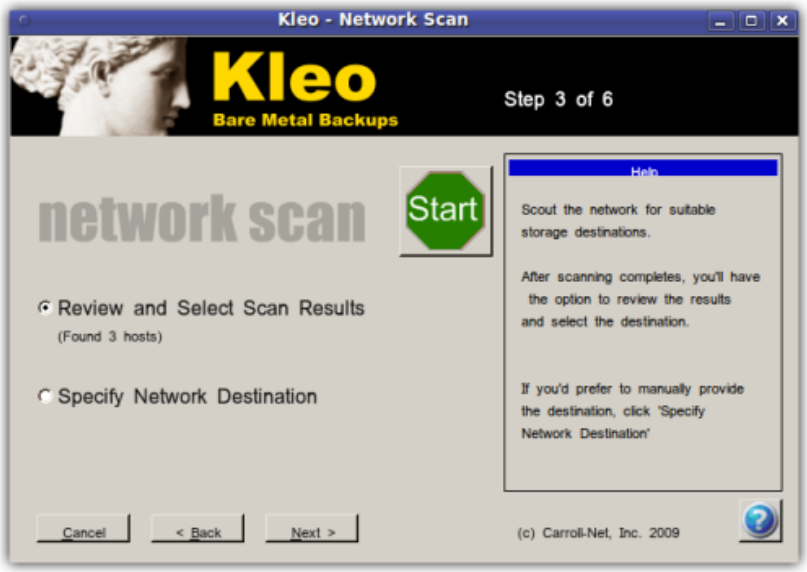
Select **Backup Server** and click **Next** to initiate a Bare Metal Backup.

Use this to indicate which disk and partition you'd like to Backup. The drop down at the top indicates which disk. When you change the disk, the partition list with be updated to show partitions on that disk. Click the partition by selecting the checkbox, then click **`Next`**.

Note: Kleo is able to backup the following file system types; Ext2, Ext3, FAT-16,FAT-32, HFS, JFS, NTFS, Reiserfs3, Reiserfs4, UFS and XFS.



Select **`Network`** and click **`Next`**.



This screen shows an animation while it's scanning the network. You can interrupt the scan at any time by selecting **`Specify Network Destination`** and then clicking **`Next`**.

After the scan is completed, you can review destinations the scan discovered by selecting **`Review and Select Scan Results`** and then clicking **`Next`**.

If you'd like, you can also force a rescan of the network by clicking the green **`Start`** button.

This screen displays the targets found during the scan. Each line represents a target. It shows the hostname, the IP address of the target, and the supported backup protocols. To choose a target, select the checkbox and click **`Next`**.

With this screen, you can provide the details of the network target where you'd like to store the backups. In the first two fields, you specify the host details. You can specify either the hostname, or the IP address of the target (or both if you like).

The storage field is a drop down you use to specify the storage protocol. Your choices are CIFS to store backups on a Windows server, NFS to store backups on the Unix server and SSH to store backups in you Unix login account. The remaining fields will depend on what storage protocol you select.

CIFS Backup

If you select CIFS, you'll need to provide the Share name, the Username and the Password. The Share name should not include the server name – just the share.

For example, if the full UNC path was **`\\server1\Docs`**, for Share you would type **`Docs`**.

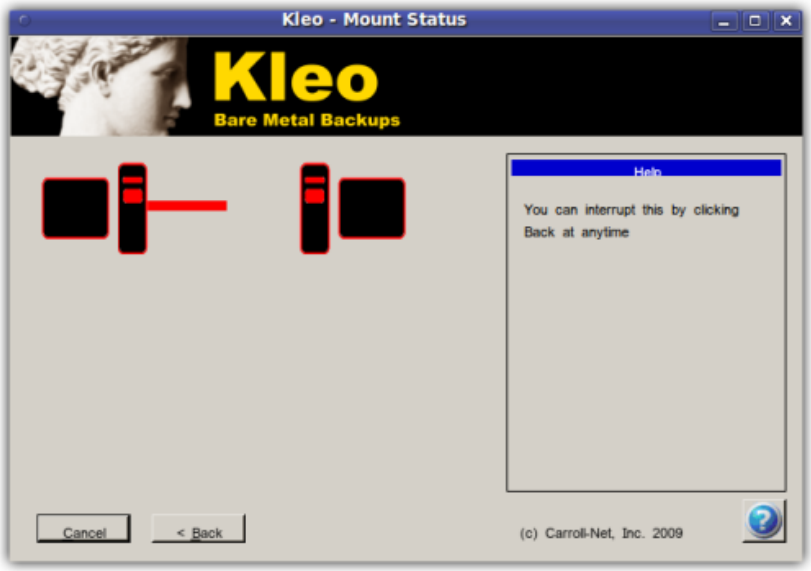
NFS Backup

If you select NFS, you only need to provide the Share name. Enter the same name exported on the NFS server (talk to your NFS server administrator for the details).

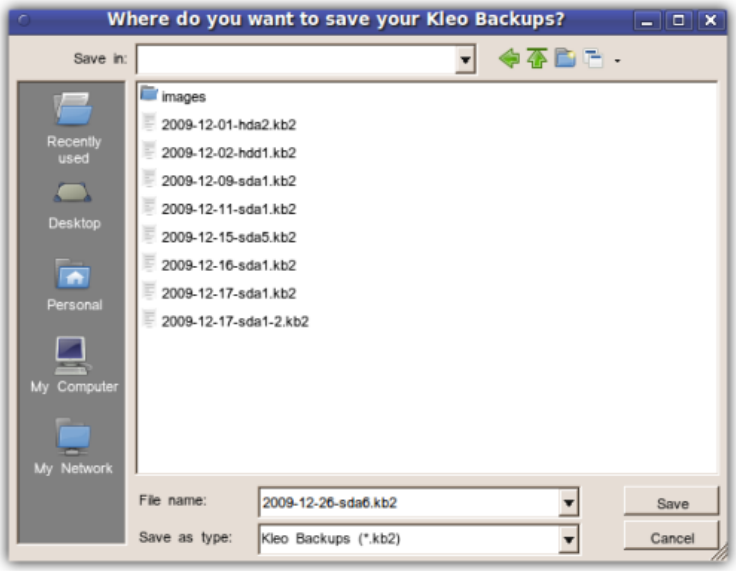
SSH Backup

SSH is a useful choice if you'd like to store a backup on an SSH server where you have an account. For Share name, select a folder where you'd like to store the backup. The Username and Password should be the same credentials you use the to login.

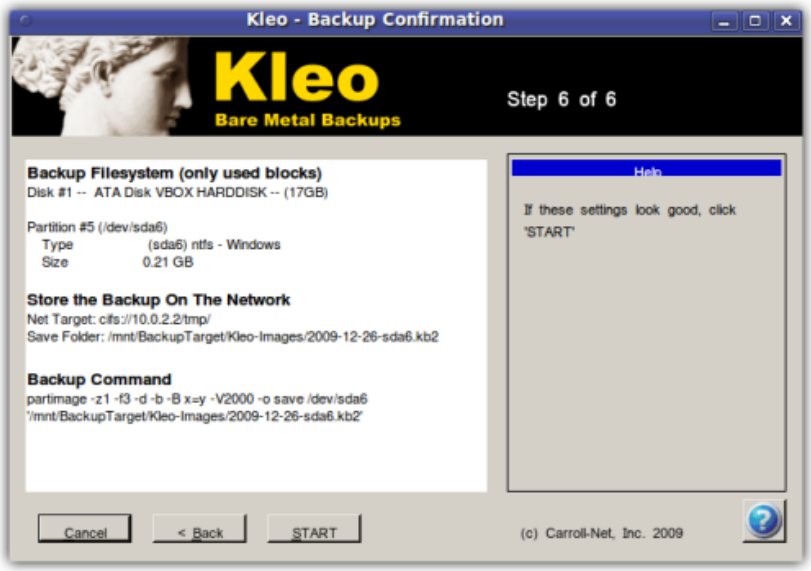
Click **`Next`** to continue



This screen shows an animation while logging into the target. If the login succeeds, you will automatically move to the next step. If there's a login error, you see a report that details what happened. You'll need to click **Back** to return and re-try with different details.

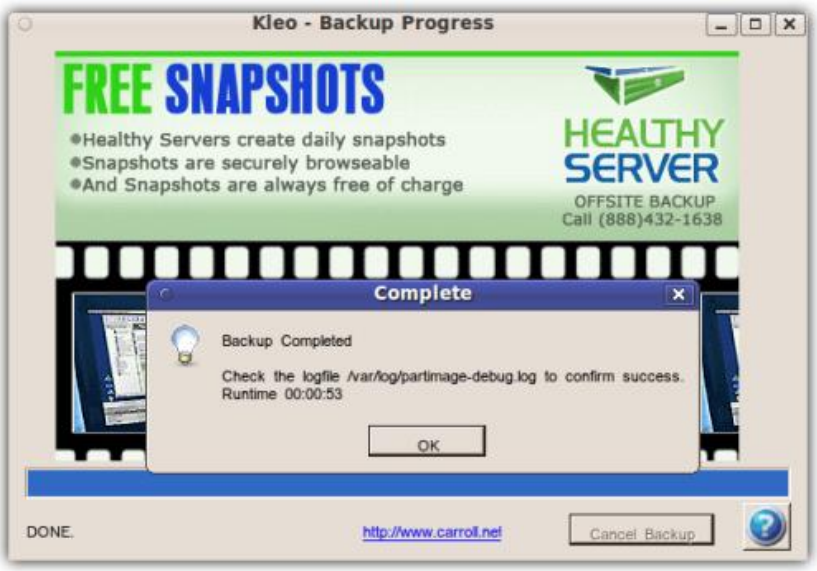


This screen presents a file selection dialog box. From here, you can browse to the folder you'd like to store your backups. Use it to select the folder, and name the backup file. Click **Save** to continue.



This screen summarizes the choices you've made. Look over your choices, and click **`Start`** to initiate the backup.

While the backups are running, a progress bar will indicate how much has completed.



If the backup completes successfully, a pop-up will report success and display the run time.

If the backup encounters an error, the progress bar will change to red, and a pop-up will report the error.

In either case, you should check the log file to confirm everything went as planned. The logfile will be written to the same folder as the backup set, and will be called **'partimage-debug.log'**. You should start with checking the tail of the file from a terminal. Click **Applications Menu → Accessories → Terminal**.

```
$ cd /mnt/BackupTarget  (← change to where you stored backups)
$ tail partimage-debug.log
```

Kleo Backup to Local Drive

Kleo Backup to Local Drive is very similar to backup to the Network. The key difference is that you need some minor prep work – you need to mount the target drive you plan to use to store backups before you start Kleo. Mounting means to connect to the file system.

Let's assume you want to store your backups on an external USB Drive. First connect the drive to your server. To mount the drive, you can use the Palimpsest Disk Utility described earlier. Click the **System Menu → Administration → Disk Utility**. Click the file system from the explorer interface on the left, and Click the **Edit Menu** and Select **Mount**.

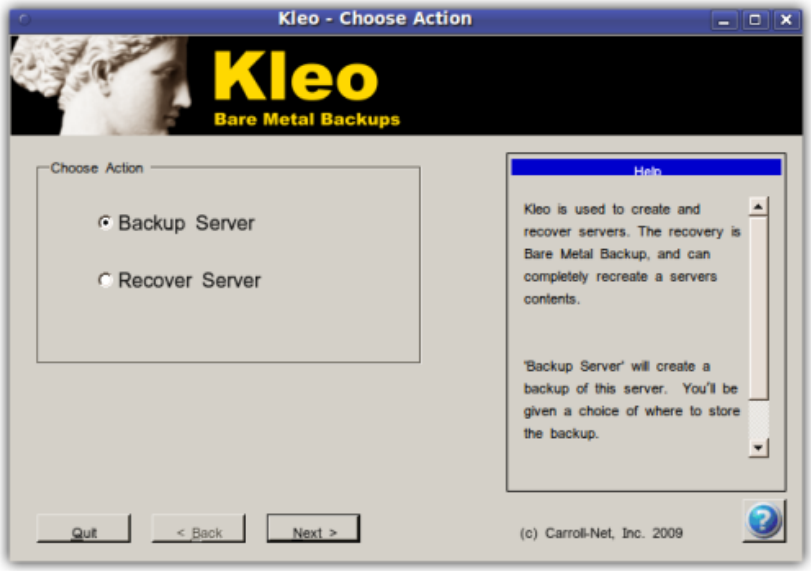
Or you can use a simple trick. Click the **`Places Menu`**. In the middle of the menu, you'll see the list of available file systems. Just click the file system you want to use to store your backups.

A new icon will appear on the CnSRK desktop, and a file system browser window will open.

With the drive connected and mounted, you can now proceed with Kleo Backup to Local Drive. The process works like this; 1) pick what to backup, 2) select backup to local device, 3) pick the folder to save to 4) confirm your choices and start the backup.

Note: From any page, if you click **Cancel**, it will cancel the operation, and bring you back to the first page. If you click **Back**, it will move you backwards in the process one step.

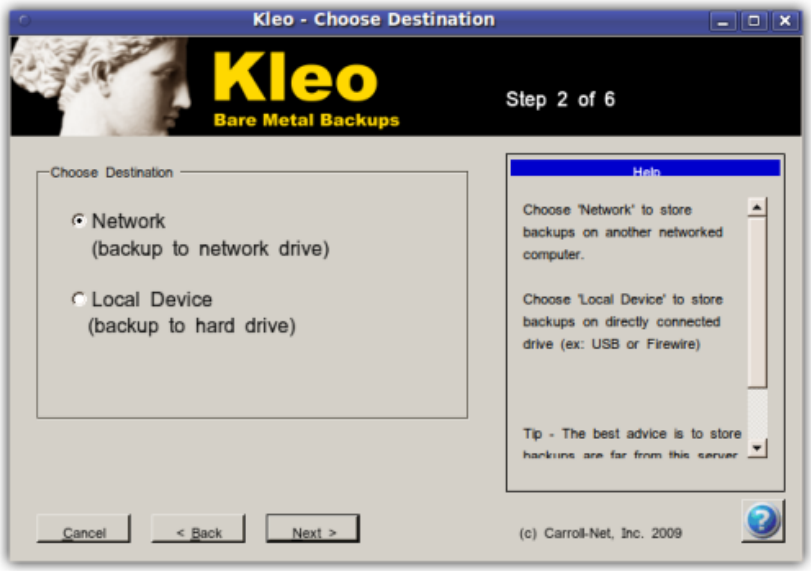
We'll walk through a sample Backup to Local Drive and demonstrate typical answers.



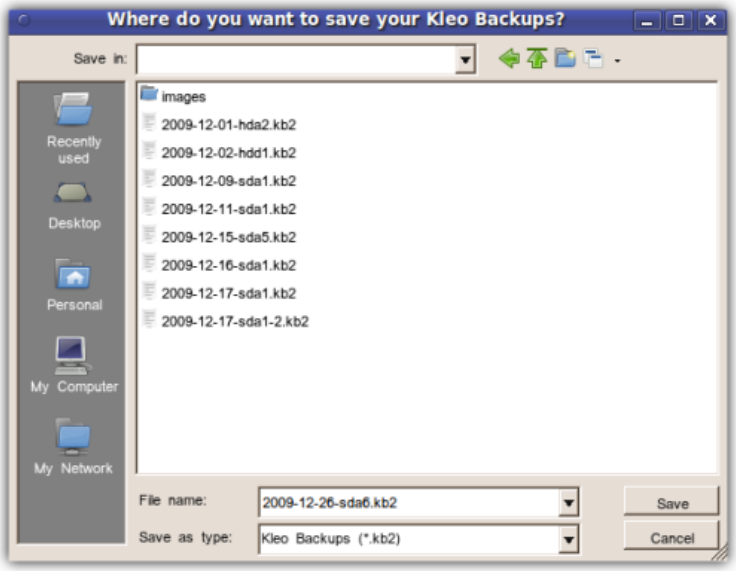
Select **Backup Server** and click **Next** to initiate a Bare Metal Backup.

Use this to indicate which disk and partition you'd like to Backup. The drop down at the top indicates which disk. When you change the disk, the partition list with be updated to show partitions on that disk. Click the partition by selecting the checkbox, then click **Next**.

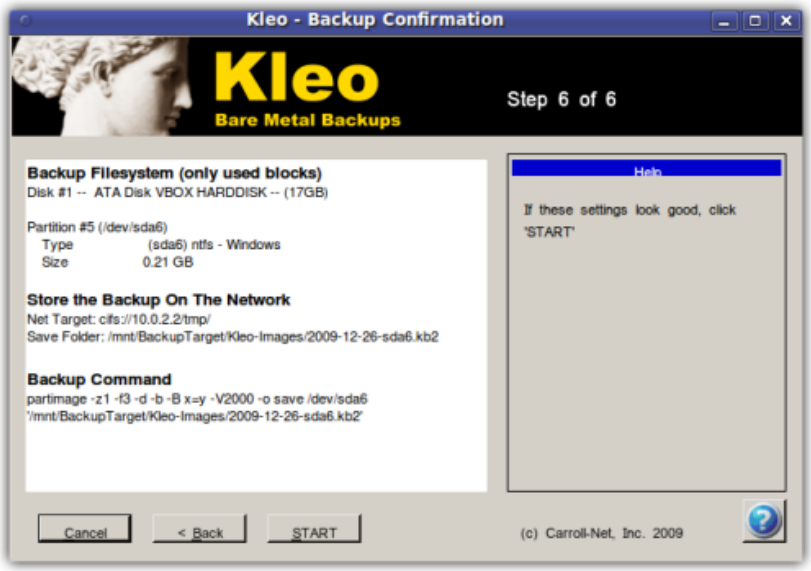
Note: Kleo is able to backup the following file system types; Ext2, Ext3,FAT-16, FAT-32, HFS, JFS, NTFS, Reiserfs3, Reiserfs4, UFS and XFS.



Select **Local Device** and click **`Next`**.

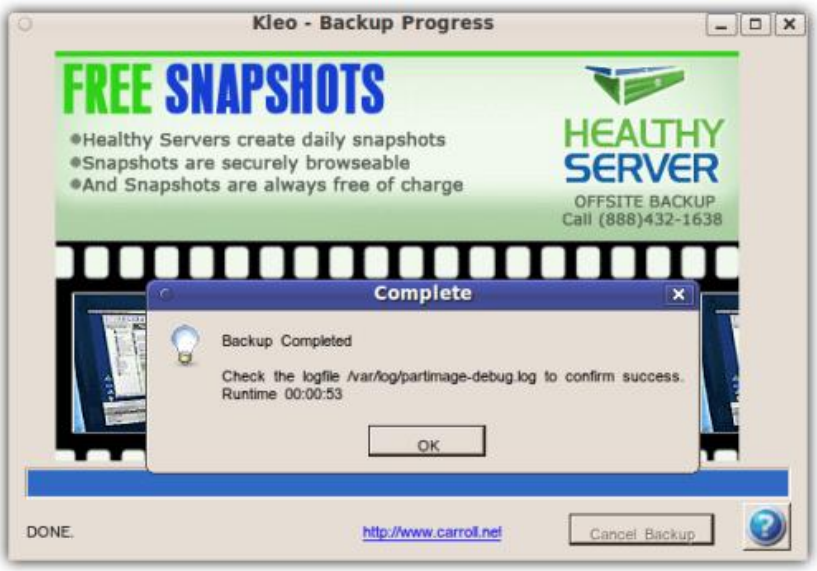


This screen presents a file selection dialog box. From here, you can browse to the folder you'd like to store your backups. Use it to select the folder, and name the backup file. Click **Save** to continue.



This screen summarizes the choices you've made. Look over your choices, and click **Start** to initiate the backup.

While the backups are running, a progress bar will indicate how much has completed.



If the backup completes successfully, a pop-up will report success and display the run time.

If the backup encounters an error, the progress bar will change to red, and a pop-up will report the error.

In either case, you should check the log file to confirm everything went as planned. The logfile will be written to the same folder as the recovery set, and will be called **'partimage-debug.log'**. You should start with checking the tail of the file from a terminal. Click **Applications Menu → Accessories → Terminal**.

```
$ cd /mnt/BackupTarget  (← change to where you recovered from)
$ tail partimage-debug.log
```

Verify Successful Kleo Backup

It is critically important that you verify backups ran successfully. There's not much worse than believing you have a good backup, only to discover later something went wrong. To make matters worse, if you don't verify your backups, you might not discover the error until you attempt recovery. Backups are critically important and verification is the most important step.

There are two simple verification techniques. The first is to review the log file created during the backup. The log file is stored along side the backup file you created – it has the same name as the backup, with the extension .LOG.

For starters, open the log and check the end of the file. Look for a line that reads 'End of operation: SUCCESS'. If it says anything other than success STOP – the backup was not successful, and further research is required as to the cause before you re-attempt another backup. After looking at the last line, scroll backwards a bit further to confirm everything looks good. Always remember, any program can have subtle bugs or errors – it's up to you to confirm Backups are successful.

If your backup is critical to your organization, you should consider doing a Sandbox Recovery of the Backup. A Sandbox Recovery means to go to your sandbox server – a spare server you can use for testing and experimentation – and use it to Recover the backup you made. This will overwrite the information on your sandbox server and confirm the Backup is suitable for Recovery.

Note: The Sandbox verification strategy takes longer than others, but is the MOST RELIABLE form of verification. If your organization depends on the server – take the time to do it. You'll be glad you did.

Kleo Recovery

Prepare for Kleo Recovery

Getting ready for recovery is pretty simple. Just decide where you want to recover to and make sure the recovery destination has enough space to store the recovery. It need not be the same size – but it must be at least as large as the size originally backed up partition. If necessary, you can use the tools in the CnSRK to resize the partition after you've successfully recovered.

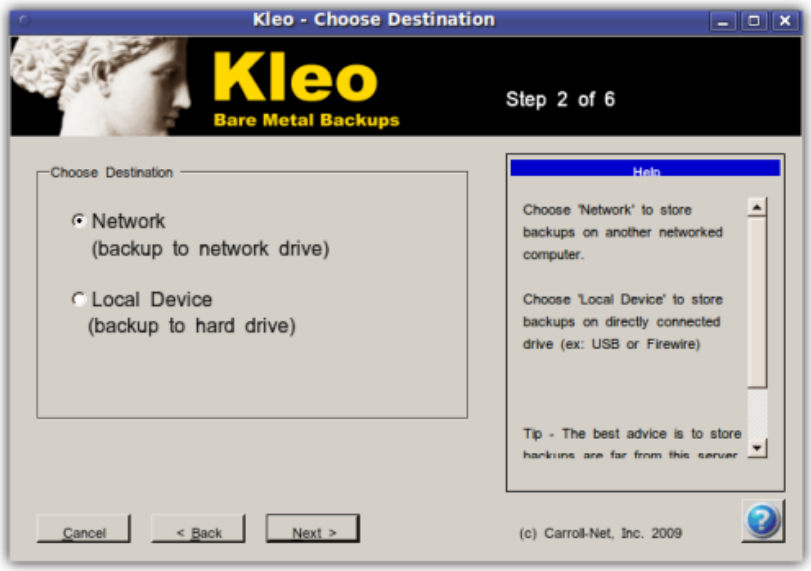
It's up to you if you want to format the partition in advance, or use the tools embedded within Kleo.

Kleo Recover from Network

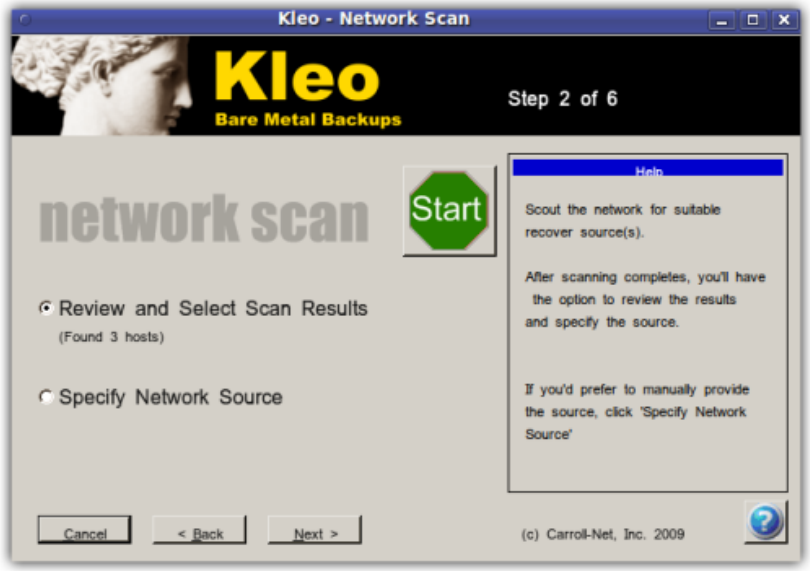
The recovery process is the reverse of the Backup process. It works like this; 1) pick the network recovery option, 2) scout the network for a suitable source, 3) login to source, 4) explore the folders, and pick the file to recover, 5) confirm your choices and start recovery.

We'll walk through a sample Recovery from Network and demonstrate typical answers.

Select **Recover Server** and click **Next** to initiate a Bare Metal Recovery.



Select **Network** and click **Next**.



This screen shows an animation while it's scanning your network. You can interrupt the scan at any time by selecting **Specify Network Source** and then clicking **Next**.

After the scan is completed, you can choose to review the sources the scan discovered by selecting **Review and Select Scan Results** and then clicking **Next**.

If you'd like, you can also force a rescan of the network by clicking the green **Start** button.

This screen displays the source servers found during the scan. Each line represents a server. It shows the hostname and the IP address of the target, and the supported recovery protocols. To choose a source, select the checkbox and click **Next**.

With this screen, you can provide the details of the network source where you'd like to recover the backups. In the first two fields, you specify the host details. You can specify either the hostname, or the IP address of the source (or both if you like).

The storage field is a drop down you use to specify the storage protocol. Your choices are CIFS to recover backups from a Windows server, NFS to recover backups from a Unix server and SSH to recover backups from your Unix login account. The remaining fields will depend on what storage protocol you select.

CIFS Backup

If you select CIFS, you'll need to provide the Share name, the Username and the Password. The Share name should not include the server name – just the share.

For example, if the full UNC path was **`\\server1\Docs`**, for Share you would type **`Docs`**.

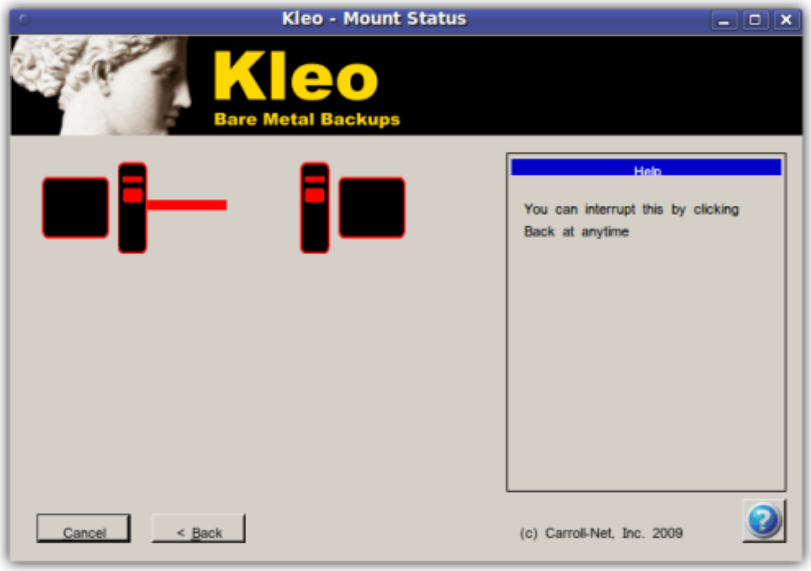
NFS Backup

If you select NFS, you only need to provide the Share name. Enter the same name exported on the NFS server (talk to your NFS server administrator for the details).

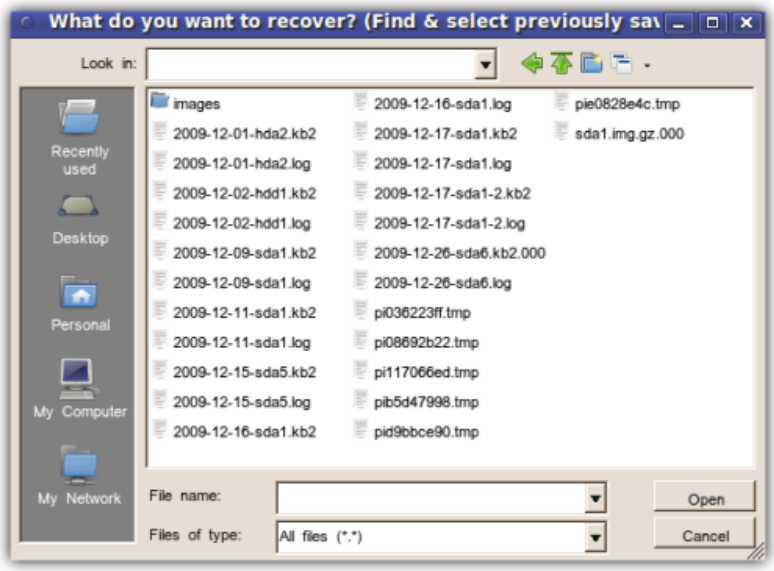
SSH Backup

SSH is a useful choice if you'd like to store a backup on an SSH server where you have an account. For Share name, select a folder where you'd like to store the backup. The Username and Password should be the same credentials you use to login.

Click **Next** to continue



This screen shows an animation while logging into the source server you specified. If the login succeeds, you will automatically move to the next step. If there's a login error, you see a report that details what happened. You'll need to click **Back** to return and re-try with different details.



This screen presents a file selection dialog box. From here, you can browse to the folder you'd like to recover your backups from. Use it to select the backup file to recover. If the backup was split into multiple files, click the backup that ends with the extension .000.

Click **Save** to continue.

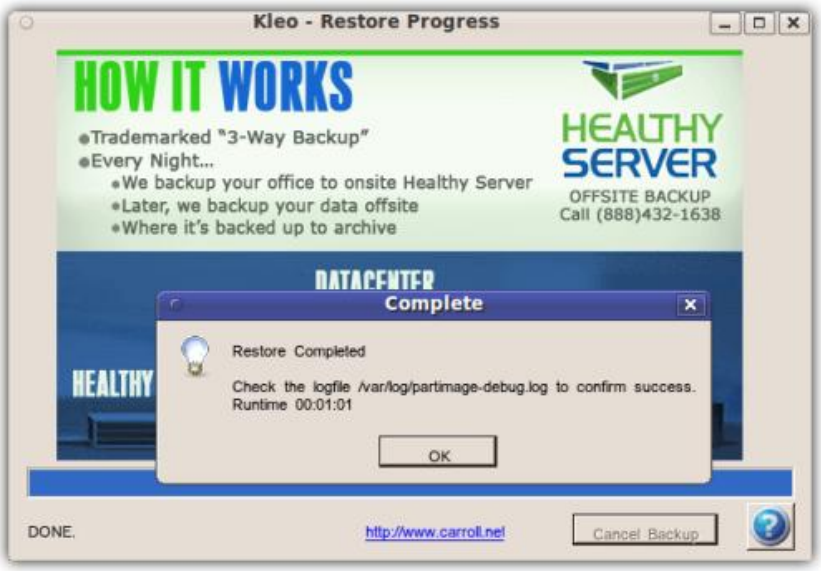
Use this to indicate which disk and partition you'd like to Recover. The drop down at the top indicates which disk. When you change the disk, the partition list will be updated to show partitions on that disk. Click the partition by selecting the checkbox, then click **Next**.

CAUTION: The partition you select will be overwritten with the recovery. All information on the partition will be lost!

This screen also provides you with powerful options to create and edit partitions. To access the Partition tools, click **Edit Partition Table**. See the GParted Tutorial in the Appendix on how to use the partition editor.

This screen summarizes the choices you've made. Look over your choices, and click **Start** to initiate the recovery.

While the recovery is running, a progress bar will indicate how much has completed.



If the recovery completes successfully, a pop-up will report success and display the run time.

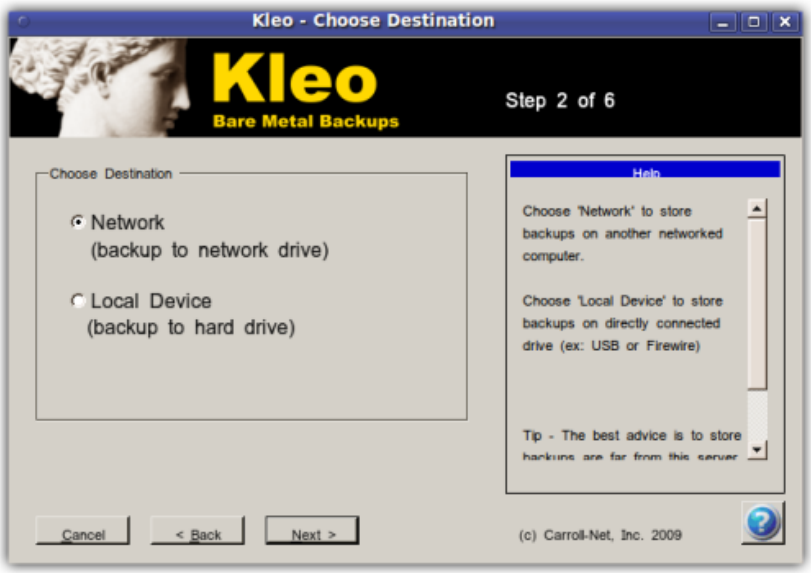
If the recovery encounters an error, the progress bar will change to red, and a pop-up will report the error.

Kleo Recover from Local Drive

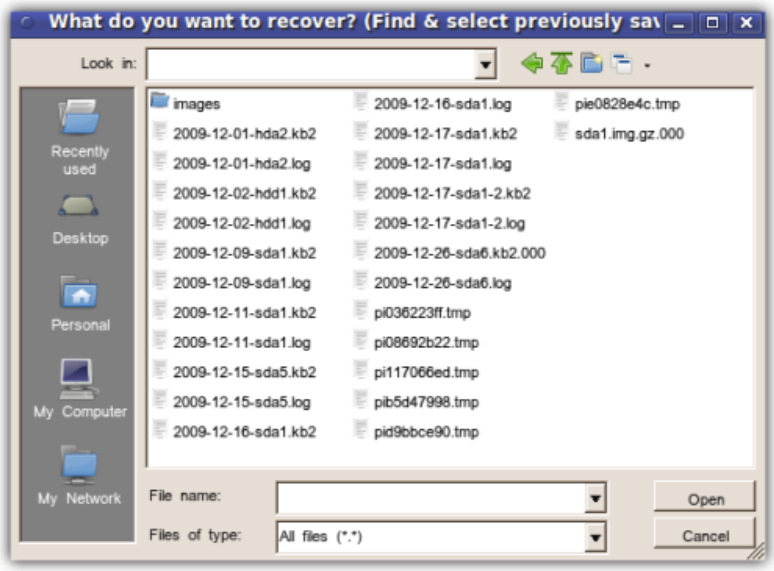
The option to Recover from Local Drive in most ways is identical to Recovery from the Network.

We'll walk through a sample Recovery from Network and demonstrate typical answers.

Select **Recover Server** and click **Next** to initiate a Bare Metal Recovery.



Select **Local Device** and click **Next**.



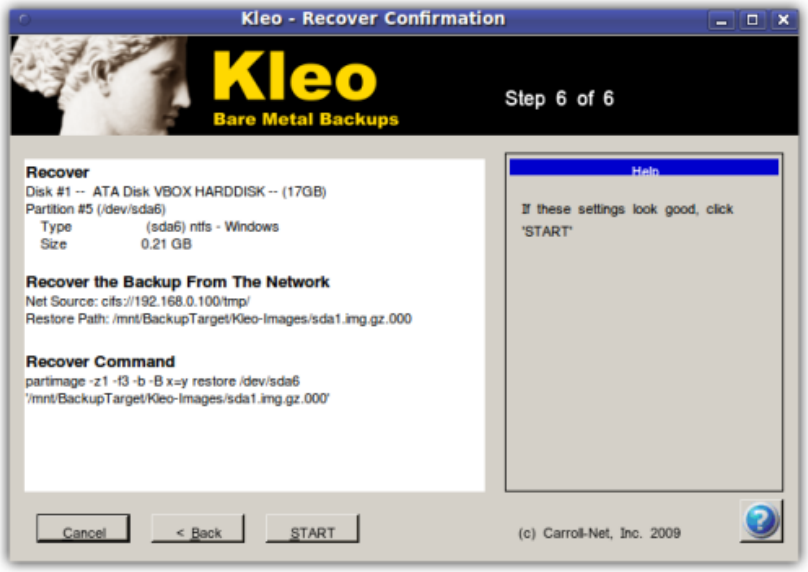
This screen presents a file selection dialog box. From here, you can browse to the folder you'd like to recover your backups from. Use it to select the backup file to recover. If the backup was split into multiple files, click the backup that ends with the extension .000.

Click **Save** to continue.

Use this to indicate which disk and partition you'd like to Recover. The drop down at the top indicates which disk. When you change the disk, the partition list with be updated to show partitions on that disk. Click the partition by selecting the checkbox, then click **Next**.

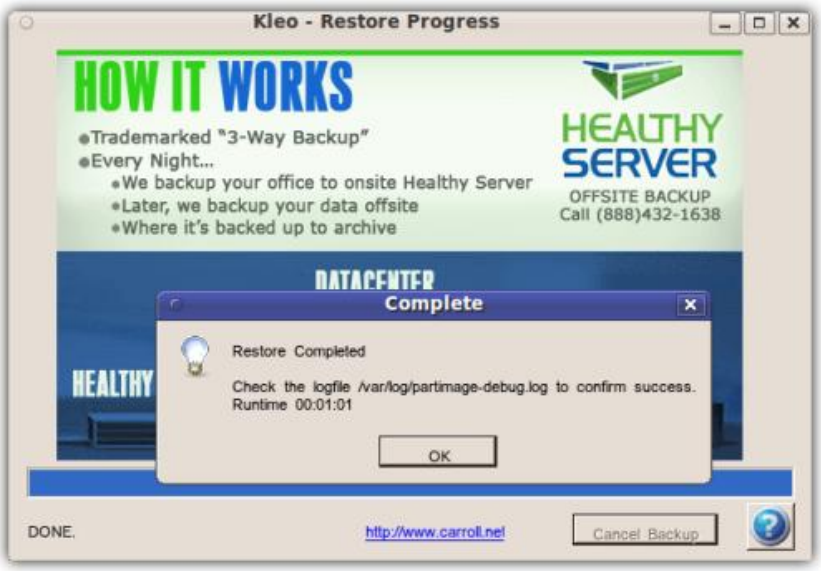
CAUTION: The partition you select will be overwritten with the recovery. All information on the partition will be lost!

This screen also provides you with powerful options to create and edit partitions. To access the Partition tools, click **Edit Partition Table**. See the GParted Tutorial in the Appendix on how to use the partition editor.



This screen summarizes the choices you've made. Look over your choices, and click **Start** to initiate the recovery.

While the recovery is running, a progress bar will indicate how much has completed.



If the recovery completes successfully, a pop-up will report success and display the run time.

If the recovery encounters an error, the progress bar will change to red, and a pop-up will report the error.

Appendix A - GParted Tutotial

GParted is an amazing tool for working with partitions. It's power is concealed beneath a pleasing interface that makes a complex subject easy and painless.

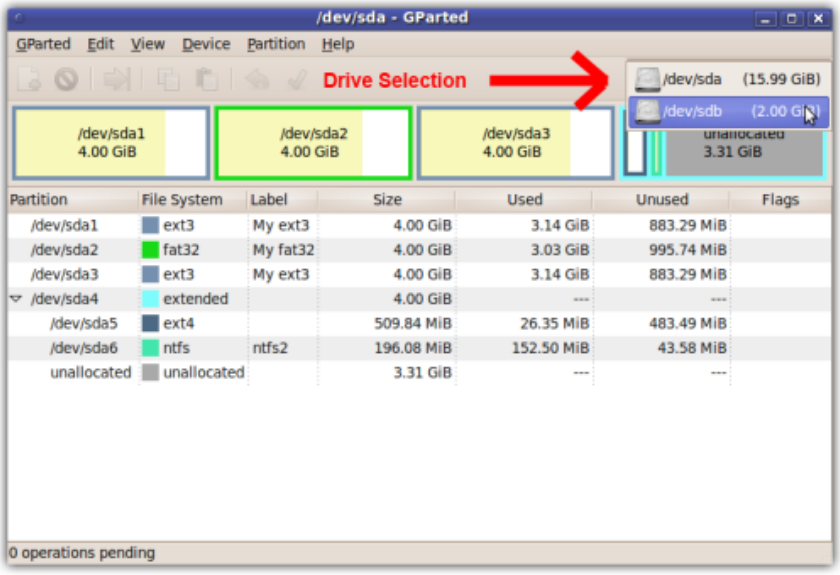
There are two operations you'll perform so frequently that we thought we'd give you a quick cheat sheet; 1) Creating partitions and 2) Resizing partitions. These two functions alone will make you glad you had this tool – but don't short change your own benefits – take some time on a sandbox server to experiment with the other functions. You'll be glad you did.

See http://gparted.sourceforge.net for more details on this incredibly useful tool.

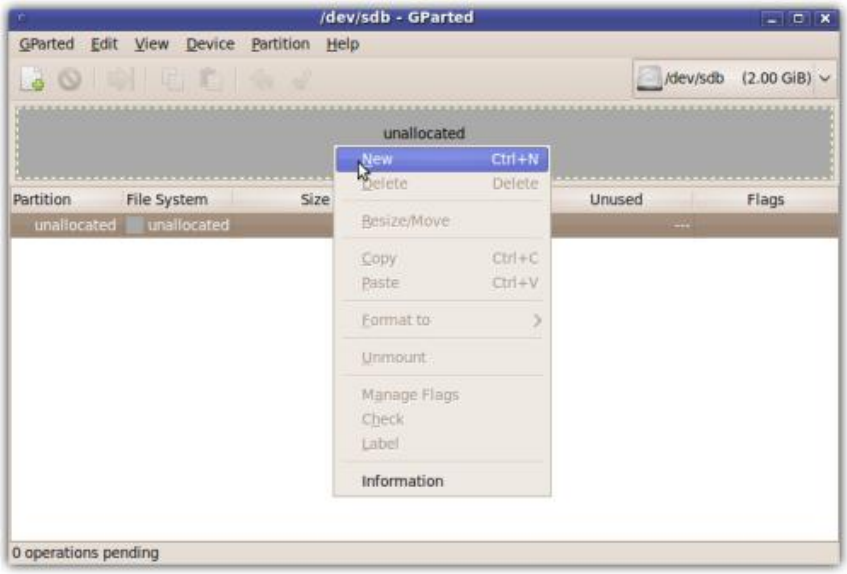
Create Partition

Creating a partition means two things. It means to allocate storage from the disk's partition table, and it means formatting the partition with a file system.

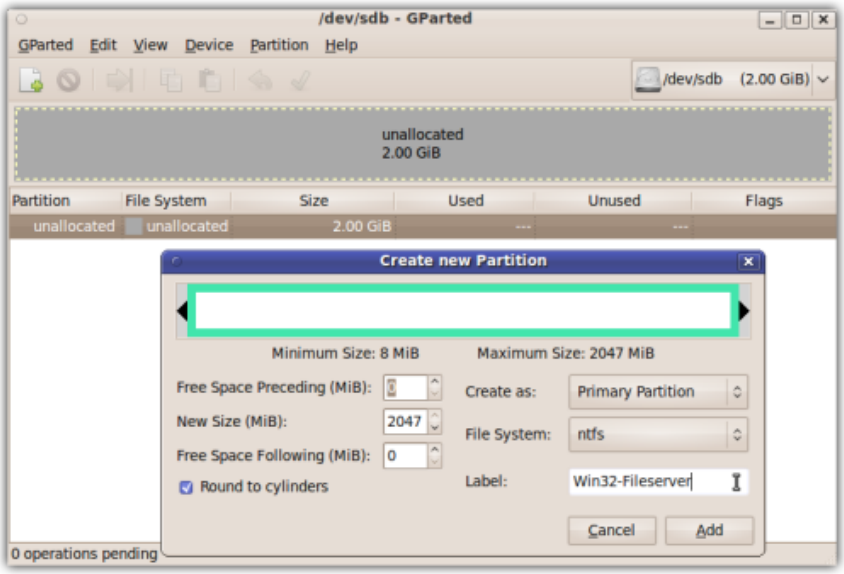
GParted will scan your server for all attached drives. The drives are displayed in a drop down in the top right corner.



Pick the drive from the drop down to see the partitions currently defined. Find a partition with unused space where you intend to create your new partition. GParted shows unused space as a grey bar.



To create a new partition, right click on the unused space, and click **New**.



Use this screen to define the partition. You'll want to focus on three items.

First, you'll want to specify the size of the partition. Sizes are always specified in Megabytes.

Second you'll want to specify the File System type. GParted can format many file system types. It's able to create; Ext2, Ext3, Ext4, FAT-16, FAT-32, JFS, NTFS, Reiserfs3 and XFS.

And Third, you'll want to specify the Partition Label. We recommend you assign easily recognizable names to each partition. Keep them short and descriptive.

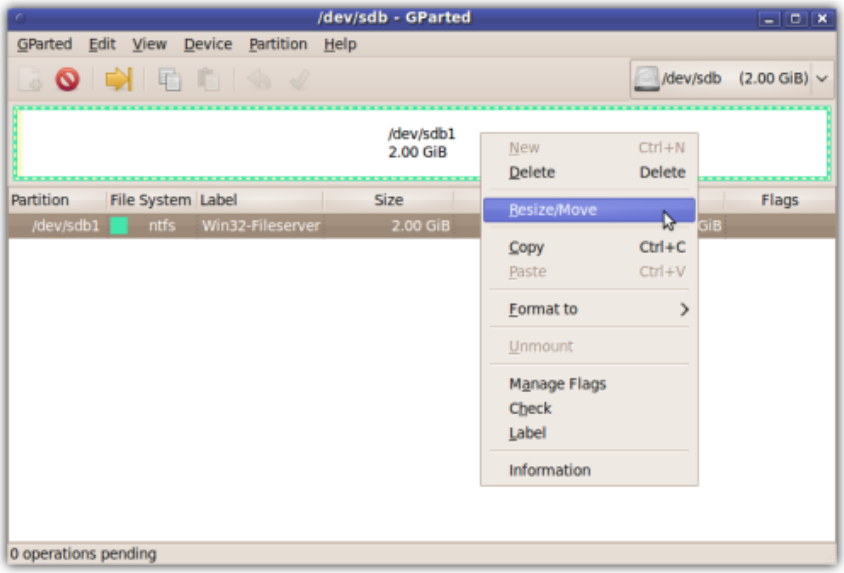
Click **Add** when you're finished.

IMPORTANT: GParted doesn't change the on-disk information until you click the Apply All Operations icon– it's the green checkmark on the toolbar. You can change your mind or even cancel an operation without any fear of altering your disk until you click the green checkmark. But once you click the checkmark, don't interrupt the operation!

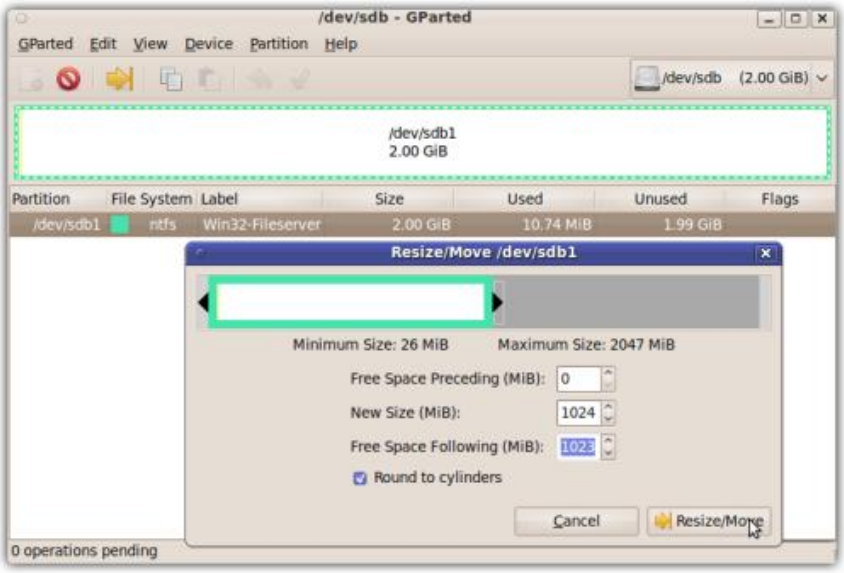
Resize Partition

Resizing partitions comes in handy. Often you create a server without knowing in advance exactly how many partitions you'll need, or knowing the right size of each. This function enables you to change the size of a partition.

Resizing is quick and simple



The first step is to find the partition, and right click. From the drop down, select **Resize/Move**.



Use this screen to provide the details of the partitions new size. You can use this to increase or decrease a partition's size. Click **Resize/Move** when your finished.

Note: The reference to **Move** is because you can also use this function to move a partition, which is to say reposition it's location on disk. You will not use this often, so you can safely ignore it.

IMPORTANT: GParted doesn't change the on-disk information until you click the Apply All Operations icon– it's the green checkmark on the toolbar. You can change your mind or even cancel an operation without any fear of altering your disk until you click the green checkmark. But once you click the checkmark, don't interrupt the operation!

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