How do I backup my Raspberry Pi?

I have been writing programs for my RasPi (running Debian) for a few weeks now, and would like to make sure I protect the work I have done.

How can I backup the files I have created?

Can I simply plug the SD Card into my Windows (XP or 7) PC and copy it either to the hard drive or another SD Card?

debian sd-card backup

edited Jun 16 '12 at 9:17
Alex L
2,410 1 15 46

asked Jun 14 '12 at 18:27
Steve Robillard
6,447 2 32 57

Is your pc running linux? – Jivings ♦ Jun 14 '12 at 18:35

3 I have PC's running both Ubuntu and Windows (XP & 7), but I would expect most people to be interested in the Windows answer. I will edit the question to make that clear. – Steve Robillard Jun 14 '12 at 18:38

3 rsync from Raspi to your pc? – Alex L Jun 14 '12 at 18:54

11 For code, you may also want to consider using distributed version control software like `git` or `hg`, that way you not only have copies of your code in multiple places, but also have the complete history of how that code has changed. – Mark Booth Jun 15 '12 at 11:01

I've used ext2 filesystems on Windows with no trouble at all (ran Visual Studio off it) using Ext2IFS. I don't know about the state of ext3/ext4 support (haven't tried ext2fsd). – reinierpost Feb 28 at 15:37

10 Answers

If you want to preserve all of the data, you will probably have to create a disk image. Furthermore, Windows cannot recognize typical Linux filesystems, so you probably won't even be able to see your files, when you plug in your SD card.

Creating a disk image will preserve not only files but also the filesystem structure and when you decide to flash your new SD card, you will be able to just plug it in and it will work.

Linux

On Linux, you can use the standard `dd` tool:

```
dd if=/dev/sdx of=/path/to/image bs=1M
```

Where `/dev/sdx` is your SD card.

Mac

On Mac, you can also use the standard `dd` tool with a slightly different syntax:

```
dd if=/dev/diskx of=/path/to/image bs=1m
```

Where `/dev/diskx` is your SD card.

Where `/dev/diskX` is your SD card.

Windows

Option 1

On Windows, you can use the reverse process that you used when flashing the SD card.

You can use Win32 Disk Imager, which is the preferred tool for flashing a SD card of the Foundation. Just enter the filename, select the device and press read:

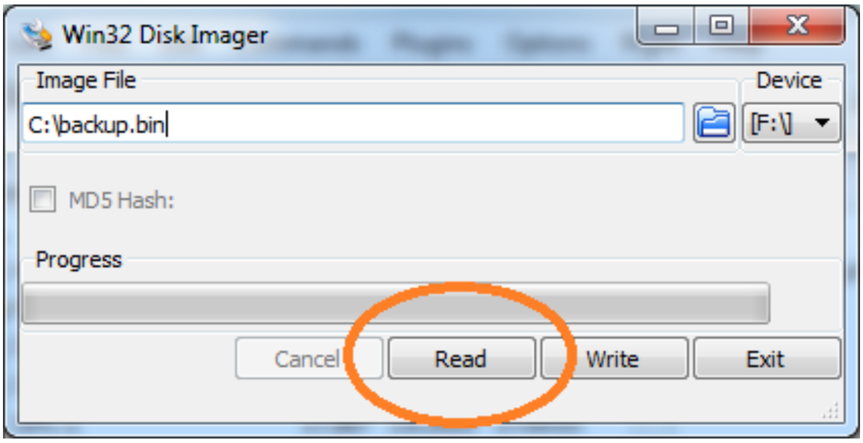


Image File: C:\backup.bin

Device: [F:\]

Of course, you can also use RawWrite, `dd` for Windows or similar tools, the process is quite similar.

Option 2

If you don't want to back up your entire system, but only specific files, I suggest you connect to your Raspberry Pi via SFTP and copy the files to your local computer (You can use the WinScp client). If you have SSH enabled, SFTP usually requires no special configuration on the Raspberry Pi side.

You can also install special drivers so your Windows can read `ext` filesystems (and will thus be able to read the whole SD card), such as `ext2fsd` but it s probably not orth the effort.

Since the image will be of the same size as your SD card, you may want to compress it. THis can be achieved simply by using your favourite compression tool, such as `gzip` , 7zip, WinZip, WinRar ...

edited Nov 20 '12 at 23:51
G3z
18 3

answered Jun 14 '12 at 18:37
Tibor
2,437 1 11 36

+1 in general, although `rsync` via `ssh` would probably be easier. Also, for source code - as Mark Booth already stated - you should absolutely use a DVCS – Tobias Kienzler Dec 13 '12 at 16:54

If my SD card became corrupted, how would I install this image to a new SD card? – Flipper Feb 3 at 8:57

Your link to Win32 Disk Imager comes up with no downloads available. I assume it's the same as sourceforge.net/projects/win32diskimager ? – Yamikuronue Feb 14 at 1:03

If you are running linux then you can use the `dd` command to make a full backup of the image:

```
dd if=/dev/sdx of=/path/to/image
```

or for compression:

```
dd if=/dev/sdx | gzip > /path/to/image.gz
```

Where `sdx` is your SD card.

To restore the backup you reverse the commands:

```
dd if=/path/to/image of=/dev/sdx
```

or when compressed:

```
gzip -dc /path/to/image.gz | dd of=/dev/sdx
```

answered Jun 14 '12 at 18:37

Jivings ♦
9,169 4 40 80

This is brilliantly handy. – phalt Jun 15 '12 at 9:14

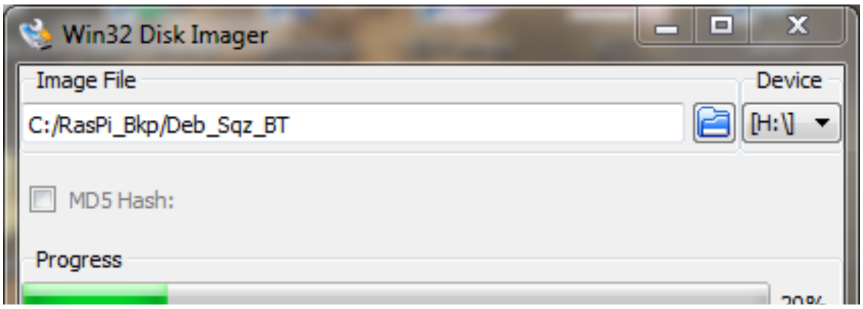
@phalt Thanks very much. – Jivings ♦ Jun 15 '12 at 9:15

1 I highly recommend using gzip - I have backed up some desktop partitions today and a 20Gb partition was saved in 8.9Gb. – Alex Chamberlain Jul 4 '12 at 15:48

2 @AlexChamberlain: gzip is pretty awesome. – Jivings ♦ Jul 4 '12 at 16:00

If you are using Windows:

1. Download Win32 Disk Imager.
2. Create the file path you wish to use to save your image. (I use C:\RasPi_Bkp)
3. Run Win32 Disk Imager
4. Browse to your backup file path spot, and type a file name.
5. Click save
6. Make sure the device shown in the drop down to the right of your file path is the one you want to back up.



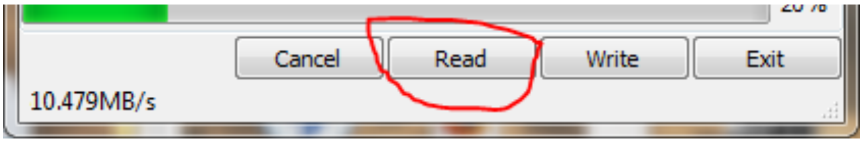
Win32 Disk Imager

Image File: C:/RasPi_Bkp/Deb_Sqz_BT

Device: [H:\]

□ MD5 Hash:

Progress 20%



1. Click "Read"
2. Wait.

answered Jul 5 '12 at 9:56

zenbike
804 3 19

Thanks - just the job. (Oddly, when I plug my SD card into my main PC, Windows 7 goes to BSOD! Fortunately its fine on another machine.) – Jon Egerton Jul 5 '12 at 10:01

Besides that block-level backups there are two common approaches to deal with the sources: to archive it continuously (1), or to use the revision control system (2). We are going to use command-line (any local terminal or ssh connection to a raspberry machine), right?

1. Archive

```
cd ~/projects
tar czvf your-raspberry-project-top-level-dir-v1.0.tgz \
         ./your-raspberry-project-top-level-dir
scp your-raspberry-project-top-level-dir-v1.0.tgz \
         user@backup-host:/home/user/backups/
```

2. RCS (Git for instance)

```
cd ~/projects/your-raspberry-project-top-level-dir
make clean                           # Or clean it manually using rm (rm ./*.o ./*.pyc)
git init                             # Create new repo here
git add .                            # Add source files to the staging index
git status                           # Verify if it's ok
git commit -a -m "Initial import"    # Fix application's source changes
git add remote https://github.com/user/your-raspberry-project.git
git push -u origin master            # Sends the sources to your github repo
git pull && git push && git status   # Now origin/master is your tracking branch
```

answered Aug 2 '12 at 10:00

okertanov
319 1

You can run this command from your linux PC with lots of space

```
ssh root@raspberrypi gzip -c /dev/mmcblk0 > img.gz
```

As a prerequisite you'll need to have generated .ssh keys and copied the id_XXX.pub over to /root/.ssh/authorized_keys

It's possible to have issues with the file system since it's a live backup, but if you RPi isn't real busy it will usually be ok.

it will usually be ok.

It's probably faster to do the compression on the PC like this

```
ssh root@raspberrypi dd if=/dev/mmcblk0 | gzip -c > img.gz
```

edited Aug 2 '12 at 5:12

answered Aug 2 '12 at 5:07

gnibbler
3,924 9 32

or with sudo 'ssh pi@raspberry sudo dd if=/dev/mmcblk0 | gzip -c > raspberry.img.gz' – cupakob Nov 25 '12 at 14:35

On the Mac you don't want to be using `/dev/diskn` , you should use `/dev/rdiskn` instead, where n is the number the OS uses to identify your SD card. This decreases the time required to copy by a huge amount.

So for the optimal backup process on a mac, I would recommend doing the following:

Run `diskutil list` , and find the disk corresponding to your Pi's SD card:

```
$ diskutil list
/dev/disk0
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:      GUID_partition_scheme                        *500.1 GB   disk0
   1:                        EFI                         209.7 MB   disk0s1
   2:                  Apple_HFS Macintosh HD            499.2 GB   disk0s2
   3:                 Apple_Boot Recovery HD             650.0 MB   disk0s3
/dev/disk1
   #:                       TYPE NAME                    SIZE       IDENTIFIER
   0:     FDisk_partition_scheme                        *7.9 GB     disk1
   1:             Windows_FAT_32                         58.7 MB    disk1s1
   2:                      Linux                         7.9 GB     disk1s2
```

Clearly `/dev/disk1` is my 8GB SD card, the Linux partition name is also a bit of a clue.

However, instead of using `/dev/disk1` with `dd` , you should use `/dev/rdisk1` , like so:

```
sudo dd if=/dev/rdisk1 of=/path/to/backup.img bs=1m
```

And to restore it, just swap the `if` (input file), and `of` (output file) parameters:

```
sudo dd if=/path/to/backup.img of=/dev/rdisk1 bs=1m
```

Or, with `gzip` , to save a substantial amount of space:

```
sudo dd if=/dev/rdisk1 bs=1m | gzip > /path/to/backup.gz
```

And, to copy the image back onto the SD:

```
gzip -dc /path/to/backup.gz | sudo dd of=/dev/rdisk1 bs=1m
```

For more info see this wiki page.

edited Dec 28 '12 at 17:08

answered Dec 28 '12 at 14:40
Alex Coplan
131 4

If your programs are all in the pi userid, there's really no reason to back up the entire filesystem, as is being suggested. what I do is to just back up the single id. I run the command:

tar -czf pi.tgz *

from pi's home directory, which creates the file pi.tgz, containing all the files and directories contained there (excluding hidden files). I then scp this file to another linux computer, but you could ftp it or e-mail it somewhere for safe-keeping... anything that got it onto another computer.

This creates a much smaller file for your back-up.

Concerned about all the additional packages you've installed along the way? Create a script that will perform those installs for you again should you need to recreate your SD card, and keep it in pi's home directory somewhere. (I have a ~/bin directory for such things). Have all the commands you need to do the installs to bring you back to the position you want to be in. It documents your changes, and allows you to quickly build up a new SD card. It would contain commands in the form of:

apt-get --assume-yes install apache2 mysqld mysql php5 php-pear

Start it out with

apt-get update apt-get --assume-yes upgrade

so that your system also is brought up to the current level before you start adding your packages.

Since this will be in your pi.tgz file, you'll have it when you need it.

answered Aug 2 '12 at 12:48
Robert Nix
11 1

For debian you could use dd and tar. This would make a complete copy of your SD card, and would

require external (to SD card) storage, probably mounted USB or network drive.

```
dd if=/dev/sdd of=yourbackupfilenamehere.dd
tar zcvf yourbackupfilenamehere.dd.tar.gz
```

with /dev/sdd being the location of your SD card, and of being output file name.

edited Jul 5 '12 at 10:40

answered Jul 5 '12 at 10:33
Forkrul Assail
109 3

This has the limitation of needing somewhere to write the image to though (that is also large enough to take the image(s). Presumably it also means a large data io through the usb hub - would take a while? – Jon Egerton Jul 5 '12 at 10:38

True, but it's kind of required in the question: "I want a full image of the SD card." – Forkrul Assail Jul 5 '12 at 10:39

Why do you make a `.tar.gz` file of the dd-file? Wouldn't it be better to just run `gzip` or `bzip2` on the dd-file directly? – Anders Jul 25 '12 at 21:11

I run raspbian and use dd and cron to do automatted backups of my SD to my external usb drive.

Really simple solution, it runs once a week at 2am on a Monday morning and makes an image of the SD card.

I wrote a script which shuts down services such as lighttpd and cron, to minimise the risk of the sd card being written to in the middle of the backup, it then calls dd, before starting to the services again when the backup has finished.

Ive put the script and some instructions on my blog, http://www.stuffaboutcode.com/2012/08/raspberry-pi-auto-backups.html

answered Oct 2 '12 at 12:51

Martin O'Hanlon

176 4

I've been using usbit for Windows. It's the only tool I can find that will allow you to swap from a larger SD card to a smaller one. All I did was tick the following on the options page; Ignore size checks & Truncate oversize images.

This allowed me to swap my openelec & Xbian images from a 16gb class 4 SD card to an 8gb class 10 card.

It's MUCH easier than resizing partition tables etc.

answered Oct 5 '12 at 21:41

Craig

1

1 Have you ever verified the files? I mean with `find -type f -exec md5sum {} \; > filelist.txt` ? – Avio Oct 5 '12 at 22:16

This is not guaranteed to work, as data stored on the second half of the disk is dropped. Furthermore, the partition table is corrupted. – Alex Chamberlain Oct 6 '12 at 9:22

protected by Jivings ♦ Feb 19 at 16:27

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