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7th May 2007, 11:26 AM #1

sideways *Offline*
Retired User

Join Date: Oct 2004
Location: London, UK
Posts: 4,999


How To extend root / partition 'on-the-fly', ext3/LVM only

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This turned out to be easier than expected, so I'm posting this short how-to. The restriction to ext3 is due to the man page for resize2fs claiming this is the only fs that can be resized without unmounting.

The scenario: you have an ext3 partition LogVol00 mounted on / and a swap partition LogVol01 in a logical volume group VolGroup00 (the default install), but you're running out of space in /, there's no room left in the volume group but you have a brand new disk drive with lots of free space. How to add some space to the / partition?

The usual problem is that / can't be unmounted, there are guides out there which involve using a livecd or dual booting into another os that recognizes logical volumes, but in this case you can do it 'on-the-fly' in Fedora.

WARNING: If you have important data in any directory under / then backup before attempting this.

I'll assume the spare disk is called /dev/sdb

1. Create a new partition of appropriate size using fdisk

Code:

```
fdisk /dev/sdb
n (create new partition, select start and end cylinders, all free space is selected by default)
w (save partition table and exit)
```

At this point you may be told that a reboot is necessary, I found it was unnecessary, but for safety you should probably reboot. Type fdisk -l again to check the new partition, I'll assume /dev/sdb1 was created ~10G in size

2. Create an ext3 filesystem in the partition (this step is optional, just a quick test that all is well)

Code:

```
mkfs.ext3 /dev/sdb1
```

3. Initialise the partition for use as a physical volume in lvm and add it to VolGroup00

Code:

```
pvcreate /dev/sdb1
vgextend VolGroup00 /dev/sdb1
```

4. Extend LogVol00 (use 'df /' to check that / is mounted on LogVol00) as required (by 10G here)

Code:

```
lvextend -L +10G /dev/VolGroup00/LogVol00
```

If you receive errors about not enough physical extents, then reduce the size of the extension a little until it fits.

5. Finally, resize the filesystem (this part normally would require unmounting /, but for ext3 and 2.6 Kernels it works while the partition is mounted)

Code:

```
resize2fs /dev/VolGroup00/LogVol00
```

Type 'df -h /', to check it worked, there should be an extra 10G available 😊
(you can use vgsdisplay, pvdisplay and lvdisplay (as root) to see detailed info, pvscan for a summary)

Note.
I've seen horror stories with lvm manipulation whereby an 'unknown uuid' error occurs for a partition, and the VolGroup can no longer be found, which prevents booting. This can be due to using e2label, mkfs etc on the partition **after** it has been initialised as a pv and added to the group. The error is fixable if you **haven't** rebooted: you need to edit /etc/lvm/backup/VolGroup00 and delete the lines referring to the unrecognized partition (they'll be a few between braces {}), the unknown uuid will be at the beginning, something like:

Code:

```
pv1 {
    id = "gAMCGW-jdaH-VXse-HR2j-PA24-AIbb-aHMjKl"
    device = "/dev/sdb1" # Hint only

    status = ["ALLOCATABLE"]
    dev_size = 20482812 # 9.76697 Gigabytes
    pe_start = 384
    pe_count = 312 # 9.75 Gigabytes
}
```

Remove all these lines, save the file, then run

Code:

```
vgcfgrestore -f /etc/lvm/backup/VolGroup00 VolGroup00
vgscan
```

vgscan should report all is ok (you can now try reinitialising the 'bad' partition using pvcreate, and then add it back to the VolGroup with vgextend)

Last edited by sideways; 9th May 2007 at 10:32 PM.



9th May 2007, 09:32 PM

#2

option Offline
Registered User

Join Date: Mar 2006
Posts: 11



thanks for the howto, sideways. worked perfectly for adding a 300GB drive to my existing partition of a single 500GB drive in my mythtv box (i set up the LVM during setup as a partition for all of my media related recordings and videos, knowing that i was going to expand it eventually). I think I found a typo though- right after using fdisk and making the filesystem, mkf2s.ext3 didnt work for me, but mkfs.ext3 did. maybe you confused that command with resize2fs? anyway, great how-to nonetheless!



9th May 2007, 10:37 PM

#3

sideways Offline
Retired User

Join Date: Oct 2004
Location: London, UK
Posts: 4,999



Quote:

Originally Posted by **option**
thanks for the howto, sideways. worked perfectly for adding a 300GB drive to my existing partition of a single 500GB drive in my mythtv box (i set up the LVM during setup as a partition for all of my media related recordings and videos, knowing that i was going to expand it eventually). I think I found a typo though- right after using fdisk and making the filesystem, mkf2s.ext3 didnt work for me, but mkfs.ext3 did. maybe you confused that command with resize2fs? anyway, great how-to nonetheless!

oops, absolutely right, I edited to correct the typo. (That section is skippable though 😊)

Glad it worked for you, I wasn't a fan of lvm, but I had this machine in need of space and was **surprisingly** impressed how easy this was to do.

A thumbs up for lvm 😊



1st August 2007, 05:08 PM

#4

Hobb3s Offline
Registered User

Join Date: Aug 2007
Location: Ottawa, Ontario, Canada
Age: 37
Posts: 6



Thanks for this! I was just looking how to do this exactly. Worked great. I appreciate your help!

Fedora 2.6.21-1.3194.fc7



1st August 2007, 06:38 PM

#5

SlowJet Offline
Registered User

Join Date: Jan 2005
Posts: 5,059



Are you sure step 2. is needed for an extend.
I always thoht the pv had to be created first, and the formatting is on the lv level.

The extend operation, I think, just formatted the new partition area again.

EDIT: actually, step 5 formatted the extended lv area.
SJ

Do the Math

Last edited by SlowJet; 1st August 2007 at 06:55 PM. Reason: actually, step 5 formatted the extended lv area.



18th February 2011, 07:52 PM

#6

axet Offline
Registered User

Join Date: Jul 2008
Posts: 378



Re: How To extend root / partition 'on-the-fly', ext3/LVM only

"Online resizing of ext4 works in a similar manner as ext3, using either `resize2fs` or `ext2resize`"

https://ext4.wiki.kernel.org/index.p..._filesystem.3F



16th December 2011, 01:06 PM

#7

Gödel *Offline*
Registered User

Join Date: Jul 2009
Location: London, England
Posts: 1,102



Re: How To extend root / partition 'on-the-fly', ext3/LVM only

Yes, these instructions still work in latest fedoras with ext4, but the logical volume naming has slightly changed, also I would recommend installing `gparted` (`yum install gparted`) to create the initial ext4 partition.

I decided to delete the 10G recovery partition `/dev/sda2` (which I never use) on a dell laptop, convert it to ext4 and add it to my root partition in F14:

1. I used `gparted` to create the ext4 partition in `/dev/sda2` (I deleted the fat32 filesystem first)
2. I used `lvscan` to find the name of the active volume group and logical volume (this may also include a swap partition, which you can ignore, I don't put swap in an lvm group because I dual boot with Ubuntu and want to share the swap partition)

Code:

```
$ su -
# lvscan
ACTIVE                '/dev/VolGroup/LogVol00' [17.34 GiB] inherit
```

Now extend the filesystem into the 10G partition

Code:

```
# pvcreate /dev/sda2
# vgextend VolGroup /dev/sda2
# lvextend -L +10G /dev/VolGroup/LogVol00
(gives error not enough physical extents)

# sudo lvextend -L +9.99G /dev/VolGroup/LogVol00
# resize2fs /dev/VolGroup/LogVol00
# df -h /
Filesystem                Size      Used Avail Use% Mounted on
/dev/mapper/VolGroup-LogVol00
                          27G      15G   13G   54% /

# lvscan
ACTIVE                '/dev/VolGroup/LogVol00' [27.33 GiB] inherit
```

(Note that the `/dev/sda2` partition wasn't quite 10G, so I had to extend by 9.99G)

This took just a few minutes. You don't have to create the ext4 filesystem in step 1, but I prefer to do this as it will report any potential problems.



9th March 2012, 05:52 PM

#8

vonmax42 *Offline*
Registered User

Join Date: Mar 2012
Location: Austin, TX
Posts: 1



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An easy way to utilize the entire space instead of guessing is to look at output from the `vgdisplay` command.

Here is an example. Look at the 1st column from **Free PE / Size**. Use that in your `lvextend`.

Code:

```

lvm> vgdisplay VolGroup01
--- Volume group ---
VG Name          VolGroup01
System ID
Format           lvm2
Metadata Areas   2
Metadata Sequence No 3
VG Access        read/write
VG Status        resizable
MAX LV           0
Cur LV          1
Open LV          1
Max PV           0
Cur PV          2
Act PV           2
VG Size          3.82 TB
PE Size          32.00 MB
Total PE         125042
Alloc PE / Size  85201 / 2.60 TB
Free PE / Size   39841 / 1.22 TB
VG UUID          WEdh4a-kUiH-8Xzx-gMfd-1J88-RxVI-hf85uZ

```

lvm>

```

lvm> lvextend -l+39841 /dev/VolGroup01/lvol0
Extending logical volume lvol0 to 3.82 TB
Logical volume lvol0 successfully resized
lvm>

```

Quote:

Originally Posted by [Gödel](#)
 (Note that the /dev/sda2 partition wasn't quite 10G, so I had to extend by 9.99G)

This took just a few minutes. You don't have to create the ext4 filesystem in step 1, but I prefer to do this as it will report any potential problems.



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