

Re: Fedora Core 2/Windows XP dual boot: selecting Linux doesn't work

Source: <http://linux.derkeiler.com/Newsgroups/comp.os.linux.setup/2005-12/msg00492.html>

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 - *Date:* Sat, 17 Dec 2005 10:11:51 +0100
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On Fri, 16 Dec 2005 21:35:21 +0100, Garnt de Vries <g.devries@xxxxxxxxxxxxx> wrote:

I copied the file `stagel`, and the first 512 bytes of `/dev/hdcl` for future reference,

Very good!

and ran `"grub-install --debug /dev/hdcl"`. This was the output:

```
grub> root (hd1,0)
Filesystem type is extfs, partition type 0x83
grub> setup --stage2=/boot/grub/stage2 --prefix=/grub (hd1,0)
Checking if"/grub/stagel" exists...yes
Checking if"/grub/stage2" exists...yes
Checking if"/grub/e2fs_stagel_5" exists...yes
Running "embed /grub/e2fs_stagel_5 (hd1,0)"...failed (this is not
fatal)
Running "embed /grub/e2fs_stagel_5 (hd1,0)"...failed (this is not
fatal)
```

Oh, I am dying to find out what that failrure could be. I will try to read the source code. I am a bit disappointed that Grub did not tell what it means to "embed", where exactly it wants to put the thing.

I suspect that it is not critical because then grub will point `stagel` directly to `stage2`. I don't know how that works, perhaps grub checks that the current placement of `stage2` satisfies certain constraints.

Re: Fedora Core 2/Windows XP dual boot: selecting Linux doesn't work

In the mean time, if you want to help us further, could you run the command

```
strace -f -o /tmp/grub.strace /sbin/grub << EOF
root (hd1,0)
setup --stage2=/boot/grub/stage2 --prefix=/grub (hd1,0)
quit
EOF
```

and post or mail me the output file /tmp/grub.strace ?

```
Running "install --stage2=/boot/grub/stage2 /grub/stage1 (hd1,0)
grub/stage2 p /grub/grub.conf "...succeeded
Done.
grub> quit
```

That failed embedding worries me a bit, but it's not supposed to be fatal...

I copied the first 512 bytes of /dev/hdc1 again and rebooted to XP.

Hey, could you do "od -t x1 linuxboot.bin" ? I want the byte at offset 0x40 into the file, that is 0100 octal. This byte is initialized to 0xff in the stage1 file, but patched to 0x81 in your setup, to say "we are booting from disk (hd1)."

I use WinHex for this kind of work. Very convenient, allows you to compare files, search for stuff, etc.

Indeed, in stage1 the 0x40 byte is 0xff. In the boot record as Fedora had created it, the 0x40 byte is 0x80. That makes sense, because it had the idea that hdc was (hd0). In the boot record as it was created with my modified device.map and grub.conf, the 0x40 had changed back to 0xff. That at least explains why I can't boot, but it remains to find out why this happens.

Ah!!! That was strange! (But something had to be strange here, since it isn't working...)

Also, the four bytes starting at offset 0x44 should be the (little-endian) 32-bit number indicating what sector to read off said drive. It should point suitably into

Re: Fedora Core 2/Windows XP dual boot: selecting Linux doesn't work

the first partition. I would expect something like 64 (0x40), since the first partition starts in sector 63 (1-based).

In the original BR these bytes were 0x41, 0xa8, 0x01, 0x00. In the BR created with my device.map and grub.conf they are 0x41, 0xb0, 0x01, 0x00. Not quite the 0x40 you were expecting.

I was expecting 0x40 in combination with an "embedded" stage1_5, which I had guessed would go at the start of the partition right after the "boot sector". Given that the "embedding" failed, I expect the number to point at the location of either stage1_5 or stage2 in /boot.

Now I need to judge the value 0x1b041 = 110657, or 56656384 bytes, unlikely to be beyond any 1024-cylinder limit. But is it the first sector of any file in /boot/grub?

Could you try this?

```
debugfs /dev/hdc1
stat /grub/stage1
stat /grub/e2fs_stage1_5
stat /grub/stage2
quit
```

With regard to Peter's comment

No idea. I also messed around with LILO, but without more success than I had with grub (all I got was "LI 99 99 99 ..." on my screen). So I

But that's definitive. That is a bios error saying "I cannot boot from there". Apparently your bios cannot boot from hdc (or at least the place on hdc where the boot stuff is).

I would like to have the output of "fdisk -ul", and even the output of

```
echo "x
d
q" | fdisk /dev/hdc
```

The only reason I know about that an area of a disk could be inaccessible

Re: Fedora Core 2/Windows XP dual boot: selecting Linux doesn't work

(apart from hard errors) is the infamous cylinder 1024 limitation, but since, 1) your computer as a SATA disk -> it must be a recent (i.e. post 2002) computer, and should support extended int 13 Bios calls, and 2) you are having a separate /boot partition in /hdc1, I suppose you have given that partition the lowest-numbered sectors on the disk, then I can't imagine the 1024-cylinder thing could be an issue.

Thinking a little more, what about some geometry weirdness?

Can you check in the Bios setup if there is a setting like "enable LBA" for the disk? It should be enabled, then sectors are numbered consecutively without regard to geometry; the only geometry translation should be the one inside the disk electronics.

We could see problems if grub computes sector numbers based on file system block numbers, which are translated to sector numbers by the kernel when accessing the disk through Linux, while the booting grub code sends the sector numbers through a Bios that insist on using a translation to cylinder/head/sector numbers according to a geometry different from the one the disk electronics uses. Well that is just a fantasy I have, I don't know that much about Bioses and disks. Anyone who knows more, please correct me.

I made a bold dash and manually changed that 0xff at offset 0x40 to 0x81. But of course, this didn't help: "GRUB Hard Disk Error".

Weird, weird. It seems to confirm Peter's interpretation, although we don't know what Lilo tried to do, if it tried to read the same sectors as Grub is trying to read. Even if we were to find that there are geometry translation errors, should we not just get the contents of the wrong sectors loaded, with subsequent hangs or weirdness when the boot loader tries to run the code - rather than direct "Hard Disk Error"?

Or, is Grub doing extended int13 calls with cylinder/head/sector numbers that are impossible according to the Bios' notion of the disk geometry? Like "head 244" when there are 26 heads?

Does the Bios setup have a function to display the disk geometry? Linux' fdisk -ul also outputs disk geometry data, are there differences?

Re: Fedora Core 2/Windows XP dual boot: selecting Linux doesn't work

See above. I hope it's of some use to you!

I find this veery interesting, I have no way to learn from such cases without your assistance. I don't have similar hardware either.

-Enrique

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