Linux+WindowsNT mini–HOWTO

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This mini–HOWTO covers some ways on how to install both Linux and Windows NT on the same computer and how to boot either of them from within LILO menu. There is also another mini–HOWTO "Linux+NT–Loader" that covers how to boot either of them from within NT Loader menu. As I consider Windows 2000 to be Windows NT version 5.0 this mini–HOWTO also covers upgrading from NT 4.0 to 2000.

More detailed information about LILO (**Li**nux **Lo**ader) itself you may find in wonderfull LILO mini–HOWTO.

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1. Introduction

Bill Wohler wrote in his v1.1 of The Linux+WindowsNT mini−HOWTO:

"Due to hardware or software problems or user headroom, I pulled my hair out for several days trying to get both NT and Linux happily settled on my new HP Vectra PC at work."

I could say that was true in my case too, but you **really** have a way to make both Linux and Windows NT co−existing on the same machine and to switch from one of them to another.

"Under no circumstances run the Disk Administrator from NT 3.51 to format partitions. It asks if it can write a signature "which will cause absolutely no harm." When it did this, it hosed my partition table until fixed by steps 3 and 7 below. Because of these problems, I was limited to one FAT NT partition. Also remember that even if you do get the Disk Administrator to work, you'll want at least one small FAT partition to use as a staging area for exchanging files between Linux and NT until Linux has an NTFS filesystem."

Well, NT's Disk Administrator is sufficient tool to check what situation on your hard disk(s) you have, before and after you used an utility called Partition Magic by Power Quest. This utility might be needed to 'shrink' your NT (either NTFS or FAT) partition, in order to get some free space for your further Linux' partitions. (After a while, I recognized that 'shrinking' used partition might not be needed. Actually, if you start from 'scratch', it might be the best way to re−format your whole disk(s) using **FDISK** command. You should make a DOS boot floppy diskette where DOS commands FDISK and FORMAT have to be also copied. More details later...)

"I installed Linux first and then NT, but based on my experience, I might now be able to install NT first and then Linux."

Of course you all are able to install Windows NT first and after that Linux. We'll see how to do that and how to use **LILO** (**Li**nux **Lo**ader) to chose which operating system to boot. But, before that we'll see the procedure that Bill Wohler, the previous maintainer of this mini−HOWTO, has been using:

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2. How to install: LINUX *first*, WINDOWS NT *after*

1. Install a minimal Linux (hold off on installing the rest until you win the Linux/NT battle). Do all your disk partitioning in Linux, including your NT partition (make it FAT). I was not successful at making more than one NT partition. I also made it the first partition, but I don't know if that is essential or not.

2. Edit `/etc/lilo.conf` and use **boot=/dev/sda** (I was not successful at installing LILO on the Linux partition−−`/dev/sda3` in my case) and run "lilo". You'll have to use the editor ae. You'll live.

3. Save the MBR with this: **dd if=/dev/sda of=/dev/fd0 bs=512 count=1** Use a floppy. Trust me. Also do this each time you change the disk partition table.

4. Install NT, part 1. When it goes to reboot halfway through the process you'll boot into Linux.

5. Add NT stanza to /etc/lilo.conf, e.g.:

```
other=/dev/sda1
label=NT
table=/dev/sda
```

and run lilo. If lilo complains about this (I forget the message), add the "linear" flag to /etc/lilo.conf near the "compact" keyword. Furthermore, if your partition table is screwed up by NT you'll either need to use "ignore−table" or follow the directions in Step 7. See also "fix−table". The LILO HOWTO is your friend.

6. Reboot, select NT from LILO, and finish NT install. You'll need the "Boot Disk XU, HP Vectra AIC 7880 Driver A.01.02" floppy to install the ethernet drivers and the "XU/VT Drivers and Documentation" CD (directory video/disk4 if I recall correctly) to install the video drivers for the Matrox MGA Millennium.

7. Back to Linux, run fdisk and ensure you don't get "partition doesn't end on cylinder boundary" on your Linux partitions. You'll still have this error on the NT partition though, but this seems to be OK.

```
/dev/sda1             1        1      322   329301    6  DOS 16-bit >=32M
```

Partition 1 does not end on cylinder boundary:

phys=(321, 39, 9) should be (321, 63, 32)

Cfdisk reports strangeness, but it seems OK:

```
                                     Unusable                      0.04*

 /dev/sda1                Primary    DOS 16-bit >=32Mb           321.59*

                                     Unusable                      0.39*
```

If you do get the cylinder boundary warning on your Linux partitions, it is sufficient to use cfdisk to do something innocuous like changing the boot sector.

If, however, NT has really screwed you over and cfdisk can't even run, complaining that it cannot open /dev/sda, then you'll need to take more extreme action. You'll need that MBR you saved previously. Clear and restore the MBR (but not the signature) with:

```
dd if=/dev/zero of=/dev/sda bs=512 count=1

dd if=/dev/fd0 of=/dev/sda bs=510 count=1
```

8. Install the rest of Linux. Easy, huh?

If you prefer to have NT write the MBR instead of LILO, you may have to resort to the following to clear the MBR first:

- dd if=/dev/zero of=/dev/sda bs=446 count=1 (in Linux) or perform a low−level format with the SCSI utilities. I've heard that a low−level format of an IDE disk is fatal, so don't do it.
- fdisk /mbr (you've obviously already created a DOS boot disk that contains fdisk).
- delete NT partition and create it again in NT install.
- continue with NT install.

Epilogue: After first posting this message, I heard from several folks that they had no problems with NT's Disk Administrator, and were able to install either NT or Linux first without any problems. Hopefully, you'll be in this camp, but if not, perhaps this campfire story will be of some use.

Since the first edition of this mini−HOWTO, others have written similar documents as well. Please be sure to consult them. If your experience differs from any presented, then you should submit your own mini−HOWTO or submit a revised version of this document to the HOWTO maintainer (reference this sentence) and send a carbon copy to me as I don't have the time to maintain this document. Someone should eventually combine all of these documents into a single coherent HOWTO.

Finally, I'm afraid this document details all I know about this subject. I should point you to an appropriate Linux newsgroup for further information. I use NT about one day a year. Under duress.

---

3. How to install: WINDOWS NT *first*, LINUX *after*

3.1 If you have *only one* IDE hard disk

- First of all, I would suggest you to install a fresh copy of Windows NT 4.0 on your hard disk. I suppose that you already made a backup of your important data, so the NT installation shouldn't be a problem. During the NT installation, setup is not going to ask you where to place NT's boot loader, so it would be placed into the MBR (Master Boot Record) of your hard disk. But, there is a possibility for a previous content of the MBR to remain within the MBR (especially any previous Lilo), so I would suggest you (*before* installation of NT) to boot the computer with a DOS floppy diskette having DOS version of FDISK. At the prompt a:\ just enter the command: **fdisk /mbr** and restart the computer again (without that floppy).
- After you have successfully installed your NT, you will see that it uses the whole hard disk or a specific partition of the hard disk (depending on what you decided during the setup process). So, it is advisable to 'shrink' the partition where NT resides in order to make some free space on the disk. Onto that free space you will install your Linux. After you have your NT configured and running, you have to boot your computer using a floppy diskette with Partition Magic utility by Power Quest. It is a graphical tool able to see all partitions on all hard disks you have. The best thing is that you can make some changes with your partitions but *not* to destroy your existing data. One of the available changes is to make your existing partition(s) smaller, so to get some free space on the disk(s) for other purposes. Although you are advised to make a backup before you make any changes to the partitions, I usually practice to 'shrink' NT's partition(s) before I install anything else onto this NT (so, if needed,

a repetitive NT re−installation wouldn't be a problem). Well, Partition Magic (or any other similar utility you are familiar with) will shrink your NT's partition (either NTFS or FAT) to a smaller measure and place it to either the beginning or to the end of the previous measure. It means that you may choose to have your 'shrinked' NT partition at the beginning or at the end of your disk (I usually choose NT to be at the beginning, so the ending part of the disk will become a 'free space'). After the 'shrinking' is finished, you may re−boot your NT in order to check the new situation: you may use Windows Explorer or Disk Administrator for that.

- As it was said in Introduction, it might *not* be needed always to use such tools like Partition Magic. It is better to say that this tool is of a great value in all those cases you have been running Windows NT for a long time, so you don't want to start from 'scratch'. For example, you are fully satisfied with your beloved NT and related applications. You are not likely to kill NT, but you have recognized that you have enough *unused* space on NT's partition(s) (i.e. NT's partition(s) might look not much populated). That case, Partition Magic is your choice. But, if you do start from the beginning, or you don't mind re−formatting the disk, it might be suitable to get a blank floppy diskette, make it to be DOS bootable and copy two DOS tools on it: FDISK and FORMAT. So, restart your computer with such floppy and at **A:** prompt enter **fdisk**. There you'll find several options that allow re−partition of your hard disk(s). Now you could make a part of the disk a FAT partition (where you'll later install your beloved NT). The rest of space you'd better leave alone (i.e. do not attempt making Linux partition(s) right now, using DOS's version of FDISK). If you *really* want to make Linux−type partitions now, you should look after Linux version of FDISK.
- So far so good. Next step is to install your Linux. Case you are familiar with RedHat distribution (I hope with other distros is the same or similar), you start by putting your installation CD in the drive and re−boot the computer). Well, when you are about to choose what type of installation it will be (Gnome or KDE Workstation, Custom, etc.) you may choose whatever you planned before, but I would suggest to install a Workstation *at first*. This is good because Linux setup will find *automatically* the free space on the (first) hard disk, make all partitions needed for Linux, format them properly, make majority of options by default so you won't have much pain during the setup (*later*, if you want, you may either **add** missing components or **re−install** RedHat Linux as Custom over the existing linux partitions). Lilo should go to the MBR.
- **Don't forget to make Linux boot floppy diskette. You'll never know when you may need it. If something goes wrong with the MBR, and you don't have boot floppy, your Linux might become not accessible, so you might have to re−install it again.**
- After it looks that Linux installation is finished, you are going to re−start the computer and there you will only see **Lilo** with only one entry to boot: Linux (or maybe more than one Linux entry, in case your hardware is multi−processor one or so). But, don't panic! Your Windows NT is still there − where you had installed it before Linux. You should become some familiar with Linux as soon as possible, in order to be able to find and edit your new **/etc/lilo.conf** file. When you open this file for the first time, you'll see that there is only one (or more) Linux entry. Well, you should know the exact position (read: a partition) where Windows NT has been installed, so you could add an appropriate entry into `/etc/lilo.conf` file. After you make those changes, restart Lilo with a command: **/sbin/lilo** and, after the next re−boot, you will have both 'linux' and 'nt' (or 'dos' or similar) entries under Lilo menu.
- My added NT entry is:

```
other=/dev/hda1
label=nt
```

So, the whole `/etc/lilo.conf` looks like this:

```
boot=/dev/hda
timeout=50
prompt
```

```
    default=linux
    vga=normal
    read-only
image=/boot/vmlinuz-2.2.12-20
    label=linux
    root=/dev/hda3
other=/dev/hda1
    label=nt
```

- Some more explanations regarding details from my `/etc/lilo.conf` file: After I have installed Windows NT, I assigned the letter C: to that drive. Beside that, I wanted to have another NTFS partition in order to store and backup important files, case I have to re−install NT on C: for some reason in the future. That's why I've made another NT partition, that has been assigned as D: disk. Both NTFS partitions are approximatelly 3 GB each and Linux setup found them as /dev/hda1 and /dev/hda2 partitions. The rest free space on the disk was cca. 2 GB, where I have made the /root partition of near 1.9 GB and /swap part of cca. 100 MB (/dev/hda3 and /dev/hda4 respectively). Lilo went to the MBR and all has been running fine.

  For your information, I *wanted* to make these linux partitions that time. Later, I found that it was not needed, so now I let Linux setup to make partitions from the free space in a way it likes to do that. I trust it :−)

3.2 If you have *more than one* (SCSI) hard disk

*Notice: Folks, you see, at my place, one of computers has several SCSI disks. That's why I put the word 'SCSI' in parentheses. There I have a couple of SCSI controllers, a SCSI CD ROM drive and a SCSI Tape drive. That doesn't mean that *you* will be using SCSI parts at all. You'd rather handle more than one IDE disks, but I hope that install process shouldn't change too much, if any.*

- First of all, I would suggest you to install a fresh copy of Windows NT 4.0 on your **first** hard disk. I suppose that you already made a backup of your important data, so the NT installation shouldn't be a problem. You can easily copy your data on your second hard disk or so. During the NT installation, setup is not going to ask you where to place NT's boot loader, so it would be placed into the MBR (Master Boot Record) of your **first** hard disk. But, there is a possibility for a previous content of the MBR to remain within the MBR (especially any previous Lilo), so I would suggest you (before installation of NT) to boot the computer with a DOS floppy diskette having DOS version of FDISK. At the prompt a:\ just enter the command: fdisk /mbr and restart the computer again (without that floppy). If you want to be sure about your machine is 'clean', you may also delete any existing partition(s) on your *other* disks, during the Windows NT Setup **in case you have *not* made any backup on other disks**.
- After you have successfully installed your NT, you will see that it uses the whole hard disk or a specific partition of the hard disk (depending on what you decided during the setup process). So, it is advisable to 'shrink' the partition where NT resides in order to make some free space on the disk. Onto that free space you will install your Linux. Well, you may also think of using other disk(s) you have for Linux (so did I). That case, you would start your linux installation and tried to use, for example, /dev/sdb (or sdc, or sdd, or else in case of SCSI system) or /dev/hdb (or hdc, or hdd, or else in case of IDE system). Looked that Linux installation accepted whatever I chose, but somehow after all was finished, when I did that, LILO was not able to do anything. Actually, it always stopped after 'LI' so it was not possible to start Linux at all. Finally, after pulling my hair out, I decided to make it all on the **first** disk. So, after I had NT configured and running, I had to boot my computer using a floppy diskette with Partition Magic utility by Power Quest. It is a graphical tool able to see all partitions on all hard disks you have. The best thing is that you can make some changes with your partitions but not to destroy your existing data. One of the available changes is to make your existing partition(s)

smaller, so you can get some free space on the disk(s) for other purposes. Although you are advised to make a backup before you make any changes with your partitions, I usually practice to 'shrink' NT's partition *before* I install anything but NT itself (so, if needed, a repetitive re−installation wouldn't be a problem). Well, Partition Magic (or any other similar utility you are familiar with) will shrink your NT's partition (either NTFS or FAT) to a smaller measure and place it to either the beginning or to the end of the previous measure. It means that you may choose to have your 'shrinked' NT partition at the beginning or at the end of your disk. I usually choose NT to be at the beginning, so the ending part of the disk will become a 'free space'. I discovered some problems if the 'free space' is made at the beginning of disk (later we'll talk about). So, after the 'shrinking' is finished, you may re−boot your NT in order to check the new situation: you may use Windows Explorer or Disk Administrator for that. You will also note how NT can 'see' all (other) disks you have in your machine (either partitioned or as 'free space' areas).

- Once again, as it was said earlier, it might *not* be needed always to use such tools like Partition Magic. It is better to say that this tool is of a great value in all those cases you have been running Windows NT for a long time, so you don't want to start from 'scratch'. For example, you are fully satisfied with your beloved NT and related applications. You are not likely to kill NT, but you have recognized that you have enough *unused* space on NT's partition(s) (i.e. NT's partition(s) might look not much populated). That case, Partition Magic is your choice. But, if you do start from the beginning, or you don't mind re−formatting the disk(s), it might be suitable to get a blank floppy diskette, make it to be DOS bootable and copy two DOS tools on it: FDISK and FORMAT. So, restart your computer with such floppy and at **A:** prompt enter **fdisk**. There you'll find several options that allow re−partition of your hard disk(s). Now you could make a part of the disk a FAT partition (where you'll later install your beloved NT). The rest of space you'd better leave alone (i.e. do not attempt making Linux partition(s) right now, using DOS's version of FDISK). If you *really* want to make Linux−type partitions now, you should look after Linux version of FDISK.
- So far so good. Next step is to install your Linux. Case you are familiar with RedHat distribution (I hope with other distros is the same or similar), you start by putting your installation CD in the drive and re−boot the computer). Well, when you are about to choose what type of installation it will be (Gnome or KDE Workstation, Custom, etc.) you may choose whatever you planned before, but I would suggest to install a Workstation at first. This is good because Linux setup will find automatically the free space on the **first** hard disk, make all partitions needed for Linux, format them properly, make majority of options by default so you won't have much pain during the setup (later, if you want, you may either add missing components or re−install Linux as Custom over the existing linux partitions). Lilo should go to the MBR of your **first** disk.
- After it looks that Linux installation is finished, you are going to re−start the computer and there you will only see Lilo with one Linux entry to boot (or maybe more than one Linux entry, in case your hardware is multi−processor one). But, don't panic! Your Windows NT is still there where you had installed it before Linux. You should become some familiar with Linux as soon as possible, in order to be able to find and edit your new `/etc/lilo.conf` file. When you open this file for the first time, you'll see that there is only one (or more) Linux entry. Well, you should know the exact position (read: a partition) where Windows NT has been installed, so you could add an appropriate entry into `/etc/lilo.conf` file. After you do that, restart Lilo and, after the next re−boot, you will have both 'linux' and 'nt' entries under Lilo menu.
- My added NT entry is:

```
other=/dev/sda1
label=nt
```

So, the whole `/etc/lilo.conf` looks like this:

```
boot=/dev/sda
map=/boot/map
```

```
install=/boot/boot.b
prompt
timeout=50
default=linux
image=/boot/vmlinuz-2.2.12-20smp
    label=linux-mp
    initrd=/boot/initrd-2.2.12-20smp.img
    read-only
    root=/dev/sda6
image=/boot/vmlinuz-2.2.12-20
    label=linux-up
    initrd=/boot/initrd-2.2.12-20.img
    read-only
    root=/dev/sda6
other=/dev/hda1
    label=nt
```

- Some more explanation, regarding details from my `/etc/lilo.conf` file: After I have installed Windows NT on the **first** disk, I assigned the letter C: to that drive. After I made enough free space *after* the NTFS partition, I let Linux setup to handle further partitioning. Although Linux should support as far as four primary partitions per disk, it seems that Linux setup is likely to make an extended partition, whenever it recognizes that there is already a primary partition on the disk. Considering that those 'virtual' primary partitions would be numbered from /dev/sda1 to /dev/sda4 (including an extended one, of course), the extended one should become /dev/sda4. Following that idea, the first one logical partition within the extended one was numbered as /dev/sda5 (in my case, it was the /boot partition that physically was the first from the beginning of the **first** hard disk). So, the /root and /swap partitions are /dev/sda6 and /dev/sda7 respectively. You may see a line "root=/dev/sda6" telling you that. Once again, Lilo went to the MBR and all has been running fine.
- Well, you may ask me: OK, but what in a case I have several hard disks installed in the machine? Good question. You see, I myself have *four* SCSI disks and, of course, I tried to install Linux on the 2nd one, next the 3rd and, finally, on the 4th disk. Whatever I did (Linux setup haven't complained at all), when I was about to finish the installation and after performing the final automatic re−boot, my Lilo would stop after 'LI' so the computer had to be re−started. Finally, I realized that there must be a problem with disks that are too "far" from the MBR that is located at the beginning of the **first** hard disk. That's why I suggest you to make them all (both NT and Linux) on your **first** disk. After having all of them running OK, there is no problem to make other disks visible (and usable) by both operating system. I hope your **first** disk is large enough to carry both operating systems (NT needs at least cca. 150 MB for itself, Linux depends on what you want to get: Gnome or KDE Workstations are about 580 MB, but the Custom wants more than 1.4 GB). That means the **first** hard disk of cca. 2.4 GB should fit.
- You may also ask me: OK, but, could I 'shrink' my NT partition in a way the 'free space' is made at the beginning of the disk? Well, I remember I tried to do so and to install, at first, Gnome Workstation (395 packages, 570 MB) there. During the setup, everything looked fine, but neither Lilo was not installed, nor the boot floppy was made. You bet, Linux was not functional. Then I tried to install KDE Workstation (377 packages, 582 MB) on the same place. Once again, everything looked fine, but neither Lilo was not installed, nor the boot floppy was made. Investigating that, I studied the structure of all existing partitions. I was surprised when recognized that new born *logical* partitions (within the new born *extended* one) were numbered as if they were physically positioned *after* the NT partition! In the other words, there I have got a 'funny' order: /dev/sda5, /dev/sda6, /dev/sda7 and, finally, /dev/sda1. Looked like the system was a bit confused. So I considered that it is advisable to make the 'free space' **after** already existing NT partition(s).
- Regarding two similar Linux images (differ in 'smp'). It is a server hardware with a multi−processor support. The "intelligent" setup has inspected the hardware and offered me to have both 'multi' and 'uni' processor functionality. Nevertheless, I still have only one CPU there.

4. How to *upgrade* WINDOWS NT to WINDOWS 2000

*Well, actually, it isn't a real "upgrade" of **running** NT to 2000, but a "fresh" installation of Windows 2000 Professional. I hope it should also work for other Windows 2000 products. I haven't tried its server−type installations yet, but I remember I haven't experienced any problem with NT, regarding it was Server or Workstation.*

- First of all, a backup of important data should be made! I do it by having another Windows−like partition on the disk, where I copy/move my texts, drawings etc. That partition is *not* going to be handled during the installation. After the backup is made, it's the right time to install Windows 2000.
- You see, folks, whenever I (re)install a Windows NT product, I like to see it on a clean partition. It means, I remove i.e. delete the existing partition where NT "system" files were stored, in order to get free ('unused') space. Then I chose to make a new partition that will be formatted as NTFS type of file system. After that, I opt to install Win2000 onto the new partition.
- The procedure of Windows 2000 Setup will remove LILO from the MBR, so a couple of next re−bootings during the installation won't show LILO prompt.
- When the Win2000 installation is finished, you may re−install your favorite applications and restore your data from the backup. You should then check if everything goes fine with your new and old Windoze stuff :−)
- So far − so good. Now you have to look after your Linux boot floppy diskette. If you can't find it, you are out of luck. Actually, I am not sure if all Linux systems might be now activated without boot diskette. Some Linux *gurus* suggest to boot Linux from the installation CD, but I don't know if it can help in case your system doesn't have *bootable* CD−ROM drive, i.e. a modern motherboard's BIOS. Any comment here?
- Well, after you successfully boot your Linux, you should go to `/etc/lilo.conf` to check it once again. You should have there at least two options: Linux and NT. Case you don't see the option to boot your beloved Windoze, you have to add it. It was described in previous sections. Then you have to run **/sbin/lilo** in order to put LILO boot loader into the MBR.
- That's all. Next time you boot your computer, you'll get your LILO prompt. Using <Tab> key you'll see your boot options.
- From my experience − all work great! Although I *removed* previous WinNT installation in order to make new Win2000 installation and also *lost* (temporarily) LILO boot loader, at the end I got both of them, Win2000 and Linux, the same way as I did with WinNT and Linux!

5. How to install WINDOWS 2000 *besides* LINUX and WINDOWS 98

*Notice: When I say 'beside Linux and Windows 98', I mean of Linux and Windows 98 that **already** work together, so they were installed earlier, **before** we made a decision to add Windows 2000. One of the machines I use at work, has both Linux and Win98. They both load from under LILO menu.*

Actually, it is not a very big problem to install Windows 2000 on a computer where another Windows is running. In my case, it is Windows 98 so I just put 2000's CD into the drive. After it recognized that an 'older' version of Windows was running on my machine, it offered me either to upgrade it to 2000 or to install W2k as the 'clean' installation. At first, I tried to upgrade my Windows 98 to W2k, in order to get a very similar combination that I have at home (described in previous chapter). But, some hardware and software compatibility issues were reported (I mean, some of my components wouldn't stay fully operational if I just did an upgrade).

When saw that, I considered to try the 'fresh' installation of W2k, *beside* Win98 and Linux. Happily, I recently installed another HD into the box, so I did not need to handle the first disk, where Win98 and Linux were living. Actually, the main reason to add the second disk was that the first one got almost full. If I wanted to install the third operating system on the first disk, I'd have to clean it well. So, when W2k's Setup asked for the location to be installed, I told it to use the second disk, repartition it and format it as the NTFS file system (just to mention that my Win98 was FAT32 and Linux was ext2).

After an hour or so, W2k's installation was finished. During the setup procedure, it re−started the system a couple of times. When it was about to do that for the first time, I was curious if it would re−write the MBR, where LILO resides (actually, in the previous chapter, I have mentioned that W2k's installation was likely to re−write the MBR). Interestingly, it did not do that this time, so I continued to see 'LILO boot:' on the screen. But, a *new* thing has appeared after LILO: the Windows 2000 boot loader, that in turn offered not only to load W2k but a 'Windows' (ie. my old Win98) too.

Well, depending on which operating system I like to start, the procedure might slightly differ, but it is easy. No problem at all. For example:

- If I like to load my Linux, then LILO boot is the "cross−road". At this point, the 'linux' entry should either be chosen or set as default in `/etc/lilo.conf`;
- If I like to load Windows, then the other entry under LILO boot should either be chosen or set to be default. After it is done, Windows 2000 boot loader should appear on the screen. On that point, I have two choices: W2k and W98. The rest is easy, both Windozes start from there happily.

---

6. How to install WINDOWS NT/2000 and LINUX (RedHat 7.1) on a *laptop*

6.1 If you want to have *both* NT and 2000, besides Linux

Notice: Recently my bosses decided to get a couple of HP Omnibook 6000 portables, so I quickly rushed to play with new toys. It was a series with Pentium 3 at 1 GHz and 128 MB of RAM. There's also a hard disk of 30 GB, removable DVD and FDD drives, a secondary battery that goes to the removable drive bay (when it's empty) and NIC/modem combo card.

- Well, the notebooks have come with Windows 2000 Professional preinstalled and I thought it might be great to reformat the disk and start from scratch. I think I did it again with Partition Magic utility by Power Quest. Actually, I have *erased* all existing partitions because I noticed a small one at the beginning of the disk, that looked to me a bit strange (well, I learned later that it was there for hibernation and/or diagnostics).
- After that, I tried to repeat a procedure that I have always been very fond of: to make a couple of FAT partitions (cca. 2037 MB) where my NT and/or W2k would go. Don't ask me why I use that old FAT format − it is just to be sure that any type of Windows setup will recognize such a partition and, as well, to be sure that some file exchange (if needed) would be possible between various operating systems. Beside these FAT partitions (that start, of course, from the beginning of the disk), I have also made several FAT partitions but, this time, starting from the *end* of the disk. Partition Magic allowes a user to do that (<−− here the guys from Power Quest should send me a couple of 0.01$ for this commercial of their product :−)).

  Well, you may ask me why somebody should make a free space somewhere in between. The answer is: In order to allow Linux's **/boot** partition to stay under well known 1024 cylinder limitation. When

it comes to 1024 cyl area (actually, when you enter 1025, 1026 ... etc), it doesn't matter what is happening there. It means, there you may put your Linux **/** (root) partition (regardless of its size and structure), as well as to use remaining space for Windows/Linux exchange zone (i.e. FAT).

- So far − so good. So, I put NT's installation disk and followed the procedure (you should be aware to use a "retail" NT installation disk, *not* the one that came with Omnibook 6000, because it is supposed to "restore" an NT installation, accompanied with a hibernation partition. Why such a partition seems not to be suitable here, we'll see later.
- After Windows NT was installed completely, it was the right time to insert Windows 2000 installation CD (once again, do not use 2000's disks that have come with the computer). So, from within NT running, I have installed 2000 onto the next partition (actually, only the first part of the installation process starts from under NT, but it is OK). When the process has finished, you have two Windozes − on your first two partitions.
- Everything seems to be running OK, excepting the diagnostics. It should be activated with F10 at system boot **if** "restore" CD's were used. BTW, NT's "restoration" finishes with even bigger partition (cca. 500 MB). And not only that: this partition seems to be a *primary* one. That means, you may end up with a shortage of primary partitions, in case you intend to install several operating systems. Anyway, I have decided that the diagnostics is not too much important to me, so there's no use of F10 at system boot anymore :−)
- Not to forget to say, the Windows 2000's boot loader should offer *both* NT and 2000 boot options, if you have followed the mentioned procedure (case you don't want to have *both* NT and W2k on the system, you may skip to the next section).
- Well, that is the time when I usually look after a Linux installation CD's. The first one (in case of two) should be inserted into the DVD (or in a CD drive) and the system has to be re−booted. As usual, after a second or two after switching the system on, `Escape` should be pressed one or two times, in order to change the "boot" device order (of course, a CD/DVD should be chosen here).
- The rest of Linux installation is just as usual. Don't forget to make a Linux boot floppy at the end of the process (you never know when the boot floppy might be of help).
- Folks, in short, that was that. If everything goes fine, the next system boot should take you into the Linux environment. Don't be surprised when you don't see your beloved Windoze(s) boot loader(s) anymore. You just have to look into the another great Linux document, called LILO mini−HOWTO. There you'll find more detailed information about how **LILO** (**Li**nux **Lo**ader) works.
- If you find it easier, read some pages before and check how it was accomplished in the chapter "HOW TO *UPGRADE* WINDOWS NT TO WINDOWS 2000"

6.2 If you want to have only Windows 2000 and Linux

Notice: Well, all I have said in the previous section, resulted in a "multiboot" (or, better to say, "3−boot") system. When I want to run Linux − I have to choose its option from within LILO menu. When I am about to run any kind of Windoze − I have to choose Windows (or DOS, or whatever else) from within LILO menu. Soon after, on the screen appears Windows 2000 boot loader. Finally, from this point, either NT or 2000 may be booted. Well, for a next task, I wanted to install Symantec's Norton System Works onto both Microsoft environments. I did it successfully, but it seems that I have later entered a command that resulted in changing something very important in the setup. In sum, I have become not able to run both flavors of Windows properly. Looks that it was the right time to re−install all the stuff again :−)

- Folks, this time I decided to use one of those "restore" CD's, that came with the notebook. I must admit that I liked to see, as the background, a great blue logo "HP Invent", as well as "Manufactured by Hewlett Packard" in My Computer's Properties (<−− here the guys from HP should send me a couple of 0.01$ for this commercial :−))

- Using the "restore" CD's might help you to avoid the whole long NT/2000's setup procedure(s), because they replicate or, if you like to say, "clone" images from the CD's to the hard disk, and it is very fast. In addition, the hibernation/diagnostics partition is being made by default. Finally, a couple of HP utils and tools can only be "restored" from these CD's.
- So, after a 6−7 minutes, NT (or W2k) is in its place, ready to work. Similarly to "retail" versions (mentioned in the previous section), now it is the right time to boot the system with a Linux installation CD.
- The rest of Linux installation is just as usual. Don't forget to make a Linux boot floppy at the end of the process (you never know when that boot floppy might be useful).
- Folks, that was that − in short. If everything is fine, the next system boot should take you into the Linux environment. Don't be surprised when you don't see your beloved Windoze(s) boot loader(s) anymore. You just have to look into the another great Linux document, called LILO mini−HOWTO. There you'll find more detailed information about how **LILO** (**Li**nux **Lo**ader) works.
- If you find it easier, read some pages before and see how it was done in the chapter "HOW TO *UPGRADE* WINDOWS NT TO WINDOWS 2000"
- You bet, the life would be much easier if there were not such troubles, like a "tolerance" between Windows and Linux world. Maybe I have made an another mistake somewhere in the cyberspace, but, as soon as I have finished with that Linux installation − RedHat 7.1 in particular (today is May 04, 2002 and I still have no newer and better distros here. Any donation from the readership ...?), I recognized that F10 at the system boot, does not open the HP diagnostics anymore. Actually, regardless of pressing F10, my Omnibook 6000 goes directly to the graphical LILO screen. *Before* installing Linux, diagnostics was running here without any problem.
- FYI, after the first next boot into W2k, its Disk Management tool has recognized the following partitions on the disk:

	Size	Format	Label	Type
1	15 MB	FAT	−	Primary
2	7.30 GB	FAT32	HPNOTEBOOK C:	Primary
3	52 MB	−	−	Primary
4	18.37 GB	−	−	Logical
5	258 MB	−	−	Logical
6	1.96 GB	Free space	−	−

- On the other hand, Partition Magic "sees" as follows:

	Size in MB	Format	Label	Type
1	14.7	FAT	save to disk	Primary
2	7.471,4	FAT32	HPNOTEBOOK	Primary
3	51.7	ext2	/boot	Primary
4	21.077,9	extended	−	Primary
5	18.811,4	ext2	/	Logical
6	258,4	swap	−	Logical

7	2.008,1	free space	−	Logical

- Some more explanations, related to the tables above: It is obvious that diagnostics partition, accompanied with "restored" Windows 2000, is rather small − cca. 15 MB (comparing to the partition, that is created with "restored" Windows NT, which goes up to cca. 500 MB). Regardless of that fact, it is a **primary** one. That means you should be aware of how many primary partitions you have in the system. I am not sure now, but that might be one of the reasons for not having diagnostic tools available anymore, after completing all operating system installations.

  Next, you may see that I have "shrinked" W2k's FAT32 partition to a smaller size (cca. 7.5 gig), in order to release enough free space for Linux.

  I would suggest you to let Linux setup procedure to transform the free space into Linux partitions. I mean, there's no need to prepare the Linux partitions manually. As you can see from the tables, it took cca. 50 megs for the boot part, cca. twice a physical RAM (2 x 128 = 256 megs) for swap and the rest goes for other Linux parts. Remaining free space was probably left after the conversions of various file format systems.
- What is the result now: Linux works, Windows works too. There's no diagnostics anymore. The hibernation (from under Windows) is not tested yet. At the first sight, the 3Com NIC/modem combo is not fully supported under Linux. Actually, NIC seems to work, but the modem part is a "winmodem". Nobody knows if HP would do something to solve that issue. All I could say is to avoid HP Omnibook 6000 if modem activities are your primary tasks. Of course, you may spend some $$$ and buy another PCI mini−card with supported modem chip. Beside that, HP's 15" screen gives you great picture with the resolution of up to 1400 x 1050 at 16 bit colors. Interestingly, that resolution seems to be *default* under Windows 2000 and it is also easily adopted under Linux (RedHat 7.1). There is also somewhat "over−sensible" touchpad that often acts as the left mouse click. It seems to be a common feature for both Windows and Linux installations. It bothers me sometimes, but your mileage may vary.
- The plan is to convert the FAT32 partition to the NTFS in order to get more reliable Windows subsystem. On the other side, Linux main (root) partition should be "shrinked" in order to get some free space. That free space will be used later for exchanging files between these two operating systems (probably it will be also FAT).

---

7. How to install Mandrake Linux 9.1 on HP products

2003−11−19

7.1 Description of the products used in this experiment

*Notice: Folks, that part of the article is **NOT** a commercial for HP production of any means! In fact, a series of their machines I use has lots of failures in the power supply units, as well as with their hard disks. On the other side, laptop's batteries get exhausted earlier than expected. Other than these issues, HP machines are fine.*

HP Omnibook 6000

A laptop computer Omnibook 6000 is equipped with a bootable DVD drive. On the other hand I have supplied a bootable DVD−ROM with Mandrake Linux 9.1 installation. After booting the laptop with that bootable DVD, it gets directly to the installation menu, asking the user to choose a language to use for the rest of the installation.

HP Vectra VL420 (used as a server)

In opposite, an HP Vectra VL420 doesn't have a DVD drive (it only has a CD drive), so the direct installation from that particular installation DVD is not possible. But, an option of making a bootable floppy disk for starting the installation procedure *is* possible. In fact, several boot images are available for those users who don't have (bootable or not) DVD drive. One of the images is a 'network' one. That means, in a local area network there has to be either a NFS, FTP or HTTP server from which the installation will take place.

HP Vectra VL420 (used as a workstation)

Another VL420 desktop system I also use, has a spare HDD from a previous Windows 2000 server installation (actually, that IDE disk was moved from the other computer where it was a primary one and here it is the second one disk for backup data). The nice things is that it has a HTTP and FTP servers installed (of course, usable if the system is boot from that disk). That was good so I could use one of these servers now. On the other hand, that particular Vectra VL420 was used to install a workstation kind of Linux (that time, using its first hard disk – having Windows 2000 Professional).

7.2 Installation procedure

System boot of the laptop

As explained earlier, the laptop has a bootable DVD drive, so that's it.

System boot of desktop machines

So, I made a 'network' bootable floppy and booted the first Vectra VL420 (intended to be a Linux server) with it. After a while, it came to a point to choose the installation method (NFS or FTP or HTTP server). At first, I wanted to use the second 'spare' HTTP server on the other Vectra, but regardless of what permission I tried to give to the 'Everyone' group of Windows users, I always got the following answer from the Linux setup:

Error: Couldn't get file ... (or something like that)

Then I tried to use the 'spare' FTP server from the second Vectra and, at first, it also asked for local and remote IP addresses. That time successfully, it started to load a part of the remote Linux files into its memory without any complaint. Soon after, it came to the very same position as Omnibook 6000 did: it got directly to the installation menu, asking a user to choose a language for the installation use.

>From that point, the setup process was almost the same...

I have chosen/confirmed the following items:

– a language to use, besides English(American) as default: I added Unicode and Serbian (both Cyrillic and Latin); – a mouse and keyboard; – a security level – I accepted defaults: 'Standard' for laptop and 'Higher' for server;

The next important task was to choose one of *DrakX* partitioning options:

– for laptop I chose the 'Use the free space on the Windows partition', because the laptop has one IDE hard disk and I wanted it to use a part of it for Linux (besides existing Windows 2000 Prof. already installed). Windows' Disk Management reported:

```
Disk 0  15      MB      FAT     (HP Diagnostics or like)
        7.13    GB      FAT32   (C: "HPNOTEBOOK")
        20.80   GB      Free space
```

The two partitions (FAT & FAT32) were made during the installation procedure, using HP's supplied installation CD's.

At the first moment, Linux setup complained that my Windows partition "was too fragmented" and required me to reboot under Windows, run the "defrag" utility, then restart the Mandrake Linux installation. The defragmentation process have taken cca. 1.5 hour to be completed! When restarted the setup, it wanted to use 7.13 GB Windows partition, instead of 20.80 GB. I chose to 'Use the free space'. Then it made partitions for Linux: /dev/hda5 and /dev/hda7.

– for Vectra VL420 I used 'Custom disk partitioning' because there I had two SCSI disks, one of them running Windows 2000 Server already installed, and the other one I wanted to use entirely for a Linux server. BTW, I wasn't sure what the option 'Erase entire disk' would do during its next step (erase a whole disk or a partition?), although it also may be the proper solution too. *DrakX* recognized the two SCSI disks as **sda** and **sdb** and I chose **sdb** to install Linux. The first step was to 'Clear all' and after that to 'Auto allocate' the space on that second disk. Finally, after a 'Done' it appeared to make /dev/sdb1 and /dev/sdb6 Linux partitions.

Package Group Selection

Per default, the Mandrake 9.1 setup offers the following to be installed:

```
- Office Workstation
- Internet Workstation
- KDE Workstation
- Gnome Workstation
```

that is in sum: Total size 1010/5267 (at laptop) and 1066/5265 (at server).

– for laptop I added all that was available, *excepting* 6 'Server' items (1612/5267),

– for server I added all that was available, *including* 6 'Server' items (1708/5265).

Then I got an info, related to selecting following servers (?) on laptop:

cups, postfix, rwho, webmin

and on server box:

cups, openssh−server, postfix, proftpd, rwho, webmin, ypserv, bind and nfs−utils.

Although I was confused about the 'servers' to be installed on a laptop, I have accepted those things to be installed, considering them needed for the proper installation of other packages.

The installation started ...

Interestingly, although the installation on the laptop was performed directly from its DVD drive, the package installation process was significantly faster on the server box. I suppose that was due the difference in performances between server's SCSI disk and laptop's IDE disk.

After that step was finished, and after entering a password for root, setup asked to 'Enter a user' (an ordinary user). The difference between laptop and server installation was that the latter offered some additional tasks for the (ordinary) user:

```
- access to compilation tools (ctools)
- access to rpm tools (rpm)
- access to X programs (xgrp)
- access to network tools (ntools)
- access to administrative files (adm)
- allow "su" (wheel)
```

... and that should be the same for other (new added) users.

Then laptop suggested to 'set up computer to automatically log on one user'. I didn't accept such a solution because I wanted each user to enter his/her password *every* time he/she is about to log on to the system.

On the other hand, server's setup skipped that particular step and asked where to install the bootloader. I have chosen to use 'First sector of drive (MBR)'.

Soon after, a 'Summary' screen appeared, so I could fine tune the installation. I changed the following items:

```
- timezone: Belgrade (both machines)
- Graphical Interface (reported as 'not configured' on the laptop? - I tried
   with 'Flat Panel 1400 x 1050' because that resolution runs fine under
   Windows), X server: Rage Mobility, XFree 4.3 and 16 million colors -
   24 bits). On laptop, I chose XFree to start when I reboot. On server, it
   offered 800 x 600 - due to a recognized monitor Samsung SyncMaster
   510(M)s (CHA5807*) and card ATI Rage 128 and 16 bit - 65 thousand color.
- Sound card: laptop is ESS Technology|ES1983S Maestro-3i|PCI Audio and
   server is Intel Corporation|ICH2 810 Chipset AC'97 Audio Controller.
- Network: with 'Use auto detection'. Results: on laptop it recognized 'LAN
   connection - ethernet card(s) detected'; on server it recognized
   nothing. So, on server I chose to configure 'LAN connection'.
   Drivers are: 3c59x (laptop), eepro100 (server).
   IP addresses for both laptop and server.
   Host name: laptop, server, Gateway:
- Firewall: disabled (def.)
- Botloader: lilo-graphic on /dev/hda (laptop)
   lilo-graphic on /dev/sda (server)
   default boot: windows on /dev/hda2 (laptop)
   windows on /dev/sda1 (server)
- Services: 32 activated for 47 registered (laptop)
   24 activated for 60 registered (server)
```

Soon after ...

```
Congratulations, installation is complete.
```

(reboot)

Installation results

The next Windows boot made a screen 'System Settings Change': Windows 2000 has finished installing new devices. You must restart your computer before the new settings will take effect. Do you want to restart your computer now? Well, I said

Windows' Disk Management has showed new Linux partitions:

```
- laptop:       5.85 GB         Healthy \
Disk 0          495 MB          Healthy - all 3 are logical drives within the extended one
27.95 GB        14.46 GB        Healthy /

- server:       5.85 GB         Healthy - primary partition
Disk 1          494 MB          Healthy \
17.12 GB        10.79 GB        Healthy - these 2 are logical drives within the extended one
```

It seems that `/boot` and `/swap` partitions are very similar in size, regardless the disk sizes, but `/` (root, home etc) partitions depend on disk size. Note that at my 'laptop' box I used the same HD of 27.95 GB for both Windows and Linux (for Windows 7.13 GB FAT32 of 27.95 GB available, the rest, cca. 20 GB for Linux).

At the 'server' box I have two HD's of 17.12 GB each, and I used Disk 0 (the 1st one) entirely for Windows 2000 Server, and Disk 1 (the 2nd one) entirely for Linux.

The first Mandrake Linux boot screen:

− laptop: a screen with only a name of a user (no root available!), Reboot and Halt buttons.

− server: a screen with 'Enter Login', 'Enter Password' and 'Session type' (no name of a user appeared).

First Time Wizard: Default KDE (both)

...

What about the Ctrl−Alt−Del action:

− laptop: a screen 'End Session for "username"' What do you want to do next? Login as different user, Turn off computer, Restart computer, OK and Cancel buttons.

− server: a screen 'End Session for "username"', Logout and Cancel buttons.

After choosing Login as different user (at laptop), or Logout (at server), what appeared were the same screens as described in 'The first Mandrake Linux boot screen' section.

Should you want to learn more about LILO (**Li**nux **Lo**ader), configured to boot the systems in the examples above, you should refer to the LILO mini−HOWTO.

HP Vectra VL420 (workstation − desktop client)

As mentioned before, HP Vectra VL420 doesn't have a DVD drive (it only has a CD drive), so the installation from that particular DVD installation was not possible. But, an option of making a bootable floppy disk for it was possible. In fact, several boot images are available for those users who don't have (bootable or not) DVD

drive. One of the images was a 'network' one. That means, in a local network there should be a NFS, FTP or HTTP server from which the installation will take place. As earlier explained, a Windows 2000 server machine (that I earlier used for Mandrake Linux server installation), has HTTP and FTP servers installed. That was good so I could use one of them now.

So, I used the 'network' bootable floppy and booted Vectra VL420 with it. After a while, it came to a point to choose the installation method (NFS or FTP or HTTP server). At first I wanted to use my HTTP server but regardless of what permission I gave to 'Everyone' I always got the answer from Linux installation program: Error: Couldn't get file ...

Then I tried to use my FTP server (on the same Windows server) and it also asked for IP local and remote addresses. Then it started to load a part of the remote files into its memory. Soon after, it came to the very same position as Omnibook 6000 did: it gets directly to the installation menu, asking for choosing a language to use.

>From that point, the installation procedure was almost the same...

I have chosen/confirmed the following items:

```
- a language to use - besides English(American) I also added
Unicode and Serbian, both Cyrillic and Latin;
- a mouse and keyboard;
- a security level - default 'Standard';
```

The next important point was to choose one of DrakX partitioning options:

– At first I used the 'Use the free space on the Windows partition' because it has one IDE hard disk and I wanted it to use a part of it for Linux (besides existing Windows 2000 Prof. already installed).

At the first moment, Linux setup complained that my Windows partition "was too fragmented" and asked me to reboot under Windows, run the "defrag" utility, then restart the Mandrake Linux installation. After defragmentation process was finished, I tried once again the 'Use the free space on the Windows partition' but it wanted just to 'shrink' Windows partition from cca. 30 gig to cca. 28 gig. Then I used Partition Magic software and tried to shrink it to cca. 20 GB in order to get more free space for Linux.

Than I tried 'Custom disk partitioning', chose the first IDE disk (hda) of 27GB, chose action 'Resize'. That one option was not good because it just offered Windows partition to get larger instead of smaller than before. Finally I used 'Use the free space' and it automatically made Linux partitions. In fact, on that one Vectra I have two IDE disks, one of them having Windows 2000 Server already installed, and the other one having Windows 2000 Prof. that I wanted to use partly for Linux. After 'Done' it came to making /dev/hda5 and /dev/hda7.

Package Group Selection

Per default, Mandrake installation offers the following:

```
- Office Workstation
- Internet Workstation
- KDE Workstation
- Gnome Workstation
```

in sum, Total size 1009/5105 (client).

– for client I added everything else (1638/5105), excepting 6 'Server' items.

Then I got an info, related to selecting following server(s) on client:

cups, postfix, rwho, webmin

I have accepted those things to be installed.

The installation started ...

After that step was finished, and after entering password for root, setup asked to 'Enter a user' (an ordinary user). The difference between client and server installation was that the latter offered some additional tasks for the user:

```
- access to compilation tools (ctools)
- access to rpm tools (rpm)
- access to X programs (xgrp)
- access to network tools (ntools)
- access to administrative files (adm)
- allow "su" (wheel)
```

... and that would be the same for other (new added) users.

Then client suggested to 'set up computer to automatically log on one user'. I didn't accept that because I wanted each user to enter his/her password every time he/she is about to login to the system.

Soon after, a 'Summary' screen appeared, so I could tune the installation. I changed the following items:

```
- timezone: Belgrade
- Graphical Interface: it offered 1280 x 1024 - due to a 'custom' monitor
   and card NVIDIA GeForce2 DDR (generic) - 24 bit 16 million colors.
- Sound card: Intel Corporation|ICH2 810 Chipset AC'97 Audio Controller.
- Network: with 'Use auto detection'. Results: recognized nothing. So, I
   chose to configure 'LAN connection'.
   Driver is: eepro100.
   IP address
   Host name: client, Gateway:
- Firewall: disabled (def.)
- Botloader: lilo-graphic on /dev/hda
   default boot: windows on /dev/hda1
- Services: 32 activated for 47 registered (the same as laptop)
```

Soon after ...

```
Congratulations, installation is complete.
```

(reboot)

Installation results (all 3 systems)

```
- laptop options: windows, linux, failsafe, floppy;
- client options: windows, linux, linux-nonfb, failsafe, windows2, floppy
- server options: windows, linux, linux-nonfb, linux-secure, failsafe
```

Notes:

– 'windows2' option at the client box is, in fact, Windows 2000 Server installation located on the second HD.

– Not sure why 'laptop' doesn't have 'linux−nonfb' *text* boot option, although it looks like it boots to Linux in just like that mode (maybe it is a matter of the laptop's LCD screen capabilities or something like that). On the other hand, client and server differ in floppy and linux−secure options (perhaps as some security measures or like).

– 'linux−secure' option at the server box may be a result of a 'Higher' security level, that I have chosen at the beginning of the installation or, maybe, there are some special server security features.

The next Windows boot made a screen 'System Settings Change': Windows 2000 has finished installing new devices. You must restart your computer before the new settings will take effect. Do you want to restart your computer now? Well, I said Yes.

Windows Disk Management has showed new Linux partitions (comparison of 3 systems):

```
- laptop:       5.85 GB         Healthy \
Disk 0          495 MB          Healthy - all 3 are logical drives within the extended one
27.95 GB        14.46 GB        Healthy /

- client:       5.68 GB         Healthy \
Disk 0          494 MB          Healthy - all 3 are logical drives within the extended one
37.28 GB        3.52GB          Healthy / (same as laptop)

- server:       5.85 GB         Healthy - primary partition
Disk 1          494 MB          Healthy \
17.12 GB        10.79 GB        Healthy - these two are logical drives within extended
```

It seems that `/boot` and `/swap` partitions are very similar in size, regardless the disk sizes, but `/` (root, home etc) partitions depend on disk size. Note that at my 'client' box I used the same HD of 37.28 GB for both Windows and Linux (for Windows 27.60 GB NTFS of 37.28 GB available, the rest, cca. 10 GB for Linux).

At the 'server' box I have two HD's of 17.12 GB each, and I used Disk 0 (the 1st one) entirely for Windows 2000 Server, and Disk 1 (the 2nd one) entirely for Linux. That's why Mandrake setup allocated 'less' space for / at the larger disk (in fact, at the 'server' box, it allocated relatively much more space for / even that HD is smaller – because that HD is 'dedicated' for Linux only.

The first Mandrake Linux boot screen:

– laptop: a screen with only a name of a user (no root available!), Reboot and Halt buttons.

– client: a screen with only a name of a user (no root available!), Reboot and Halt buttons.

– server: a screen with 'Enter Login', 'Enter Password' and 'Session type' (no name of a user appeared, but root may also login there!).

First Time Wizard: Default KDE (client, just like the others)

There is a difference between KDE screens at client and server: the client VL420 offers 'CD−ROM mounted at /mnt/cdrom' and 'Floppy mounted at /mnt/floppy' but server Vectra VL420 (having the same type of devices!) doesn't. Besides that, if a flash storage is connected to a USB port, *before* Linux being started, there will also appear an icon for it. Interestingly, at server there's no something like that. I consider, that is also a matter of the difference between the client and server types of Mandrake Linux installations, or maybe a

matter of some security measures for server−type installations. Whatever it is, I see that as a shortage of confortable for Mandrake Linux servers. Case some of you, the readers, has some workarounds on that issues, your contributions are welcomed!

Besides that, KDE's Panel at client offers 'Mandrake Control Center − System configuration tool' (although useful only under root privileges), and KDE's Panel at server doesn't have that (in fact, an 'ordinary' user may access the same tool from the Start Applications menu and, again, to use it after the root's password entered). It makes me wonder why they at Mandrake did it like that. Maybe they didn't want 'ordinary' users to access some configuration tools as easily ...

...

What about the Ctrl−Alt−Del:

− laptop: a screen 'End Session for "username"' What do you want to do next? Login as different user, Turn off computer, Restart computer, OK and Cancel buttons.

− client: a screen 'End Session for "username"' What do you want to do next? Login as different user, Turn off computer, Restart computer, OK and Cancel buttons.

− server: a screen 'End Session for "username"', Logout and Cancel buttons.

After choosing Login as different user what appeared were the same screen as described in 'The first Mandrake Linux boot screen' section.

Should you want to learn more about LILO (**Li**nux **Lo**ader), configured to boot the systems in the examples above, you should refer to the LILO mini−HOWTO.

There is also a difference between client and server behavior when it is about to shutdown (halt) the system. A user is capable to halt the system even from the login screen at client (that is not available at server). On the other hand, a user has to know root password to halt the system at server.

7.3 General issues with the Mandrake 9.1 Linux installation

A 'Network' bootable installation floppy should also be capable to reach Mandrake installation files not only from NFS, FTP or HTTP servers, but files that are copied to shared disks on machines within the local network. When an image is called a 'Network' image, that means, IMHO, all kinds of network locations should be accessible − NOT only those specific server−type locations like NFS, FTP or HTTP servers. In fact, if a user in a local network doesn't have NFS, FTP or HTTP servers, but has the installation packages copied somewhere else on the LAN, there should be a way to access those packages too.

The workstation−like installations do not offer a 'root' account to be used from the graphical login window (I suppose that 'su' or 'sudo' actions are available − I haven't tested them yet). That might be a problem in cases when a user misconfigures his/her account and when the administrator has to login to the system to fix that problem. At the moment, I am not sure how the administrator could do that without having the 'root' login ability (perhaps using virtual text consoles accessed with CTRL−ALT−F1, CTRL−ALT−F2 ... , then starting GUI if needed, etc ...)

Some issues *after* the Mandrake 9.1 Linux installation:

Talking about the behavior of Mandrake 9.1 − related to the type of installation (a workstation or a workstation/server combination) − it seems that there are some other differences. As already mentioned, on a workstation desktop there are icons for CD and FD drives (although maybe not already being *mounted* at the moment of the system boot). As well, if a USB flash storage is connected to the USB port, there is also an icon of an *sda* (SCSI ?) USB storage available. On the other hand, in case of workstation/server installations − there are no icons of those devices at all. It seems that the server installation considers that is better to live without these devices in case of a server :−) Any comments are welcomed.

Related to writing and testing HOWTO's. I prefer to write a 'HOWTO' document using a text editor and make it with a `.sgml` extension. Then I use the old, good `sgml2html` tool to make HTML pages, in order to check how these pages will look like. Well, that's OK under Red Hat 7.1 but under Mandrake 9.1 it seems that I am not able to find the same tool. Any idea on that task?

---

8. Linux accompanied with Windows 2000 and Windows XP

2005−10−09

Recently I had a hard−disk failure and my more_than_a_year old Linux/Windows 2000 home system disappeared. When considering what to have on a new purchased disk, I decided to try Linux with both Windows 2000 and Windows XP.

In short, the new disk was of 40 GB and I made a half of it (20 GB) a NTFS partition for Windows XP. It became so called C: disk. The second partition of 10 GB (FAT32) became D: disk of Windows 2000. As usual, you have to repeat installations of Microsoft products for several times − before they even start behaving partly as you expect from them. To be more precize, it looked that Windows 2000 had to be installed *before* Windows XP, in order its boot entry got a part of XP's list of boot entries (If I remember, I tried it the opposite way and it didn't work).

Then I used the remaining 10 GB to install Mandrake 9.1 (Bamboo) and I made it without problems − The only minor issue was that a try of disk−type installation where Linux files were placed on an existing NTFS partition failed because Linux setup actually did not manage to locate installation files on a NTFS partition. (That was why I made Windows 2000 installation on a FAT32 file system − because later I could use it for Mandrake 9.1 disk−type setup).

So far − so good. One of the main things I wanted to make working within all three environments was the e−mail client. You bet, an another open source solution was available: the Mozilla suite. For Windows operating systems I used Mozilla 1.7.11 and for Linux I used Mozilla 1.6 (an older xft version − some newer ones I was not able to install). And, as usual for me, I wanted all of them to share my mailbox files, i.e. I wanted to access my incoming emails from all and each operating system − booted at the time.

In order to make that possible, I chose Mozilla under Windows 2000 (FAT32) to become the 'central location' for saving the mailbox files. That means I had to make some changes within other two Mozilla's configurations − to make them capable to read/write from/to the first chosen mailbox location (FAT32). For Linux I did the following:

Instead of keeping an 'original' Linux−native location:

```
/home/misko/.mozilla/default/fydeba98.slt/Mail/solair.eunet.yu
```

I changed to this mounted one:

```
/mnt/win_d/Documents and Settings/misko/Application Data/Mozilla/Profiles/default/oeu1tmbd.slt/Mail/
```

As a result of that change, now it is possible for me to download email messages from within one O.S. − then to read them from another O.S. − and finally reply/send the email from the 3rd one environment. The only minor drawback is that each operating system is likely to 'remember' only its own last known state of Mozilla's Mail & Newsgroups. In order to get a 'refreshed' state of e−mail folders, a user has to click on a mailbox name. Another solution is to activate an option of 'Compact all folders ...'.

What belongs to my 'wish−list' now, is to continue upgrading all three Mozilla's (at least that old one v1.6 that runs under Mandrake). It makes me wonder if I could use a 'regular' one (instead of xft's) − although I remember that older regular's were producing awful fonts under Linux environment. I am not sure if things got improved.

The second important task is to install one of the most popular radio amateur software, also an open−source, called LinFBB (FBB for Linux). More details related to that you can find in another Linux manual: the FBBHOWTO.

9. Bibliography

2006−07−28

Notice: I often participate to (inter)national ICT conferences in Serbia & Montenegro, as well as abroad, presenting papers and running tutorials. What I have been doing is to spread − as much as possible − the basic ideas and the useful mission of the amateur radio hobby and its possible usage in engineering education. You bet, whenever possible I want my readers to make it with Linux. Besides that, I have been writing various articles for a variety of scientific and other magazines. Here you have a list of the articles I have written, and the papers submitted to the conferences until now.

In case you want to re−publish or forward my volunteer paper works to some journals or other public media around, you are free to contact me. Some of my papers are written in Serbian Cyrillic, some of them are in English and some of them even combined!

- "U prilog I.A.C.", MI (the youth scientists' organization newspaper), No. 69, 1990.

- "U prilog I.A.C. (2)", MI (the youth scientists' organization newspaper), No. 70, 1990.

- "Vise od radio-amaterskog hobija", Vojska, No. 163, 1995.

- "Korak ka zvezdama", Vojska, No. 200, 1996.

- "Die Gefahr von Innen - Internet gegen Amateurfunk", AMSAT-DL Journal, No. 4, Dez./Feb. 96/97.

- "Kakva nam organizacija (ne) treba?", Radioamater, Feb. 1997.

- "Kakva nam organizacija (ne) treba? (2)", Radioamater, Apr./May. 1997.

- "Sateliti umiru padajuci", Vojska, No. 235, 1997.

- "The Internet is not the Enemy", QST, Aug. 1998.

- "Novi radio-amateri za novi vek", Antena, June 2000.

- "Racunarske komunikacije putem radio-veza i
  zastita pristupa", Bezbednost, No. 3, 2000.

- "Paket-radio - Racunarske komunikacije putem radio-veza",
  proceedings, "Info-Teh", Vrnjacka Banja, Serbia, 2001.

- "Racunarske komunikacije putem radio-amaterskih veza",
  proceedings, "YU-Info", Kopaonik, Serbia, 2002.

- "Computer Communications over radio", presentation,
  "Linux FEST", Belgrade, Serbia, 2002.

- "Paket-radio - Radio-amaterske digitalne veze",
  proceedings, "Kongres JISA", Herceg Novi, Montenegro, 2002.

- "Paket-radio (2) - Modemi za radio-veze",
  proceedings, "Info-Teh", Vrnjacka Banja, Serbia, 2002.

- "Alternativne racunarske mreze", festival catalog,
  "INFOFEST", Budva, Montenegro, 2002.

- "Alternative computer networks", proceedings, "TELFOR",
  Belgrade, Serbia, 2002.

- "With rule and regulation improvements to the progress"
  proceedings, "TELFOR", Belgrade, Serbia, 2002.

- "Racunarske komunikacije putem radio-amaterskih veza (2)",
  proceedings, "YU-Info", Kopaonik, Serbia, 2003.

- "Racunarske komunikacije putem radio-amaterskih veza (3)",
  proceedings, "YU-Info", Kopaonik, Serbia, 2003.

- "Paket-radio (3) - Programske mogucnosti na strani servera",
  proceedings, "Info-Teh", Vrnjacka Banja, Serbia, 2003.

- "Paket-radio (4) - Legal rules and regulations in the amateur
  computer networks", proceedings, "Info-Teh", Vrnjacka Banja,
  Serbia, 2003.

- "Packet-radio (2) - With rule and regulation improvements to the progress",
  proceedings, "Kongres JISA", Herceg Novi, Montenegro, 2003.

- "Alternativne racunarske mreze (2)", festival catalog,
  "INFOFEST", Budva, Montenegro, 2003.

- "Alternativne racunarske komunikacije putem radio-veza",
  Info M, 6-7/2003.

- "Legal Rules and Regulations in the Amateur Radio Computer Networks",
  proceedings, "22nd ARRL and TAPR Digital Communications Conference",
  Hartford, CT USA, 2003.

- "Favoritism", IEEE Potentials, Oct/Nov 2003

- "Alternative computer networks (2)", proceedings, "TELFOR",
  Belgrade, Serbia, 2003.

- "With rule and regulation improvements to the progress (2)"
  proceedings, "TELFOR", Belgrade, Serbia, 2003.

- "XI Telekomunikacioni forum - TELFOR 2003", Info M, 8/2003.

- "Aktivnosti organizacije IEEE Computer Society - YU Chapter" Info M, 8/2003.

- "Yugoslavia IEEE Student Branch", IEEE Region 8 News, Vol. 7 No. 1, Feb/Mar 2004

- "Radio-amaterske racunarske mreze", tutorial, "Info-Teh", Vrnjacka Banja, Serbia, 2004.

- "Radio-amaterske racunarske mreze", tutorial, "Kongres JISA", Herceg Novi, Montenegro, 2004.

- "The Amateur Radio as a Learning Technology in Developing Countries", proceedings, "ICALT/TEDC 2004", Joensuu, Finland, 2004.

- "The Amateur Radio in Engineering Education", seminar, "IEEE-EESTEC Technical Conference 2004", Arcavacata di Rende (Cosenza), Italy, 2004.

- "The Conference Low-Down", IEEE Potentials, Feb/Mar 2005

- "ICALT 2004, IEEE Novi Sad SB, Serbia & Montenegro", IEEE Region 8 News, Vol. 8 No. 1, Mar 2005

- "The Conference Low-Down", IEEE Potentials, Apr/May 2005

- "The Amateur Radio Networking And Computing", proceedings, "PSU-UNS ICEE 2005", Novi Sad, Serbia, 2005

- "Radio-amaterske racunarske mreze", tutorial, "Info-Teh", Vrnjacka Banja, Serbia, 2005 (intro: dr D. Surla, PMF)

- "Radio-veze", round table session, "Kongres JISA", Herceg Novi, Montenegro, 2005.

- "The New Amateur Radio University Network - AMUNET", proceedings, "9th WSEAS CSCC Multiconference", Vouliagmeni, Athens, Greece, 2005.

- "The perspectives of the Amateur University Network - AMUNET", WSEAS Transactions on Communications, Vol 4, pp 834, Sep. 2005.

- "Conferences in Serbia and Montenegro", IEEE Region 8 News, Vol. 8 No. 3, Sep 2005.

- "The Conference Low-Down", IEEE Potentials, Dec 2005

- "University Networking Through the Amateur Radio Communications", plenary lecture, "3rd WSEAS/IASME Int. Conf. on Engineering Education", Vouliagmeni, Athens, Greece, 2006.

- "The New Amateur Radio University Network - AMUNET (Part 2)", proceedings, "10th WSEAS CSCC Multiconference", Vouliagmeni, Athens, Greece, 2006.

- "University Networking Through the Amateur Radio Communications", tutorial, "10th WSEAS CSCC Multiconference",

```
Vouliagmeni, Athens, Greece, 2006.
```

Besides these articles published and papers presented, I have been studying for an M.Sc. degree in computing. I am also the member of the following associations: IEEE Computer Society, IEEE Communications Society and ACM. In addition, I have been voluntarily working on establishing an academy computer network that would use the amateur radio stations as the media. Such networks exist somewhere else on the globe and I invite their administrators to contact me in order to cooperate.

---

10. Further information

10.1 Copyright

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Naming of particular products or brands should not be seen as endorsements.

You are strongly recommended to take a backup of your system before major installation and backups at regular intervals.

10.3 News

This is not the first release of this mini−HOWTO. I hope to improve it whenever possible. Besides that, there are other documents that may help you to install more than one operating system on the same computer. You may look for them at the same location where you get Linux+WindowsNT mini−HOWTO.

This mini−HOWTO would be improved from time to time. If you think that the HOWTO on your Linux installation CD is some out−of−date, you may check for newest release on the Internet. It could be found within the main Linux Documentation Project homepage or this one: Linux Documentation Project.

10.4 Credits

This version of Linux+WinNT mini−HOWTO is based on:

```
The Linux+WindowsNT mini-HOWTO
by Bill Wohler, wohler@newt.com
```

```
v1.1, 19 February 1997
```

Credit also goes to:

```
Dragomir Kalaba, a local Linux 'guru'
```

Any comments or suggestions can be mailed to my email address: skoric at eunet dot yu

10.5 HOWTO

These are intended as the primary starting points to get the background information as well as show you how to solve a specific problem. Some relevant HOWTOs are `Bootdisk`, `Installation`, `SCSI` and `UMSDOS`. The main site for these is the LDP archive at Metalab (formerly known as Sunsite).

10.6 Mini−HOWTO

These are the smaller free text relatives to the HOWTOs. Some relevant mini−HOWTOs are `Backup-With-MSDOS`, `Diskless`, `LILO`, `Large Disk`, `Linux+DOS+Win95+OS2`, `Linux+OS2+DOS`, `Linux+Win95`, `Linux+WindowsNT`, `Linux+NT-Loader`, `NFS-Root`, `Win95+Win+Linux`, `ZIP Drive`, `FBB packet-radio BBS`. You can find these at the same place as the HOWTOs, usually in a sub directory called `mini`. Note that these are scheduled to be converted into SGML and become proper HOWTOs in the near future.

10.7 Local Resources

In most distributions of Linux there is a document directory installed, have a look in the /usr/doc directory. where most packages store their main documentation and README files etc. Also you will here find the HOWTO archive (/usr/doc/HOWTO) of ready formatted HOWTOs and also the mini−HOWTO archive (/usr/doc/HOWTO/mini) of plain text documents.

Many of the configuration files mentioned earlier can be found in the /etc directory. In particular you will want to work with the /etc/fstab file that sets up the mounting of partitions and possibly also /etc/mdtab file that is used for the `md` system to set up RAID.

The kernel source in /usr/src/linux is, of course, the ultimate documentation. In other words, *use the source, Luke*. It should also be pointed out that the kernel comes not only with source code which is even commented (well, partially at least) but also an informative documentation directory. If you are about to ask any questions about the kernel you should read this first, it will save you and many others a lot of time and possibly embarrassment.

Also have a look in your system log file (/var/log/messages) to see what is going on and in particular how the booting went if too much scrolled off your screen. Using `tail -f /var/log/messages` in a separate window or screen will give you a continuous update of what is going on in your system.

You can also take advantage of the /proc file system that is a window into the inner workings of your system. Use `cat` rather than `more` to view the files as they are reported as being zero length. Reports are that `less` works well here.

10.8 Web Pages

There is a huge number of informative web pages out there and by their very nature they change quickly so don't be too surprised if these links become quickly outdated.

A good starting point is of course the Linux Documentation Project home page, or this one: Linux Documentation Project an information central for documentation, project pages and much, much more.

Please let me know if you have any other leads that can be of interest.

---

11. Getting help

In the end you might find yourself unable to solve your problems and need help from someone else. The most efficient way is either to ask someone local or in your nearest Linux user group, search the web for the nearest one.

Another possibility is to ask on Usenet News in one of the many, many newsgroups available. The problem is that these have such a high volume and noise (called low signal−to−noise ratio) that your question can easily fall through unanswered.

No matter where you ask it is important to ask well or you will not be taken seriously. Saying just *my disk does not work* is not going to help you and instead the noise level is increased even further and if you are lucky someone will ask you to clarify.

Instead describe your problems in some detail that will enable people to help you. The problem could lie somewhere you did not expect. Therefore you are advised to list up the following information on your system:

Hardware

- ◊ Processor
- ◊ DMA
- ◊ IRQ
- ◊ Chip set (LX, BX etc)
- ◊ Bus (ISA, VESA, PCI etc)
- ◊ Expansion cards used (Disk controllers, video, IO etc)

Software

- ◊ BIOS (On motherboard and possibly SCSI host adapters)
- ◊ LILO, if used
- ◊ Linux kernel version as well as possible modifications and patches
- ◊ Kernel parameters, if any
- ◊ Software that shows the error (with version number or date)

Peripherals

- ◊ Type of disk drives with manufacturer name, version and type
- ◊ Other relevant peripherals connected to the same busses

Remember that booting text is logged to `/var/log/messages` which can answer most of the questions above. Obviously if the drives fail you might not be able to get the log saved to disk but you can at least scroll

back up the screen using the SHIFT and PAGE UP keys. It may also be useful to include part of this in your request for help but do not go overboard, keep it *brief* as a complete log file dumped to Usenet News is more than a little annoying.