Linux+Solaris HOWTO

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Linux+Solaris HOWTO

Max Berger

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Describes how to use Linux (x86) and Solaris (x86) together on one machine

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1. Introduction

1.1 Why Solaris?

This is actually a good question. Why use Solaris, when you can have Linux? Solaris is a commercial system, the hardware support is scarce. But if you are reading this you have probably already decided on using Solaris. If not, here are some reasons:

- I have a part−time job administrating Solaris machines. It is of no use that I learning all the neat command parameters and nifty Linux tricks at home, when I can't use them on my Solaris−Box.
- Sun was giving away Solaris for what they call ``Shipping and handling cost only'' for some time. They might do that again. And almost−free−of−charge is always a good deal.
- Another reason might be that you like CDE.

1.2 Things covered in this HOWTO

This HOWTO tries to help you install Solaris 7 or 8 on an x86 computer already running Linux. The main targets are

- not to destroy any data, see section Preparing your Harddrive
- To make Linux and Solaris coexist (boot manager), see section Boot−Managing
- To share data between Linux and Solaris, as described in section Sharing Data

1.3 Referenced versions

The reference versions used while creating this document where:

- Solaris 7 x86 (= Solaris 2.7 / SunOS 5.7)
- Solaris 8 x86 (= Solaris 2.8 / SunOS 5.8)
- Linux 2.2.14, 2.3.99−pre3

- fdisk v2.10f

The information might apply to other versions of the software, or it might all be different.

1.4 Warning

Please back up any data before messing with your system! A lot of the things described in this document may result in excessive data loss! I am not responsible for any data loss! See also section Legal stuff

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2. Preparing your Hard Drive

To Prepare your hard−drive for Solaris, you need to know about standard PC partition tables and about Solaris disk slices. In this HOWTO I talk about single−disk systems only, but all the information should also apply to a multi−disk environment.

2.1 Traditional PC partitions

The standard partition−table has only 4 entries. The entries important for us are the following:

A Primary Partition

Takes up one entry, and contains exactly one partition. A waste of resources, but the only partition you can boot from!

An extended Partition

Takes up one entry, but can contain multiple DOS, Linux, and other partitions

A Solaris Partition

Takes up one entry, but can contain multiple Solaris Partitions

To find out what partitions are present on your system, use the `fdisk` program. Partitions numbers 1 to 4 (`hda1..4`, `sda1..4`, ...) are the ones in your partition table.

2.2 Solaris partition labels

Solaris has its own partitioning scheme. It uses one entry in the partition table, and this entry is and acts as this partition would be the entire disk.

This virtual disk is then divided in up to 8 slices. The third slice, s2, covers the whole virtual disk, so you actually have up to 7 slices for Solaris.

Unfortunately, the Solaris partition entry has the same type as a Linux Swap partition (82). Therefore, you should not have any Linux swap partitions as primary partitions. Linux doesn't care about this, but who knows what Solaris does?

Although the Linux fdisk program has some ``Sun disklabel'' support, this doesn't seem to help any.

2.3 Hard disk space

Of course, Solaris needs disk space. The minimum installation of Solaris 8 is about 300 MB. For the normal tools its about 700 MB, and for a ``developer−system'' about 1 GB.

But this is only the space required for the base installation. You might want to add a lot of GNU−Tools, and other stuff. And if you want to share data between Solaris and Linux, this has to happen on the Solaris partitions.

You might even think of sharing your home directories between Solaris and Linux. As the time of this writing: Forget it! I messed up my home directory doing so and I was *very* happy about my backup. See also section sharing data

2.4 Quick check list

Here's the quick check list. Make sure you:

- have used no more than 3 entries in your partition table
- have no Linux swap partitions as primary partitions
- Have at least 1 Linux ext2 partition as primary
- Have at least 1 GB unpartitioned space

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3. Preparing Linux

3.1 Building a new kernel

Some people don´t like building a custom kernel. For those of you: you *must* build your own kernel if you want to share data between Solaris and Linux on one hard disk. If, however, you do not want to share data, you are safe with your old kernel.

Here are your kernel options for ``Solaris compatibility'':

- Under `code maturity`:
  `Prompt for development drivers`

  Unfortunately UFS writing is still experimental.
- In `file systems`:
  `UFS file system support`

  UFS is the Solaris file system

  `UFS file system write support`

  The only way to pass data to Solaris

  `partition types / Solaris (x86) partition table support`

Is needed for the slices within your Solaris partition to be found.

Additional info about kernel building can be found in the Kernel−HOWTO

3.2 Preparing your boot loader

Before messing with your boot loader, please make sure that you have an emergency disk ready which enables you to boot your old system.

Unfortunately the Solaris install overwrites the master boot record (MBR) and overwrites your old boot manager.

Fortunately, the Solaris boot manager is able to chain−boot. For this to work you have to put your old boot loader (e.g. lilo) into the boot sector of one primary Linux partition.

For lilo this means: look at your /etc/lilo.conf. Look for the `boot=` line. If it is something like `boot=/dev/hda1` everything is fine. But if it´s something like `boot=/dev/hda` it points to the MBR. Please change it to point to a primary Linux partition (e.g. `boot=/dev/hda1`)

A way to check if your boot−loader is chain−loadable is installing lilo in to the MBR and trying to chain load your other boot−manager. I used the following file called lilo.conf.mbr for this:

```
#lilo.conf.mbr
#Lilo in Master Boot Record doing nothing but chain-loading another lilo
boot=/dev/hda
root=/dev/hda5
install=/boot/boot.b
map=/boot/map
vga=ask
delay=50
other=/dev/hda1
label=lilochain
```

You can then run `lilo −C lilo.conf.mbr` to install lilo into your MBR. And don´t forget to run `lilo` to have lilo in the boot sector of your hard−drive.

If you reboot now, you should have a lilo−prompt. When you select `other` this chain loads the old lilo, which in turn loads Linux.

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4. Installing Solaris

4.1 Solaris interactive

Solaris 7

Solaris Interactive is on the first CD. Boot it, select Solaris interactive

Solaris 8

> On the Solaris 8 CDs the interactive installer is on the first software CD. You don't need the install CD at all.

The Solaris installation itself is quite straight forward. One thing that might be confusing is the partitioning. Solaris will automatically use all the free space on your hard disk, and create it's own virtual disk in it. And when it comes to slicing up your virtual disk, don´t forget to add space for Solaris/Linux exchange. A good place for this is an extra /export/share partition.

Please Note: If you abort during the Solaris installation, the MBR of your hard disk may already be overwritten and you may not be able to boot from the hard disk at all.

4.2 Web−Start

I couldn't get Web−Start to work at all. Please mail me if you have any experience using it.

However, once Solaris was installed, I had no problems adding web−start−packages

4.3 Getting GNU−tools

Solaris standard installation doesn't even have a `less` command. Some people recommend getting the Redhat Package Manager (RPM) for Solaris, but the standard packaging tool will usually do it. You can find many nice packages at http://www.sunfreeware.com The standard packages can be used with `pkgadd <package>`, and the web−start packages with
`java <packagewithoutclassextension>`

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5. Boot managing

5.1 Using the Solaris boot manager

When booting, the Solaris boot manager gives you all 4 primary partitions for choosing which to boot from. If you had your boot loader installed on the boot sector of a primary partition, everything should be fine. Just boot from this partition, and Linux should come up.

5.2 Using lilo

Now you have lilo as a secondary boot loader, but you want it to be your primary boot loader again? No Problem. Lilo can easily chain boot Solaris. Just add the appropriate `other=` lines to your lilo.conf

For testing, you should add the Solaris chain loading to the lilo in your boot sector first. Then try chain loading lilo, Solaris, lilo, Solaris, ... until you have enough of it. If this works, you should be able to put lilo back into the MBR again.

However, Solaris might have messed up your partition table. This has happened on my system after installation of Solaris 8. Lilo doesn't like the new partition, nor does fdisk. I had no problems with Solaris 7

5.3 Using grub

Unfortunately, I have no experience with grub booting Solaris. If you do, please mail me!

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6. Sharing data

6.1 Using a shared partition

If you have build your kernel with Sun disk label support and UFS support as mentioned in section building your new kernel, you are now able to mount your Solaris partitions. During boot up, you should get something similar to:

```
hda: [PTBL] [523/255/63] hda1 hda2 < hda5 hda6 hda7 hda8 > hda3 <Polaris: [s0]
hda9 [s1] hda10 [s2] hda11 [s3] hda12 [s6] hda13 [s7] hda14 >
```

Meaning (in this case): partition 3 (`hda3`) is a Solaris partition with 6 slices (s0,s1,s2,s3,s6,s7). They are mapped to Linux devices `hda9` to `hda14`.

Try mounting your Solaris partitions. When mounting UFS partitions, you always have to add an `-oufstype=` argument, in this case `-oufstype=sunx86`. So the command to mount a partition is something like:

```
mount -oufstype=sunx86 /dev/hda14 /mnt
```

Now, test your partition. *Please note: The write support on UFS partitions is very experimental. Please don't trust any data you write on your UFS partitions!*

If you want your Solaris partitions automatically mounted at boot time, you can add a line like

```
/dev/hda14 /solaris ufs ufstype=sunx86 0 0
```

to your /etc/fstab

6.2 Alternative ways

And, of course there are always other ways of sharing data:

Floppy disk

I don't know which floppy disk file systems are supported by Solaris. Do you? Mail me.

Network

Solaris knows NFS. Linux knows NFS. This might actually be the best way of sharing data

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7. Running foreign binaries

7.1 Linux binaries on Solaris

Is supposed to work using a program called ``lxrun''. I haven't got around to testing it yet. See the Solaris web site for more information.

7.2 Solaris binaries on Linux

Are as far as I know unsupported

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8. Finding additional info

Here are some URI that might help you:

- Sun Freeware
  My first stop for Solaris resources. Has many GNU−tools in binary format ready to install.
- Sun Microsystems
  Suns official web page
- Solaris Homepage
- Solaris Hardware Compatibility List (HCL)
- Solaris Online Documentation
- My Website
  You will always find the newest version of this document somewhere on this page

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9. Credits and legal stuff

9.1 Credits

Thanks to Marcel Meyer for beta testing this HOWTO while installing Solaris on his machine

9.2 Questions, comments, suggestions

Are always welcome. You can reach me via e−mail at max.berger@xslt.de

9.3 License

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