

Installing 3D Support for Nvidia cards

HOUSE OF CARDS

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In order to enjoy the smooth flow in most games, you will need 3D hardware support. Here we explain the installation for Nvidia-based graphics cards.

While in the past, computers were driven to the limits of their capacity by database applications or scientific calculations, nowadays it's games which are the greatest guzzlers of resources. In particular since the screen display has become ever more realistic, even the fastest processors have broken into a sweat over the necessary calculations. Instead of moving flat figures over a painted background (as used to be the case) games scenes are now depicted in 3D - in virtual space there are now several thousand objects spread around, with different structures, form and colours. But since a monitor can still only show two-dimensional images, the game scene must thus be photographed for each individual monitor image from the point of view of the player or, more correctly, it must be *rendered*.

To give the CPU a bit of breathing space, sub-tasks to do with rendering have gradually been farmed out to the graphics card chip. Now, instead of tracing each individual beam of light, the processor need only tell the graphics card the position and nature of the individual objects (which are split up into small, triangular areas) - and the graphics card takes care of the rest.

One of the biggest manufacturers of such graphics chips with 3D hardware acceleration is the chip forge Nvidia (<http://www.nvidia.co.uk>), which is where many graphics cards manufacturers, such as Elsa for example, go for their chips. Since every chip manufacturer uses his own, well-protected instruction set, a special driver is necessary to make use of the 3D characteristics. Nvidia has been offering Linux drivers for quite some time now, which you will find on the company's FTP server at ftp://ftp1.developer.nvidia.com/pub/drivers/english/XFree86_40/.

The driver consists of two parts: The GLX package, which guarantees connection to the X-server, and the kernel module, which allows direct access to the graphics card. Nvidia supplies ready-adjusted packages for the commonest distributions. By the way, you will not find the drivers on our cover CD, since this is not possible for licensing reasons - they have not been disclosed. For reasons of space and time, though, we are limiting ourselves to

versions 7.1 and 7.0 from SuSE and Red Hat 7.0. Since the Nvidia driver requires at least XFree86 4.0.1, the use of older distributions is problematic and not recommended. Generally, the system should always be the very latest, which is why you cannot get away without regular updates for the driver, the X-system and the kernel. The use of the latest driver is absolutely vital, as Nvidia is still struggling with problems of stability, from simple graphics errors to complete crashes of the Linux system.

SuSE 7.1

During installation, YaST2 offers you, at the X-installation, the option of selecting the 3D driver, but you can ignore this. Integration is done later via SaX2 or by manual adaptation of the configuration file. As we closed for press, the latest version of the Nvidia driver was Version 0.9-769, the corresponding packages are called *NVIDIA_GLX-0.9-769.suse71.rpm* and *NVIDIA_kernel-0.9-769.suse71.rpm*. If newer drivers come out in the meantime, you should give these preference. The two packages should be stored in the */tmp* directory, which facilitates the description of the next steps.

We are assuming a SuSE-7.1 standard installation. To prepare the 3D installation you must of necessity leave the graphical user interface and change over to a text console. The first text console can be reached using [Ctrl+AltF1], and there you should log in as *root*. After that, use *init 3* to switch the graphical user interface off completely and you can start the actual installation.

You no longer need the *mesasoft* package for software rendering, and can delete it using *rpm -e mesasoft*. Next, the kernel and then the GLX package from Nvidia are installed:

```
rpm -i --force /tmp/NVIDIA_kernel-0.9-769.suse71.rpm
rpm -i --force /tmp/NVIDIA_GLX-0.9-769.suse71.rpm
```

The kernel package must be installed by *--force*, because it overwrites the Nvidia modules supplied by SuSE. When installing the GLX package, RPM may possibly complain about the lack of the file

`switch2nv_glx`, but this is not a problem. The next thing is to set a missing link for GLX:

```
In -s /usr/lib/libGL.so.1 /usr/lib/libGL
```

In order to activate the 3D support, you can either edit the X configuration file by hand or use SaX2.

Installation with SaX2

Call up `sax2 -f` and refuse the first 3D support offered, since otherwise SaX2, especially in the case of GeForce-3 based cards such as the Elsa Gladiac 920, will not start. The settings which SaX2 now offers you should also be rejected and instead of these, you should select *Change Configuration* from the menu at bottom right. Then comes a query, as to whether any allegedly missing components should be installed. Say no to this.

In the dialog which follows, accept your former X-settings with *Use / change the current configuration* and click on *Next* until you reach *Graphics Device Setup*. The corresponding modules must be selected here. Click on *Properties, Expert*. You will be offered, under *Driver*, the `nv` module. Instead, choose `nvidia` from the pull-down menu, as shown in Figure 2. With *OK* you will come back into the graphics device setup. There you should click on *Load 3D modules*, tick `glx` and again confirm with *OK*. With *Next* you will reach the monitor selection, where, under *Properties*, apart from your monitor model, you can also set the resolution required. If you have finished this, click on *Finish*.

In the window that follows, save the settings first as in the tests, there were some SaX2 crashes, for which no configuration had been written. After saving, do not leave SaX2, but start the test mode. Here you can make the final fine adjustments. The *Save Configuration* button then brings you back to SaX2, which you can then shut down.

That completes the installation, and with `init 5` you can get back to the graphical user interface.

In rare cases, it can happen that games, despite apparently correct installation, do not run 3D-accelerated, or even complain about the absence of the library `libGL`. If this happens, call up `switch2nvidia_glx` as `root`. On one occasion, it was even necessary to play in the GLX package again using `rpm -i --force --nodeps NVIDIA_GLX-0.9-769.suse71.rpm`.

In order to return, in the worst-case scenario, to your original configuration, all you need to do is rename the file `/etc/X11/XF86Config.saxsave` again as `XF86Config`.

Manual installation

Editing the configuration file directly in an editor, such as `mcedit`, goes much faster than with SaX2. Using `mcedit /etc/X11/XF86Config` you can edit the central configuration file of the X-window system. First, look for the section *Modules* and there add the entry `Load "glx"`:

```
Section "Module"
...
Load "freetype"
Load "glx"
EndSection
```

This means the GLX-Module will be loaded on the next startup. Now you must enter the Nvidia module in the section *Device*. SuSE has the module `nv` in there as standard. Here is the changed section:

```
Section "Device"
Driver "nvidia"
Identifier "Device[0]"
EndSection
```

Store the file with [F2] and leave `mcedit` with [F10]. That's the end of installation, `init 5` brings you back to the graphical log-in.

SuSE 7.0

Installation with SuSE 7.0 is significantly more time-consuming: Since there is no Nvidia driver for version 4.0 of XFree86 which is included in SuSE 7.0, you will have to download around 30MB from the Internet. Updating the X-server is a subject that brings its own set of problems. If it goes awry the graphical log-in will no longer function. Which is why you should not perform the update without some thought.

You can obtain the RPM packages from `ftp://ftp.gwdg.de/pub/linux/suse/ftp.suse.com/suse/i386/XFree86/XFree86-4.0.2-SuSE/`. To update on XFree86 4.0.2 you will need the RPM packages `xshared`, `xmodules`, `xf86`, `xloader` and `xfntsl`. Also advisable is `xfnt100`, and for installation, also, `intlfonts-ttf` and `sax2` from the `sax2` subdirectory.

To update, you must also switch off the graphical user interface. To do so, change, using [Ctrl+Alt+F1] to the first text console, log on as `root` and call up `init 2`. After that, install the RPM packages in the sequence mentioned above using `rpm -Uhv --force --nodeps packagename.rpm`. So long as no error messages have popped up, you can move on to the installation of the 3D support.

To do this, first install the corresponding packages from Nvidia, in our case these were `NVIDIA_GLX-0.9-769.suse70xfree86-4.0.2.i386.rpm` and `NVIDIA_kernel-0.9-769.suse70xfree86-4.0.2.i386.rpm`. The procedure corresponds to that of SuSE 7.1.

Installation with SaX2

Manual installation after the update is very difficult – there is no configuration file to rely on. For this reason, you should use SaX2. The procedure is

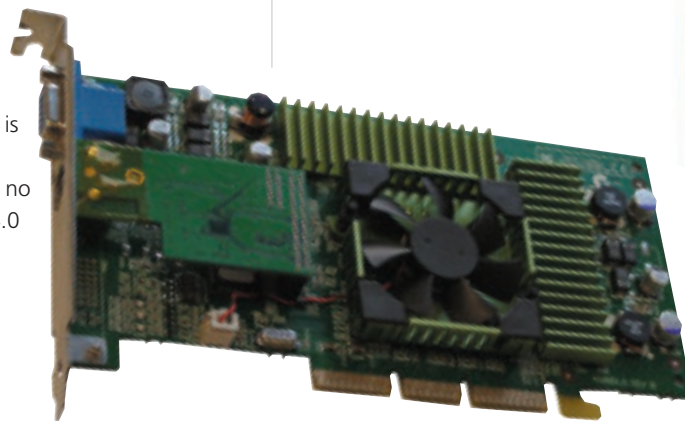


Figure 1: The Elsa Gladiac 920 with GeForce-3 chip functions only with the latest driver version (from 0.9-769). The installation programs from SuSE and Red Hat do not yet recognise it, but in case of doubt the settings for older models like GeForce 2 will work.

KNOW HOW

3D INSTALLATION

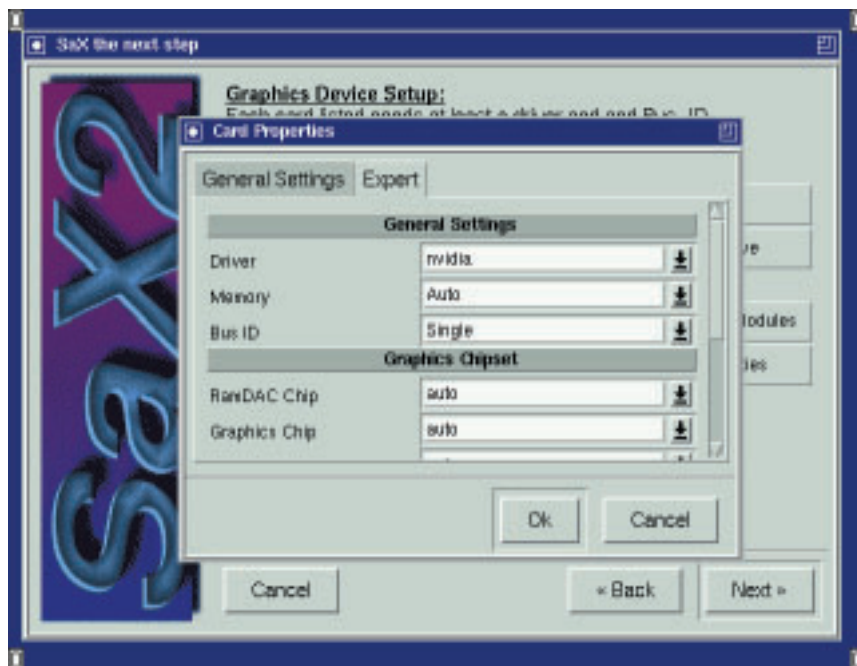


Figure 2: The nvidia module is the hardware-accelerated variant.

identical to the installation under SuSE 7.1, except that you must additionally control the proposed settings for mouse and keyboard. On the whole, though, these can be taken over. After the end of installation, return to the graphical log-in with *init 3*.

In order to revive the old XFree86 in case of error, insert the first SuSE CD (or DVD) in the text console and, as root, call up *yast*. Under *Define installation/start, Change/create configuration* you will find a listing of the SuSE series. The packages required are in the series "x", marked with [i]. Now go to the package thus marked and press the [R] key, which will change the marking to [R]. With [F10] you can then leave the series and select *Start installation*. At the end of installation, leave YaST and use *init 3* to return to the graphical log-in.

Red Hat

Installation under Red Hat 7.1 is something we will have to owe you, sadly, as the packages offered by Nvidia were produced for the wrong kernel version. By and large, the procedure with Red Hat 7.1 is similar to that described below.

Red Hat 7.0 already comes with XFree86 4.0.1 and therefore needs no X-update like SuSE 7.0. Should your graphics card not be recognised during installation, for example because you are using a GeForce 2 GTS or GeForce 3 and this is not yet detected, select a previous model, such as GeForce 2. The Nvidia packages necessary for installation of the 3D support are *NVIDIA_GLX-0.9-769.i386.rpm* and *NVIDIA_kernel-0.9-769.rh70-up.i386.rpm*. Both packages should be saved in */tmp* to simplify matters.

With Red Hat, too, you must first swap the graphical user interface for the text console: After switching over with [Ctrl+Alt+F1] log on as *root* and switch off X with *init 3*.

Additional preparations are not needed, and the next thing to do is install the kernel and the GLX package from Nvidia:

```
rpm -i /tmp/NVIDIA_kernel-0.9-769.rh70-up.i386.rpm
rpm -i /tmp/NVIDIA_GLX-0.9-769.i386.rpm
```

RPM will tell you that diverse files have been renamed by way of avoiding conflict. But more about that later, for the moment we can ignore the messages.

Manual installation

This leaves the manual entry of the correct server in */etc/X11/XF86Config-4*. The GLX-Module is already entered in the case of Red Hat as standard, so all you need do now in the section *Device* is to swap *nv* for *nvidia*. The result should look like this:

```
Section "Screen"
    Identifier "Screen0"
    ...
    Driver      "nvidia"
    ...
EndSection
```

That completes the 3D installation, *init 5* brings you back again to the graphical log-in. On our system Version 0.9-769 of the driver turned out not to be very stable. If you have problems with crashes in 3D games, you might want to try out the forerunner - version 0.9-6. The installation procedure differs only in that RPM now comes with the parameter "--force".

Uninstallation

The message displayed during the installation of the GLX package about the renaming of four files was intended for any later uninstallation and concerns two files in each of the directories */usr/lib* and */usr/X11R6/lib/modules/extensions*: "xxx" is placed before their names and the ending ".RPMSAVE" attached, so if you want to uninstall you must rename them as before. No other changes are necessary.

Prospect

Naturally there are other graphics chips with 3D support than those from Nvidia. For a few very widespread chips, including ATI Rage 128, ATI Radeon, 3Dfx and Matrox, the DRI Project (<http://dri.sourceforge.net/>) makes ready-made driver packages available for self-compilation – you can find the main ones on our cover CD. But since the drivers require Kernel 2.4 together with XFree86 4.0.1 or higher, the only suitable bases are the latest distributions from SuSE, Red Hat or Mandrake. We will come back to this topic in a later issue. ■

Links

Nvidia-driver for XFree86 4.0.1 or higher:
ftp://ftp1.detonator.nvidia.com/pub/drivers/english/XFree86_40/
Update to XFree86 4.0.2 for SuSE 7.0:
<ftp://ftp.gwdg.de/pub/linux/suse/ftp.suse.com/suse/i386/XFree86/XFree86-4.0.2-SuSE/>