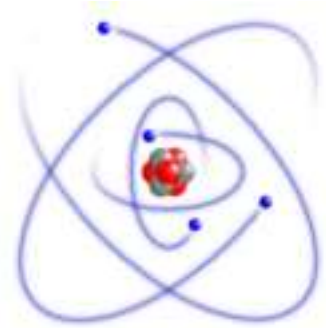


Introducing

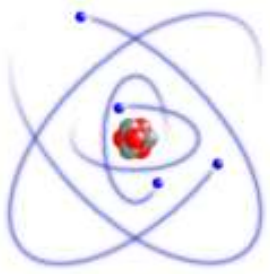


Scientific Linux

at



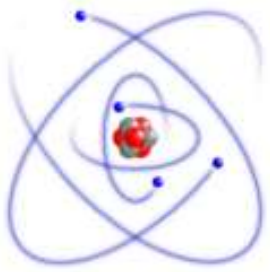
Standort Zeuthen



Outline



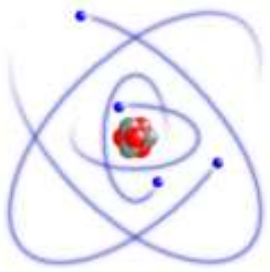
- brief recap: about Scientific Linux
- SL3 at Zeuthen
 - local modifications
 - compatibility with DESY Linux 5
 - changes relevant to users, and how to cope with them
 - the 64-bit world
- migration DL5 -> SL3
- outlook on SL4
 - will not obsolete SL3 !
- the future of linux notebook support (?)



About Scientific Linux



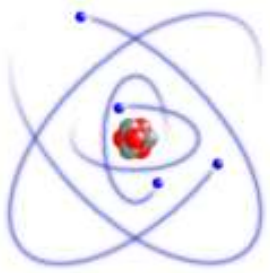
- **recompiled** sources of **Red Hat** Enterprise Linux
- + enhancements
 - OpenAFS, other software
 - site mechanism
- mainly done at **FNAL, CERN**
- project works very well
 - solid distribution
 - useful mailing lists (populated by the right people)
 - errata are recompiled very quickly, and announced
- (being) deployed at **CERN, FNAL, SLAC, ...**



Accessing SL



- main site: <https://scientificlinux.org>
 - CERN SLC3: <http://linuxsoft.cern.ch>
- we mirror SL3 and SL4, i386 and x86_64
 - [/net/z/DL6/SL/<release>/<arch>](#)
 - except SRPMS, full ISO images
- network installations on private devices are possible with `.../images/SL/boot.iso`
 - your device must be registered for nfs access
- installation is simple, including the OpenAFS client
 - we cannot support private installations
 - you get plain SL, without DESY modifications



Local Modifications - Incomplete List



- **software** added

acroread auctex cabextract cernlib cmz dcache-client fftw firefox form freemind gcc-2.95.3 gcc-3.3.3 graphviz ICA-client Java2 Java5 k3b maple mathematica mgdiff mysql4 netbeans oracle patchy perl pine plan qps quanta root subversion tkdiff wipe xgrabsc xosview xv

- adapted to **AFS/Kerberos**
pam, ssh, screen locks, pine

- no **UTF-8**

replaced less, adapted man configuration, ...

- **Printing**: LPRng

- desktop support:

- **Audio** (ALSA)

- **hotplug**

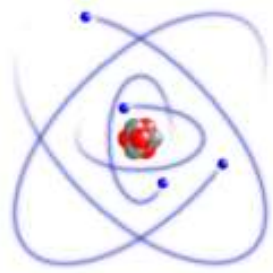
- **Fonts** added:

- MS Truetype Core Fonts

- Bitstream Vera TT Fonts

- Mathematica Fonts

- automatic **installation**,
configuration, **maintenance**,
updates



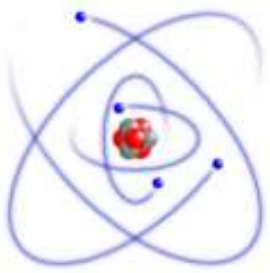
Compatibility with DESY Linux 5



- does this look familiar?

- it's **fvwm2**
- it's **HEPiX11**
- it's **SL3**
- it's **64-bit**
- it's the **fvwm2** built for **DL4**

The screenshot displays a Linux desktop environment. At the top, there is a taskbar with icons for 'Desk0', 'Desk1', a clock, and several application windows including 'Fvwm2...', 'Mozilla', 'Editors...', 'Graphics...', 'Apps...', and 'Hosts...'. A 'Session' window is open in the top right, showing user information: 'User : wiesand', 'Server : lx64.ifh.de', and 'Display : :0'. In the center, a calendar window for 'Sun, 17.4.05 15:53' shows the month of April 2000. Below the calendar, a terminal window displays a message dated 'Thursday, 14. Apr 2005' regarding an AFS file server issue. In the foreground, the 'pine' mail client is open, showing a 'MAIN MENU' with options like '? HELP', 'C COMPOSE MESSAGE', 'I MESSAGE INDEX', 'L FOLDER LIST', 'A ADDRESS BOOK', 'S SETUP', and 'Q QUIT'. The terminal also shows the copyright notice for PINE: 'Copyright 1989-2004. PINE is a trademark of the University'. The terminal prompt is '[lx64] ~ %'.

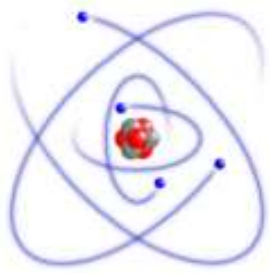


Changes: X Sessions



- the default session is **KDE**
 - as on DL5
 - but on SL3, also if Xsession is not called from a display manager
- additional choices
 - **GNOME**
 - may work best on SL4
 - **icewm, windowmaker**
 - lightweight window managers
 - may replace fvwm2 on SL4





Changing Your Default Session

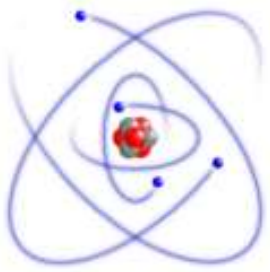


- **KDE** doesn't play well with **Exceed** in **rootless** mode
 - you may have other reasons for preferring another WM
- KDM stores your last choice in `~/.wmrc`
 - but it can't read it before you log in (it has no AFS token)
 - **replace** this file **by a link**:

```
mv ~/.wmrc ~/public
ln -s public/.wmrc ~
```

- If you call Xsession directly
(Exceed or XWin32 with secure SSH tunnel)
 - add your preferred Session type as parameter:

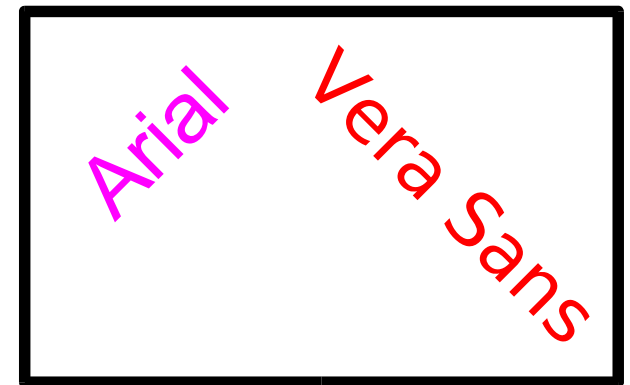
```
/usr/sue/lib/xdm/hepix/Xsession fvwm2
```

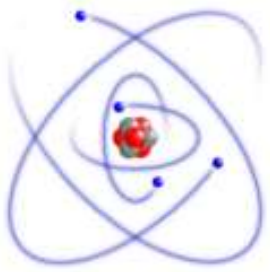



Changes: Font Handling



- desktops use only their local fonts by default
 - some fonts from the central font server were packaged
 - in addition, we provide
 - the free MS Truetype Core Fonts
 - the Bistream Vera Truetype Fonts
 - the fonts coming with Mathematica
- they access these fonts through a local font server
 - default font path: `unix/:7100`
- a login system's font server is available to Exceed/XWin32:
 - default font path example: `tcp/pub3.ifh.de:7100`
- the central font server will vanish eventually



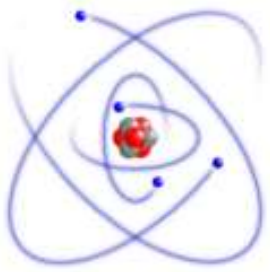


Changes: Desktop PCs





- **xhost +** or **xhost <host>** no longer works
 - extremely insecure, long deprecated, now disabled
- **mount points** for removable media changed
 - CD-ROM/CD-RW: **/mnt/cdrom**, **/mnt/cdrom1**
 - Floppy: **/mnt/floppy**
 - USB Memory Sticks: **/mnt/hotplug**
 - only the first primary partition works
 - you can now format and partition your device yourself
 - other USB storage devices may work, but are unsupported
 - CD Writers should be ok
 - hard disks / multi card readers cause problems
 - often flood our logs with error messages
 - may have to be blacklisted

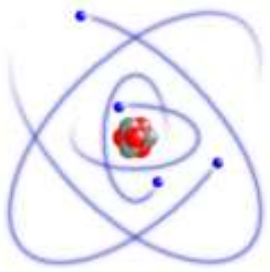




Other Changes



- **AFS sysname:** list
 - 32-bit: `i586_rhel130 i586_linux24 i386_linux24`
 - 64-bit: `amd64_rhel130 amd64_linux24` + 32-bit
 - no links in AFS space needed, compatible files are found automatically
 - SL4 will add `amd64_linux26` and `i386_linux26`
 - we may have to drop `amd64_linux24` and `i386_linux24`
- the recommended **Web Browser** on SL3 is 
-  will continue to be available for a while
- no plans for thunderbird support
 - the recommended mail reader is still pine

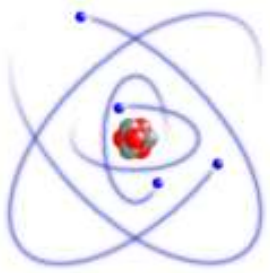


Changes: gcc & glibc



- in general, applications built on DL5 work well on SL3
 - and vice versa
 - but some incompatibilities do exist
- the default **compiler** is gcc 3.2.3 from the distribution
 - but heavily patched, and very equivalent to 3.3.3
 - available in `/opt/products/gcc` if needed:
 - 3.3.3 (DL5 default)
 - 2.95.3 (DL4 default)
- **system library** nominally is the same version (2.3.2) as on DL5
 - in fact, it's very different in at least one respect:
 - **NPTL** (Native POSIX Thread library)

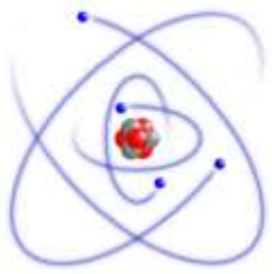




NPTL



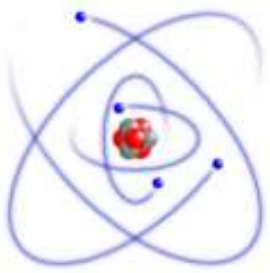
- much closer to POSIX specification than old LinuxThreads
 - see status page for links to documentation
- **binary backward compatible**, but **NOT** for threaded software relying on the deviations of LinuxThreads from POSIX
- SL3 ships with **two older non-NPTL glibcs** as a fallback
 - so does SL4; SL5 will not
- to make an application use them, make sure its environment has the variable **`LD_ASSUME_KERNEL`** set
 - to **`2.4.19`** or **`2.4.0`**
- **do NOT set this generally** (wrap broken applications instead)
- see <http://people.redhat.com/drepper/assumekernel.html>



More Minor glibc Issues



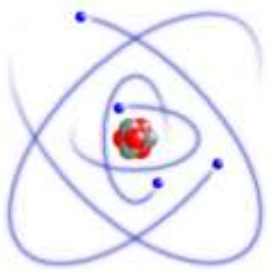
- no **libc5**
 - probably not needed anymore
 - affects very old dynamic executables only (1997 or older)
 - could possibly be helped if really needed
 - NB: **a.out binaries** are on the red list as well
- undefined reference to **__ctype_b**
 - or some other symbol starting with **__ctype**
 - breaks static objects and static libraries built against older glibc versions
 - example: libraries coming with old pgi compiler
 - workaround available on the status web page



Other Changes



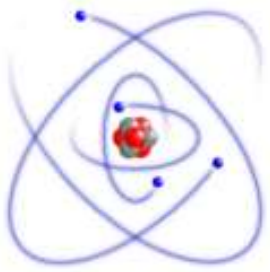
- the **hostname** command will return the fully qualified name (including .ifh.de), with or without the `-f` switch
- general remark:
 - this distribution has a significantly longer lifetime than SuSE professional
 - it receives more bug fixes, support for new hardware, and additional functionality during its first years
 - this is good, but it makes **SL less static than DL used to be**
 - compiler has changed significantly since RHEL3 first released
 - x86_64 support was added, and is still evolving (ok since Update 4)
 - policy of backporting fixes is less strict than with SuSE
 - SL4 released with firefox 1.0.1, erratum was 1.0.2 (I consider this ok)



Known Issues



- stale SuSE customizations
 - desktop links (OpenOffice, ...)
 - application preferences (skins,...)
- missing applications
 - magicpoint (will probably be added)
 - midnight commander (probably won't)
 - no mp3 player ;-)
- plan lacks knowledge of public holidays
 - rebuilt SuSE-9.2 package



64-bit SL3



- public login system: lx64.ifh.de (aka s13-64.ifh.de)

- for test and development, not production



- pretty complete and ready for use

- most 32bit compatibility packages available since SL 3.0.4

- generally: 32-bit libraries in `.../lib`, 64-bit ones in `.../lib64`

- some exceptions

- there's even a **64-bit cernlib** now (!)



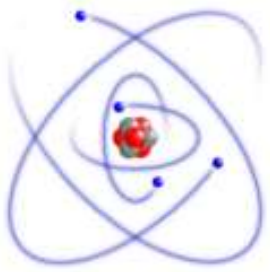
- 2004 release, with additional fixes from H. Vogt

- all tests ok **except** Ariadne (4-momentum non-conservation)

- output of all tests is packaged (`doc/BuildInfo.tar.gz`)

- rumours about a 2005 release

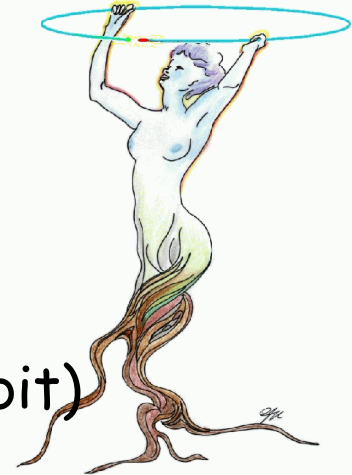
- 64-bit **Oracle** client & **Mathematica** RSN

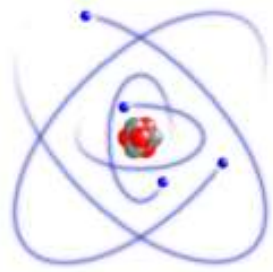


64-bit Details



- Oracle
 - will have `.../lib32` and `.../lib`
 - `oraenv/oraenv32` will set up 64/32-bit environment
- ROOT
 - shared `$ROOTSYS` impossible (ROOT is too clever...)
 - 64-bit ROOT is in `/opt/products/root64`
 - 32-bit ROOT is in `/opt/products/root` (as on 32-bit)
- some software needs a `linux32` prefix to run
 - 32-bit Mathematica (soon a non-issue):
 - `linux32 mathematica`



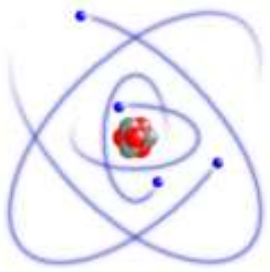


64-bit: Building Software



- `gcc/g77/g++` build 64-bit objects and executables by default
- use the `-m32` switch to build/link 32-bit objects
 - also supported by `gcc-3.3.3` in `/opt/products`
 - not supported by old `gcc-2.95.3`, but even this works:
 - add `-Wa,--32` to compiler flags
 - add `-L/usr/lib` (and other appropriate directories) to linker flags
- no 64-bit intel compilers (yet?)
- 64-bit **Portland Group** compilers are available
 - `ini pgi64` version 5.2.1
 - `ini pgi32` version 5.2.1
 - `ini pgi` old version 3.2 with known SL3 `__ctype` issue



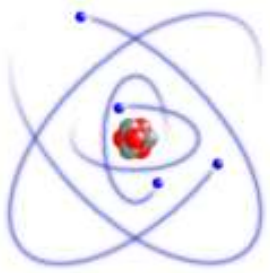


64-bit Desktops ?



- possible, and available on request
 - if you happen to have / are granted a Dell Precision 370
- some rough edges left
 - problems with Sound in some applications
 - no 64-bit plugins for firefox (Java, Flash,...)
 - pine (32-bit) has problems with IMAP server certificate
 - 32-bit KDE applications tend not to work
 - no k3b
 - probably more...
- most users probably want to give this some more time
 - or wait for SL4

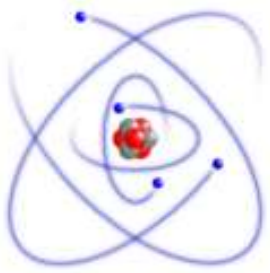




Migration DL5 -> SL3



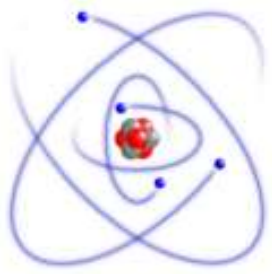
- SuSE 9.3 was released last Friday
 - in two months time, no more patches for SuSE 8.2
 - at this point, keeping DL5 secure becomes much harder
 - in some cases, binary packages from 9.0 can be used
 - in others, we'll have to rebuild the package or backport the fix
 - much work, and stability may suffer
 - packages not essential will rather be removed
- we already have ~90 SL3 systems, SL3 is default installation
- already upgraded: pub2, pub3, pub6, all public PCs (2L01,...)
- to be done in May:
 - pub1,4,5 + all PCs not associated with a group (guest rooms)



Migration: Desktops, Workgroup Servers



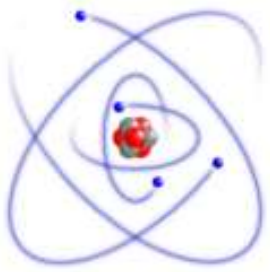
- preferably before 8.2 end of life (mid June)
- procedure:
 - 1) **contact** uco-zn@desy.de ("owner" or group admin)
 - 2) **we prepare** the upgrade
 - /usr1 is preserved
 - we have never lost any data during upgrades, but as usual: **no guarantees**
 - 3) Desktops:
 - **unplug all USB gadgets** (except mouse)
 - **monitor** must be switched **on**
 - 4) **Reboot** (**same day**, or preparation will be undone)
 - by user or -DV-
- takes 90 min. on a PIII 850 Mhz, but need not be attended



Migration: Batch Nodes



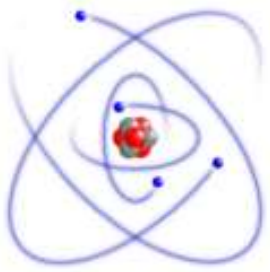
- goes together with SGE5 -> SGE6
- 64-bit systems all run SL3 anyway
- 32-bit systems are being migrated step by step
- to send jobs to SL3:
 - `ini sge6`
 - to submit jobs to 64-bit queues only: `qsub -l arch=amd64`
 - to submit jobs to 32-bit queues only: `qsub -l arch=ia32`
 - by default, jobs may go to either architecture



SL3: Summary



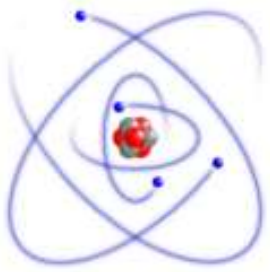
- it's ready
- DL5 compatibility is good, migration should be smooth
- migration has started
- no pressure to upgrade yet
 - we have two months before DL5 becomes any problem at all
- if you haven't done so yet, check your applications on SL3
 - there's still time to work things out
- having all systems with user access migrated by mid-June would save us substantial resources
- these could be spent on progress instead of legacy support



Outlook: SL4



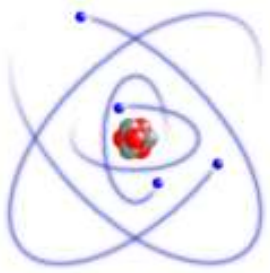
- first SL4 release expected tomorrow
- for general use in Zeuthen, **SL4 is at least 6 months away**
- **SL3 will be supported until long after SL4 is introduced**
- SL3 is very much like DL5
- **SL4 will be very different**
 - the base system (kernel 2.6, ...)
 - **and** our local customization:
 - HEPiX scripts need a major overhaul
 - HEPiX11 needs to be revised - or ditched
 - fvwm2 will probably vanish, we probably can't fight **UTF-8** any longer. ...
 - **even preparing a preview system will take months**



SL4 features



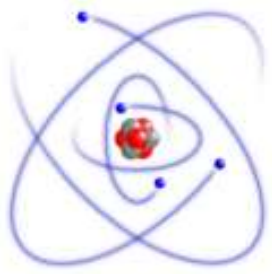
- kernel 2.6
 - improved support for recent/future hardware
 - NUMA, ACPI, Multicore -> batch performance, Notebooks
 - improved hotplug support -> desktops, Notebooks
 - needs openafs-1.3 client (still unstable)
- SELinux (Security Enhanced Linux)
 - fine grained, mandatory access control
 - very beneficial, but steep learning curve ahead
- GNOME improvements
 - may become the recommended desktop



SL4 features continued



- **NFS v4** (secure, WAN compatible, possibly faster, ...)
 - may or may not turn out to challenge AFS
- **ext3** filesystem improvements
 - **performance** (they claim)
 - **online resizability**
- **gcc 3.4**
 - including **gfortran**
 - FORTRAN95, finally, but not yet mature
 - we'll make this available on SL3 as well
- **network connection manager**
 - first look was a bit disappointing, but it's a ray of hope



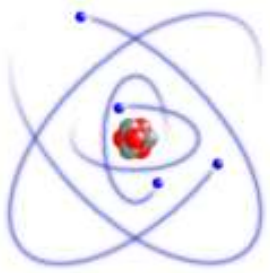
The Future of Notebook Support ?



- like the last item, many SL4 improvements are needed for notebooks



- but it's not clear whether and how linux notebook support can or should continue



Problem 1: The Hardware Zoo



- despite all efforts to standardize:

display controller:

i855 or
i915 or
ATI 9000 or
ATI 300

display: XGA or SXGA+

WLAN:

Prism II (PCMCIA) or
Broadcom (PCMCIA) or
ipw2100 (PCI) or
ipw2200 (PCI)

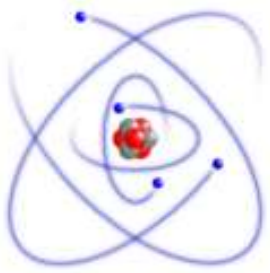
keyboard: US or German

touchpad: synaptics or alps



power management:
APM or ACPI

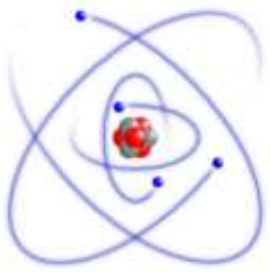
- these are just the components that still are problematic
- and just the supported models (excluding old C6x0, C8x0)
- some of this could have been avoided, some not
- **no database for values that can't be autoprobbed**
- we buy hardware not yet supported before the old one becomes unavailable



Problem 2: Versatility



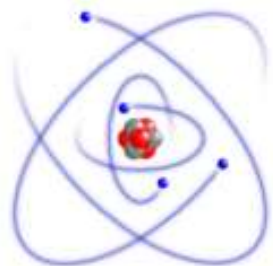
- users keep pressing for **features hard to support**
 - **desktop** replacement
 - external keyboard & monitor
 - **home** PC replacement
 - **ISDN, DSL**, analog **modem**
 - all alongside LAN & WLAN, of course
- devices with root access by the user tend to become **unusable** or **unmaintainable** quickly
 - “someone in HH installed software xyz for me”
 - of course on a partition NOT foreseen to be preserved during upgrades
 - “I made ISDN work, but your AFS client is broken”
 - no it's not - you now run a firewall, without the AFS port opened



Problem 3: Dual Boot



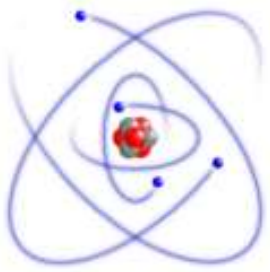
- **Windows** and **Linux** are fundamentally **incompatible**
 - example: Linux wants the **system clock** on **GMT**
 - Windows wants it on local time
 - 6 months a year, that's different by one hour (in our time zone)
 - the other 6 months, that's different by two hours
 - windows will shift the clock forth and back, linux doesn't know
 - kerberos (AFS) needs a clock accurate to ± 5 min.
 - example: still no common generally usable **filesystem**
 - Windows support and Linux support speak different languages
 - "drive letters" vs. "partition numbers"
 - the problems are usually being worked around on the linux side
 - if Windows on a dual boot system won't boot, it's Linux's fault



Problem 4: Little Progress



- even with (an unmodified) SL4:
 - **no suspend** possible for devices w/o APM-BIOS (Dell D-Series)
 - a Dell D600/610 will **not** even **turn off the display backlight** when the lid is closed - that needs to be scripted
 - a Dell X300 and a Dell D410 will - but it **won't come back on** when the lid is opened again - that needs to be scripted
 - using **beamers** does not work well
 - truly **poor battery lifetime** without major modifications
 - no easy, failsafe way to handle **multiple network interfaces**
 - with or without root privileges
 - no support for at least some WLAN chips we have bought
- no hope for some **DESY-wide effort** on Linux for Notebooks:



Π



- have you heard about Π , the platform integration program ?
- here goes my hope for linux on notebooks being an objective

Aktuelle Arbeitspunkte



- Das Fehlen eines formalen Projektplanes hindert uns nicht an der Fortsetzung begonnener Arbeiten
- In drei Projekten gibt es laufende Aktivitäten

Exchange 2003 (D. Jahnke)



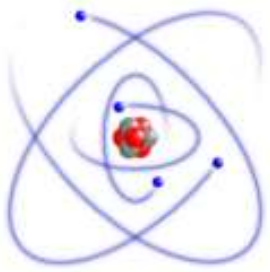
Mobile Geräte (K. Woller / R. Baltrusch)



Terminalservices (R. Baltrusch)

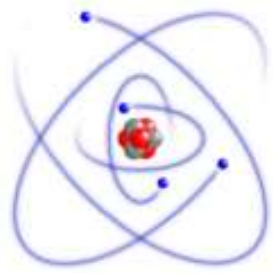


Linux Notebooks: Summary



- substantial effort
- questionable results
- unsatisfied users
- no light at the end of the tunnel
- is this the right thing to do?
- after all, Windows isn't that bad anymore
 - it's not at all easier or less effort to support
 - but the resources are being spent on it
 - there are flyers, classes, projects, programs - right now
 - linux support is never ever going to be competitive, and we're already putting more effort into it than we can afford





Linux Notebooks: Proposal



- **assess** the true **need** (vs. "demand") for Linux on notebooks
 - if it exists, find the best way to satisfy it, and the manpower
 - evaluate **alternatives** (cygwin, vmware, native Windows software)
- meanwhile, continue with a **minimal, affordable support model**
 - based on **SL4** (needed for latest hardware)
 - emphasis on **mobile use**, LAN, WLAN - no ISDN etc.
 - easy **security updates** by user
 - standard **scientific software**
 - **ditch dual boot** support
 - when ready, immediately obsoletes previous installations
- more isn't feasible - still interested?