



Linux Notebook Support

at



Standort Zeuthen

Boundary Conditions



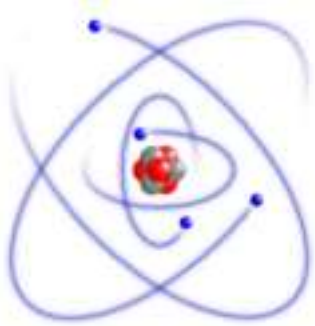
- no dedicated manpower
 - requires high degree of standardization and automation
- no personal notebooks
 - supposed to be shared within groups
 - small pool managed by DV for short term borrowing
- => objectives:
 - provide colleagues with a **tool to get work done & stay in touch when out of office**
 - **secure, easy & failsafe** to use
 - sufficiently **functional**
 - **zero administration & education**

Solution



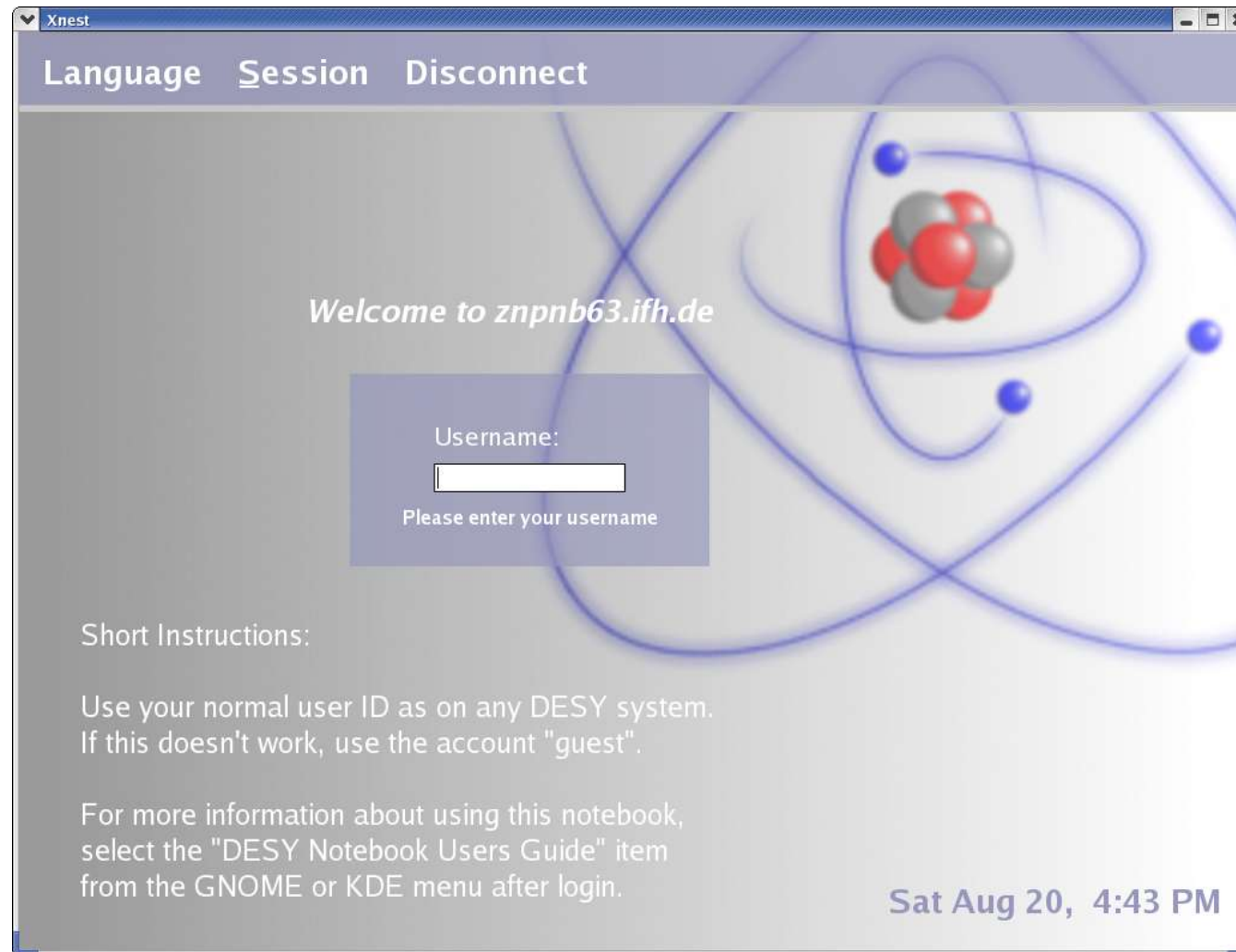
- handle notebooks as **stateless appliances**
 - standardized hardware & standardized, automated setup
 - no permanent user data
 - no backup
- **no passwords**
 - notebooks know all AFS accounts enabled in Zeuthen
 - kept in sync automatically, home created during 1st login
 - gdm grants login to any account locally
 - the screen can be locked
 - is this insecure?
 - don't hand any computer to anyone you don't trust - even with passwords
 - no passwords => no bad passwords, no chance for brute force attacks

Choice of Distribution



- RHEL is not the best distribution for notebooks
 - IMHO
- anyway, chose [Scientific Linux 4.1](#)
 - gaining experience with future SL
 - most efficient use of time
 - SL3 too limited for notebooks (poor ACPI support)

Using a Notebook



- reading two sentences is all that's required to get started

After Login



The screenshot shows a Linux desktop environment. On the left, the 'Applications' menu is open, displaying various categories: Accessories, Graphics, Internet, Office, Preferences, Programming, Sound & Video, System Settings, System Tools, File Browser, Help, Network Servers, and Notebook Users Guide. The 'Notebook Users Guide' is highlighted. In the center, a Mozilla Firefox browser window is open, displaying a local file: `file:///usr/lib/DZNB/RelNotes.html`. The browser's address bar shows the file path, and the main content area displays a list of links under the heading 'News and Changes'. The links include: Support and Service Level, Security and Updates, Basics: Desktop, Data, Keyboard, Mouse, Touchpad, ..., Using the Network, System Clock, Printing, Using Beamers, Power management, and Known Issues, Troubleshooting. Below the links, there is a section titled 'News and Changes' with a list of dates and updates: August 20, 2005 (The X1 is now supported), August 14, 2005 (we can now switch the VGA output of ATI Radeon cards), August 8, 2005 (added information about the notebook kernel, improved touchpad information), August 5, 2005 (added X300 information), and August 1, 2005 (initial release). At the bottom of the browser window, there is a section titled 'Hardware supported' which states: 'This setup is available for the DELL Latitude C400, D410, D600, D610, X300, and X1. The X300 has a broken DSDT that prevents ACPI from working properly unless the patched kernel is used and the DSDT overridden. This is dependent on the BIOS'. The browser window also shows a 'Done' status at the bottom.

Applications Actions

- Accessories
- Graphics
- Internet
- Office
- Preferences
- Programming
- Sound & Video
- System Settings
- System Tools
- File Browser
- Help
- Network Servers
- Notebook Users Guide

Mozilla Firefox

file:///usr/lib/DZNB/RelNotes.html

Scientific Linux Distros

file:///usr/lib/DZNB/RelNotes.html

- Support and Service Level
- Security and Updates
- Basics: Desktop, Data, Keyboard, Mouse, Touchpad, ...
- Using the Network
- System Clock, Printing, Using Beamers, Power management
- Known Issues, Troubleshooting

News and Changes

August 20, 2005 • The X1 is now supported

August 14, 2005 • we can now switch the [VGA output of ATI Radeon cards](#)

August 8, 2005 • added information about the [notebook kernel](#)
• improved [touchpad information](#)

August 5, 2005 • added X300 information

August 1, 2005 • initial release

Older news items are [here](#).

Hardware supported

This setup is available for the DELL Latitude C400, D410, D600, D610, X300, and X1.

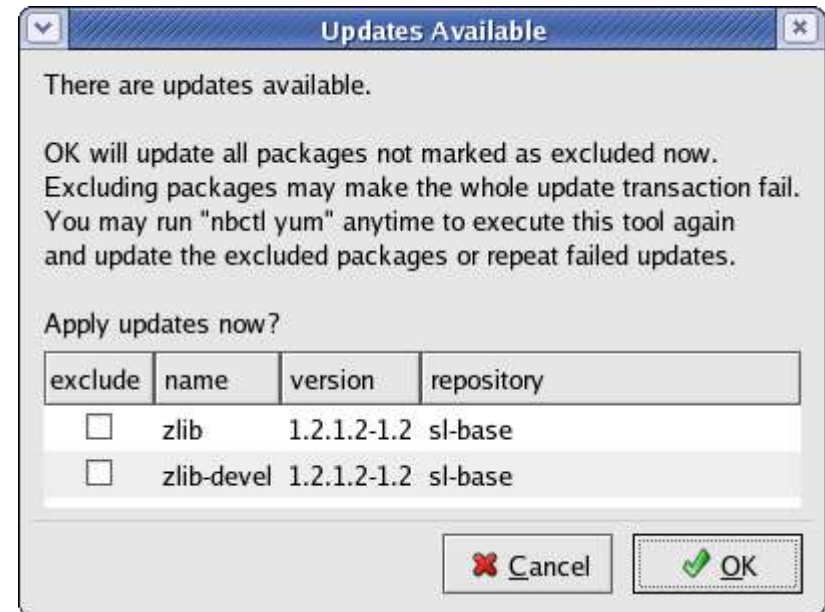
The X300 has a broken DSDT that prevents ACPI from working properly unless the [patched kernel](#) is used and the DSDT overridden. This is dependent on the BIOS

Done

Security



- local **firewall**
 - allows ssh daemon & AFS client
 - only ssh public key authentication
- package **updates**
 - checked for upon every start of any network device
 - which does not happen automatically
 - works anywhere
 - all packages are signed
 - user need not accept
 - but will be bothered again next time
 - no automatic reboots



root Access ?

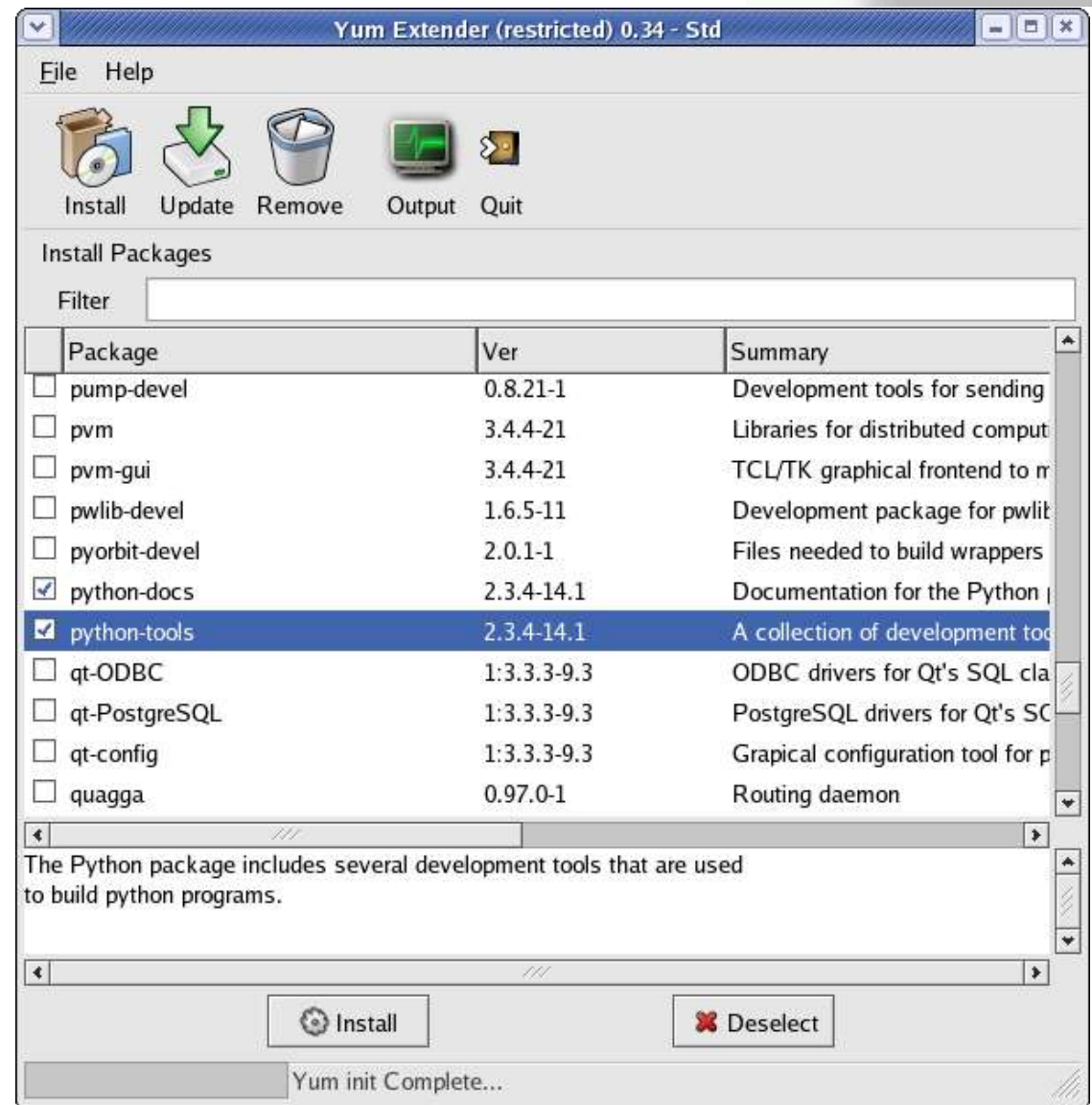


- is **not granted** (usually)
- and **not needed**:
 - possible without:
 - start/stop/configure network interfaces (and restore the default configuration); start/stop AFS client
 - using ISDN, DSL & external modems; use local printer, set clock,...
- if granted,
 - -DV- no longer responsible for security and functionality
 - access to internal network revoked, unless group administrator signs paperwork to acknowledge RSR rules for individually maintained systems
 - support limited to re-installation

Also possible w/o being root:



- **install** packages
 - from SL or Zeuthen repositories
 - if signed with trusted key
- **remove** packages
- some unwanted packages will be removed automatically
- some wanted ones will be reinstalled
- not 100% failsafe



What's Provided



- **supported models:** Dell Latitude
 - C400, D410, D600, D610, X300, X1
 - unsupported: D400 (broken DSDT, no fix available)
 - could be added: other C series models
- **native display resolution** at 16 bpp
 - clone on VGA port can be switched on/off
 - (all except D6x0 only clone 1024x768)
- **acceptable battery lifetime** (w/ default battery):
 - X300/X1: 2.5 hours
 - others: > 4 hours
 - at lowest display brightness, w/o WLAN

What's Provided (continued)



- **easy use of LAN, WLAN & AFS**
 - commands: lan, lan stop, lan status, wlan, wlan stop, afs, ...
 - stops all other interfaces, avoids routing/afs problems
 - simple commands for (re)setting ESSID/WEP key
 - scriptable, shortcut for DESY internal WLAN
- **enhanced touch-pad driver**
 - all models: tap to left-click, scrolling, edge movement
 - somewhat model specific: corner and/or multi finger taps to middle/right-click
- working **battery monitor** (DSDT fix on X300)
- **fast boot** (60 seconds for X1 w/o AC)

What's provided (continued...)



- free MS **truetype core fonts**
- **additional software**: much like on SL3
 - scientific: cernlib, root, maple, ...
 - not coming with SL due to licensing: Adobe Reader, Flash, ...
 - packages missing from SL: jpeg2s, xmgrace, ...
 - DESY letter style, ...
- most **configuration tweaks & fixes** as on SL3
 - letter -> A4 (ps2pdf, ...)
 - make dvips create files by default instead of print
 - usable zsh configuration, ..

Missing/Unsupported Features



- missing:
 - suspend to disk (all models)
 - requires intrusive kernel patches
 - suspend to RAM (all w/o full APM BIOS = all D & X series)
 - requires intrusive kernel patches
 - bluetooth
 - simply haven't looked at it yet
 - firewire
 - red hat turns this off...
- unsupported:
 - internal winmodem

How it's all done



- **kickstart installation** with single generic profile
 - **%pre** (uses microp Perl + script retrieved with wget)
 - deal with partitioning and some model specifics (resolution)
 - model detection: dmidecode
 - determine dual/single boot, keep linux or add to empty/win-only disk ?
 - pass on some data to %post via install system's /tmp on ramdisk
 - windows mounts, saved ssh keys
 - **%post**
 - fix hostname according to DNS information
 - install MS truetype fonts (license forbids packaging)
 - restore ssh keys
 - install notebook specific packages
 - these do the remaining work

Maintenance



- uses nothing but **RPM**
 - no framework
- base package:
 - init script for **(few & fast!) actions during boot**
 - adapt xorg.conf to touch-pad on/off, ...
 - ifup-local running **whenever a network interface was started**
 - get accurate **time** from a DESY time server, or pool.ntp.org
 - update base package
 - **check for updates**, ask user for ok
 - if ok, update, then **sync accounts & package selections...**
 - many helper scripts
 - lots of triggers & postinstall scripts

Model Specific Packages



- **turn off/on backlight** when lid closed/opened
 - needed on D600, D610
- switch VTs when lid opened to **restore the X display**
 - needed on D410, X300, X1
- apply BIOS version specific **fixed DSDTs** to initrds
 - needed on X300 (and would be on D400)
 - triggered by kernel update
- **patch** RAM copy of i915GMs **VESA BIOS** early during boot
 - needed to get native resolution on X1

Other Notebook Packages



- laptop-mode
 - **save power when running on battery:**
 - tune VM subsystem (cluster writes, increase read-ahead)
 - remount filesystems with noatime option
 - turn off services crond, atd, anacron
 - set HD power management to aggressive - except SATA disks (D610)
 - get initial state right, act on AC events (works with APM as well)
 - syslogd configured to NOT sync after each message
- beamerctl
 - utilities to **steer the VGA output** of Intel & ATI graphics
 - single command `beamer [off]` for all models

Patched Kernel



- I **really tried to avoid this**, but without it:
 - no DSDT override (no proper X300 support)
 - no enhanced driver for ALPS touch-pads (ALL D-series)
 - no NTFS driver (no access to C: on dual boot notebooks)
- these are **simple config changes & not too intrusive patches**
- all **notebooks work reliably with the stock SL4 kernel**
 - just some features will be missing, all auto-detected
- deliberately **stayed away from intrusive patches**
 - swsusp2, late S3 BIOS (suspend to RAM/disk)
 - this would need more manpower to be sustainable

Lessons Learned



- **dual boot** is a nuisance, but everybody wants it
- hand out the **root/BIOS password**, and the device **WILL** come back in an unmaintainable state
 - "I just installed xemacs from SuSE-9.2 on my 8.2 Notebook."
 - "I just changed the partitioning a little bit with partition magic."
 - "I KNOW that NTFS write access is safe."
 - "The guys in HH installed xyz for me. It **MUST** be preserved"
- **developers need unencumbered, immediate access** to all supported models - a desktop PC is no substitute
- **efficiency** improves with growing number of supported models, devices, and users

Summary



- hardware, drivers, notebook specific configuration
 - still tedious work, cannot be avoided
 - results still not perfect (suspend...)
- single config kickstart
 - avoids per-device configuration
 - simple PXE installs can be done by all staff
- local accounts w/o password
 - avoids administrative overhead, no problem in practice
 - notebook accounts handled by user registry in the future?
 - besides implementation, would require user education