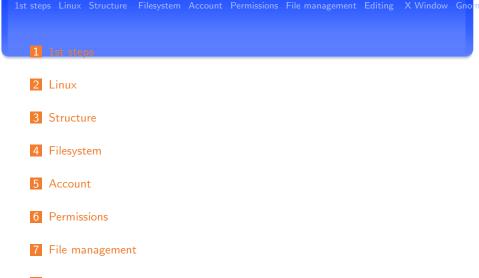
Debian/GNU Linux Introduction

Károly Erdei

September 11, 2012

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8 Editing

9 X Window

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First Steps in Linux - The Login How to login

Directly

- xdm/kdm: by graphical display managers login prompt
- on the serial console (24x80 character terminal window)

Remotely

- from other computer (through network) from terminal window
 - ssh [-X] host name or host IP (ssh -I ke -X gorilla.risc.jku.at)

Working Environment

- GUI, see the KDE, GNOME desktops
- shell in terminal window; command line input, closed by RETURN
 - some simple commands: Is; who; date; wc;

Logout

- KDE/GNOME/X: use GUI
- shell: exit, logout, etc.

My GNOME Screen



First Steps in Linux - The Login

How to change the password

in KDE with GUI: kdepasswd

🗶 Change i	Password - KDE passwc ? 💷 🗙			
R	Please enter your current password:			
Password:				
	<u>O</u> K <u>C</u> ancel			
🗙 Change i	Password - KDE passwc 📍 💷 🗙			
R	Please enter your new password:			
Password:				
¥erify:				
Password st	rength meter:			
Passwords of	io not match			
	ØK Cancel			

In shell:

- passwd for a computer without networking
- yppasswd for network environment

First Steps in Linux - The Login

How to start an application in Linux

on the local computer

- start from the menue system (tree structure)
- (double)click on the application's icon on the desktop
- start from the menue bar after you put there the icon
- start from the command line (shell)

start it on a remote computer

- using networking, X11, display local, running remote
 - ssh -X gorilla.risc.jku.at kile
- using VNC, having remotly a graphical display

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3 Structure

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Computer Environment at RISC

Linux Environment

Desktop Computers

- 55 Debian Linux PCs
- 3 MS Windows PCs (secretary)

Server Computers

- 12 Debian Linux Servers
 - 5 mailservers (2x incoming, 2x smtp-auth, user mailbox)
 - web-, ftp-, svn-, moodle-, vpn-, etc. server
 - fileserver (home directories for all users)
 - compute servers for RISC (gonzales: 118 GB RAM, 2x X5675 @3.07GHz, 6 cores)
 - servers for virtualisation (2 older, 2 new)

Window 2003 Server

Linux - Windows integration

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Advantage of Linux Using Linux

Advantage of Linux

- FREE, OpenSource Software by no cost !
- multitasking OS, multiuser OS
- native networking OS (to use remote resources)
- native graphical networking capabilities (X11)
- very stable, very secure OS
- wide Internet support (mailing lists, irc groups, etc.)
- wide free documentation
 - User Guides, HowTos, FAQs, etc.
- Iot of FREE software packages are available
- the absolute leader OS in the server area

Linux Distributions Using Linux

Distributions

- more as 100 different Linux distributions
 - in reality about a dozen main (full) distributions
- as a sign of the democracy in software development
- check: http://distrowatch.com/

Main Distributions

- Mint (2), Mageia (1), Ubuntu (3), Fedora (5), OpenSuse (2), Debian (10)
 - Mint Ubuntu, Debian
 - Mageia Mandriva Red Hat

Linux Distributions Using Linux

Ubuntu - ancient African word: humanity to others

- Ubuntu Manifesto:
 - available free of charge, usable by people in their local language
- lot of sub-distribution (based on Ubuntu)

Mint - Ubuntu-based, more complete out-of-the-box experience

■ including browser plugins, media codecs, support for DVD playback

Debian GNU/Linux - create a free Linux OS - The Universal Operating S.

- quality over time pressure; lots of packages (25000)
- the most architectures supported:
 - alpha, amd64, arm, armel, hppa, i386, ia64, mips, mipsel, powerpc, sparc,
- the base for the most other Linux distributions (Ubuntu, Mint, etc)

Working with Linux Using Linux

Today no difference in using Windows or Linux

■ in both cases: you have to click, click, click ...

Problems of using Linux

- no perfect support for new or specific hardware
 - reason: the manufacturer do not give free the necessary information
- upgrade to new hardware not possible immediately
 - late announcement of the HW information for drivers

Difference: MS Windows distribution - Manufacturer's distribution

- all HW drivers for the given model are included !
- using MS Windows-7 Campus licence DVD (almost no drivers)

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Structure of Linux The Kernel

Kernel: the conductor in the OS

- loaded by the boot loader at start of the OS
- managing processes (scheduler)
- managing memory (real and virtual); access to memory
- doing multitasking
- serves the File System
- manages rights and permissions (users, files)
- manages hardware units (I/O, hard disks, equipments, etc.)
- networking

Structure of Linux Unix Processes

Process - a running program

- started by kernel;
- get CPU time slices (multitasking)
- priority: 0 to 64 (minimal)
- PID (process ID, sequential number)
- first process: kswapd0
 - for virtual memory management
- second process: init, PID=1
 - start and stop the system (i.e. all other processes)
- process state: see ps output
 - running (R) stopped (T),
 - active (S) idle (I) (waiting 20sec)

Structure of Linux The Shell - an overview

Shell

- User Interface to the OS
- it runs in a terminal window
- is a command language interpreter
 - usable as an interactive login shell
 - shell script command processor
- interprets command line inputs; manages display output
 - includes a command-line editor
- included is a programming language (shell script)
 - commands, variables, expressions,
- includes a job control
- Iot of built in commands for each specific area
- invokes programs; redirects input/output; makes pipelining

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The Linux file system Structure and Components

File System

- tree structure, begins with the root (/) directory
- any number of (nested) subdirectories
- any number of files (file = leaf in the tree structure)

File Types

- ordinary files (text, executable, jpeg, wav, doc, etc.)
- special files (dev files = device description files)
- symbolic link (pointer to another file)
- subdirectories contains any type of files

Linux Root directory structure

/bin/ /boot /cdrom /dev /etc /home /lib /lost+found /media /proc /root /tmp /usr /var

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The Linux file system Symbolic link, path

Symbolic link:

- only one physical file; any number of symbolic link to it
- delete symlink: the physical file will not be deleted !
 - lrwxrwxrwx 1 ke ke 24 2008-10-21 22:04 oxygen.png -> ../oxy.png

Path

- the exact location of an object (file, subdir, etc.)
 - /usr/share/doc/latex-beamer/solutions/generic-talks
- absolute path; relative path (../rlogin-ssh)
- gives shell the directory list to search for executable commands
- commands: pwd current location; cd change dir
- echo \$PATH

/usr/local/bin:/usr/bin:/usr/bin/X11:/usr/games:/zvol/timer/bi /home/ke/bin:/usr/NX/bin:/usr/local/Adobe/Acrobat7.0/bin The Linux file system

file systems on the file server atlantis

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
/dev/sda1	15377820	4914984	9681680	34%	/
/dev/sda3	15377852	7398996	7197696	51%	/zlocal/sda3
/dev/sda5	15377820	12158088	2438576	84%	/zlocal/sda5
/dev/sda6	15377820	13050212	1546452	90%	/zlocal/sda6
/dev/sda7	15377820	13734280	862384	95%	/zlocal/sda7
/dev/sda8	15377820	11910696	2685968	82%	/zlocal/sda8
/dev/sda9	15377820	12721576	1875088	88%	/zlocal/sda9
/dev/sda10	15377820	169368	14427296	2%	/zlocal/sda10
/dev/sda11	15377820	169368	14427296	2%	/zlocal/sda11
/dev/sda12	15377820	169368	14427296	2%	/zlocal/sda12
/dev/sda13	15377820	169368	14427296	2%	/zlocal/sda13
/dev/sda14	6261684	143664	5799936	3%	/zlocal/sda14
/dev/sdb1	15377820	169368	14427296	2%	/zlocal/sdb1
/dev/sdb2	15377852	169368	14427324	2%	/zlocal/sdb2
/dev/sdb3	15377852	169368	14427324	2%	/zlocal/sdb3
/dev/sdc1	480719056	7563748	448736108	2%	/zlocal/sdc1
					► < = ► = • • Q (











6 Permissions



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The user account Overview

user identification by login:

- Linux: username, passwd
 - similar by gmail account or by XP Professional

further parts of the Linux user account:

• the home directory; the shell; the users group; other parameters

location of the Linux home directory: /home/username

- (XP: Eigene Dateien, gmail: not visible)
- local /home/username not a usable solution in a networking environment
- problems by backup, by changing the workstation, etc.

LAN-wide home directory

The solution for a computer network

riscwide Home directory

- at RISC the home directories are located on a file server
 - the file server exports them by NFS to all other workstations
- you have always the same home directory
 - independently on which workstation you logged in
- advantage by backup
 - only the file server hard disk has to be backuped
- miscellaneous information must be distributed LAN-wide
 - see later: NIS, YP, etc.

special user in Linux: root (read/write rights for all files)

Parameters of the user account

Files related to accounts:

- /etc/passwd, /etc/group, /etc/shadow, /etc/gshadow
- /etc/passwd:

login name:password:UID:GID:real name,,,:home directory: shell sysadmin:x:1000:1000:sysadmin at risc,,,:/home/sysadmin:/bin/bash

/etc/group

```
sysadmin:x:1000:
```

additional information:

- real name, location (room number)
- work phone number, home phone number,
- shadow: additional information about:
 - password expires, last changed, has to be changed
 - account expires, etc.



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Permissions in Linux file system

Groups and attributes

Groups

- files and users have miscellaneous attributes
- the user belongs to a group in Linux (adm, root, audio, etc.)
- /etc/group file contains the groups

<pre>root:x:0:</pre>	cdrom:x:24:ke
daemon:x:1:	audio:x:29:ke
<pre>bin:x:2:</pre>	video:x:44:ke

more users may belong to a group

webadmin:*:10019:sysadmin,mkauers,wwindste
sysadmin:*:10017:sysadmin,ke,landerl,kesysadm

- the file gets attributes for the grouping: u/g/o
 - u: the user, who owns the file
 - g: all users in a group
 - o: other users not in the files group and not owner (others=world)

Permissions in Linux file system

Attributes

- files/directories get attributes for the grouping: u/g/o
- file attributes:
 - r: read; w: write; x: execute; -: no rights
 - special permissions: s: execution with rights of the owner
- directory:
 - r: list of files; w: create/delete file; x: change into directory; -: no
- Is -I /etc/passwd /etc/shadow
 - -rw-r-r- 1 root root 119 Nov 02 1999 /etc/passwd
 - -rw-r— 1 root shadow 1079 2008-01-12 18:48 /etc/shadow
- Is -Id /etc/network
 - drwxr-xr-x 7 root root 4096 2009-05-15 08:43 /etc/network/

1.character:

- file, d directory, l link, c char device, b block device

(ロ) (部) (E) (E) =

Permissions in Linux file system

umask - user mask

Umask is a shell variable and a function

- sets the default permissions for files and folders
- it consist of three octal digit (or four, 1st is special)
- the values of an octal digit are calculated:
 - 4 read, 2 write, 1 execute, 0 none (for files)
- Umask is confusing in that it is set up by defining what is NOT wanted

Examples

- 022 means the rights: 755 for dirs, 644 for files
- 000 means: 777 for directories, 666 for files

Permissions in Linux file system

umask - chmod

To find the proper permission wanted, subtract the umask

- Permissions for files = 666 umask
- Permissions for directories = 777 umask

Using umask

- umask (lists the current value)
- umask 022 (sets new values)

chmod

- change file/directory mode
- chmod values path

Permissions in Linux file system

gorilla:/zlocal/sda3> pwd /zlocal/sda3 gorilla:/zlocal/sda3> ls -ld kerdei/ drwxr-x--- 3 ke root 4096 Sep 25 2011 kerdei/ gorilla:/zlocal/sda3> chmod 700 kerdei/ gorilla:/zlocal/sda3> ls -ld kerdei/ drwx----- 3 ke root 4096 Sep 25 2011 kerdei/ gorilla:/zlocal/sda3> chmod 750 kerdei/ gorilla:/zlocal/sda3> ls -ld kerdei/ drwxr-x--- 3 ke root 4096 Sep 25 2011 kerdei/ gorilla:/zlocal/sda3> chmod g-rw kerdei/ gorilla:/zlocal/sda3> ls -ld kerdei/ drwx--x--- 3 ke root 4096 Sep 25 2011 kerdei/ gorilla:/zlocal/sda3>

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File and directory management Functions of File Managers

Functions

- create, remove directory, file
- copy, move file1 file2, directory1 directory2
- change permissions
- create symbolic links (for files, directories)

there are a lot of file managers in Debian

get list with grep "file manager " squeeze-packages.txt

File Managers

- xfe: X file explorer
 - a lightweight file manager for X11, like Windows Explorer
- nautilus:
 - gnome file manager

File Managers xfe - X File Explorer

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🗉 🚞 2-bearbeiten		forum-pres	4 KB	Folder	10/16/2008 08:16:54	ke	ke	drwxr-xr-x
🗉 🚞 2-check-risc		intro-ws	4 KB	Folder	10/16/2008 04:00:36	ke	ke	drwxr-xr-x
🖲 🚞 2-check-sort		n ke	4 KB	Folder	10/22/2008 10:12:30	ke	ke	drwxr-xr-x
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million amsn_received		ng org	4 KB	Folder	10/16/2008 08:10:21	ke	ke	drwxr-xr-x
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🗉 💼 forum-pres		topics-for-KE.txt	3.5 KB	Plain Text	10/21/2008 01:55:42	ke	ke	-rw-rr
🖲 🚞 intro-ws		topics-WS-mail.txt	3.3 KB	Plain Text	09/28/2008 02:59:04	ke	ke	-rw-rr
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File Managers xfe - X File Explorer

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General Permission	s	ociations			
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Network	data		2 items	folder	Sat 01 Sep 2012 12:37:52 AM CES
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	media	Copyright © 1999-2009 The Nautilus authors	0 items	folder	Fri 28 Sep 2012 05:15:04 PM CES
	mnt	Nautilus Web Site	0 items	folder	Mon 19 Nov 2007 07:21:19 PM C
	mnt2	Credits License Close	0 items		Tue 30 Aug 2011 05:45:56 PM CE
	P in opt		1 item		Mon 01 Aug 2011 10:26:18 PM CI
	proc				Tue 18 Sep 2012 02:54:58 PM CE
	proc		255 items 0 items		Thu 27 Sep 2012 05:20:16 PM CE
	I sbin		146 items		Fri 28 Sep 2012 03:05:01 PM CES
	Image: Selinux		0 items		Tue 16 Sep 2008 09:38:17 AM CE
	Selling		2 items		Sun 08 Apr 2012 08:38:58 PM CE
	I sys		11 items		Tue 18 Sep 2012 02:54:58 PM CE
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File managers on-line Demo

On-line Demonstration of the file managers

- GNOME
 - nautilus
 - dolphin
 - gnome-commander
- KDE
 - konqueror

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Editing function in Linux

Editing

- what kind of object do we want to edit
 - text file, audio file, jpeg image file, etc.
 - cd, dvd contents
- dozens of editor are available
 - check them with grep editor squeeze-all-packages.txt
 - 306 packages with 'editor'
 - 58 packages with 'text editor'
- general purpose text editors of different power
- special editors for specific objects
 - audacity, gimp, xfig
 - K3B CD/DVD creator

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Office suites, Text editors

Libre Office (OO)

 lowriter (Word processor), localc (Spreadsheet), loimpress (Presentation), lodraw (Drawing), lobase (Database), lomath (Equation editor)

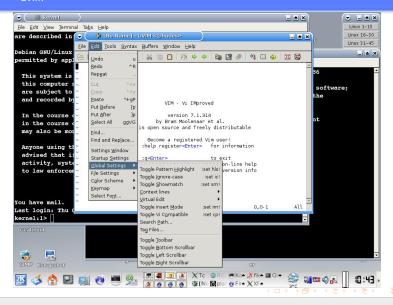
K-Office (KDE Office suite)

kwriter, kspread, kpresenter, kformula, kthesaurus, etc.

Text Editors

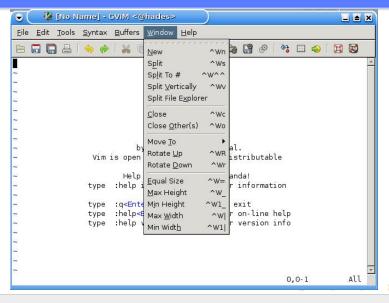
- vi: historical times, but very powerful
- gvim: emacs-like, very powerful (www.vim.org)
- emacs: very powerful
- kate: advanced text editor for KDE

Text editor



Text editors

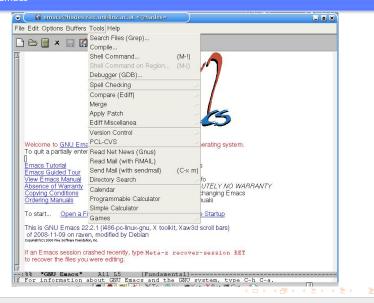
Gvim



Text editors



Text editors



Text editors

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	Highlight Syntax		Csh	
	Apply Backlighting		Fortran	
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			Pascal Perl	
			PostScript	
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Text editors

Kate - KDE advanced text editor

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Special editors For object types

Object Editors

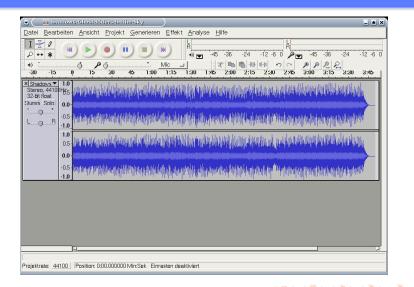
audacity: a fast, cross-platform audio editor

- audio recorder, converter, audio file manipulator
- Linux, Windows, Mac versions available
- GIMP: the Gnu Image Manipulation Program
 - almost as powerfull as Photoshop
- K3B: the KDE CD and DVD creator

Special program - ksnapshot

to create screen shots about different parts of the screen

Object Editors - Audacity



Object Editors - K3B CD-DVD creator



Special program - ksnapshot screen shot creator

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* * = =		ew Snapshot		
111	******* L	<u>S</u> ave As		
		y to Clipboard		
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Cap <u>t</u> ure mode:	Full Screen	.		
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	Window Under Cursor			
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X Window System The X-Server

X Window System

- X-Windows, Version 11: X11 today: X.org
- Developed in 1984 at MIT
 - supported by DEC, HP, SUN, IBM
- Network-based graphics window system for Unix
- Uses the multitasking function of Unix
- A client-server model

X server

- runs on a host (in the network)
- controls the display (=graphics card) and keyboard/mouse
- binds to the D-K-M (in contrast to XVNCServer)
- intermediator between X-clients (applications) and D-K-M
- accepts client connections from local host (remote host)

X Window System The X-client

X client

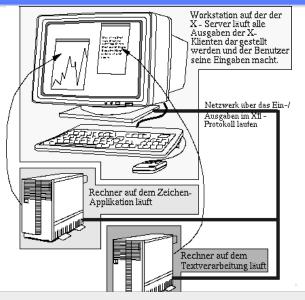
- connects to the X-server, to display its GUI
- most important X-clients
 - the X Window Manager; Xterm the terminal emulator
- name begins with x (xterm, xclock, xcalc, etc.)
- any window on the screen is an X-client !

Networking feature of X-Window system

- host runs an X-server
- any X-client executed on the host connects to X-server
- any X-client executed on a remote host can connect to the X-server
 - it displays its GUI on the remote server !
- client and server (may) run on different hosts

Seperation between where a program runs and where its display is!

X Window System X11 scenario



X Window System Some components

Display Manager

- displays the graphical login window ("login manager")
- after successfull authentication starts an x-session
- restarting the display manager (Ctrl+Alt+Backspace)
 - finishes all programs in the session (new login window)

X Window Manager

- provides the frame around a window with its functions
- responsible to move, resixe, minimize, maximize, close any window
- responsible for the pointing device input
- provides part of GUI: look and feel; lot of WM; grep for it

X terminal emulator

- a window that functions as a standard terminal
- xterm the first version; try, use: gnome-terminal, konsole

Desktop Systems Window Managers

Window Managers

- xdm X window manager
- kdm KDE window manager
- gdm GNOME window manager

Desktop systems

KDE, GNOME, Xfce, Icewm

Window Managers

 kde-window-manager, amiwm, evilwm, icewm, jwm, metacity olvwvm, sawfish, xfwm4

1 1st steps

2 Linux

3 Structure

4 Filesystem

5 Account

6 Permissions

7 File management

8 Editing

Károly Erdei — Debian/GNU Linux

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The Gnome Desktop, details Gnome desktop

Desktop Gnome

- Gnome is a big, powerful system (desktop environment)
- explore the Gnome menu Application tree
- explore the Gnome Application Debian tree
- creating desktop icons
- customizing the menu bar
 - adding new applications
 - adding new applets
 - virtual desktops
- learn the Gnome Menu:
 - System/Preferences
 - System/System Settings

My GNOME Screen



GNOME System Settings

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Date & Time	e Display	Font Installer	Input Actions	Keyboard & Mouse	Multimedia	

The Gnome Utilities Gparted

gparted - the GNOME partition editor

- it lists the connected hard disks
- you can initialize a hard disk or SSD
 - create a partition table
- creats partitions of different types
 - formats them
- deletes partitions (be careful)
- resize/move partition
- with a GUI

live demonstration of the use of gparted

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Thanks for your attention !