

Vistula, IT Faculty, 2015

# Operating Systems

Dmitry A. Zaitsev

<http://daze.ho.ua>

## **Lecture 3:**

# **Overall organization of OS Linux. Graphical User Interface**

# History of Unix/Linux

- AT&T Bell Labs, 1969 (Ken Thompson, Dennis Ritchie, Douglas McIlroy, and Joe Ossanna)
- BSD, Xenix, AIX, Solaris, SCO
- Open source, C
- Kernel, packages
- Networking
- Linus Torvalds, 1991
- Debian, Ubuntu, Fedora etc

# Linux structure

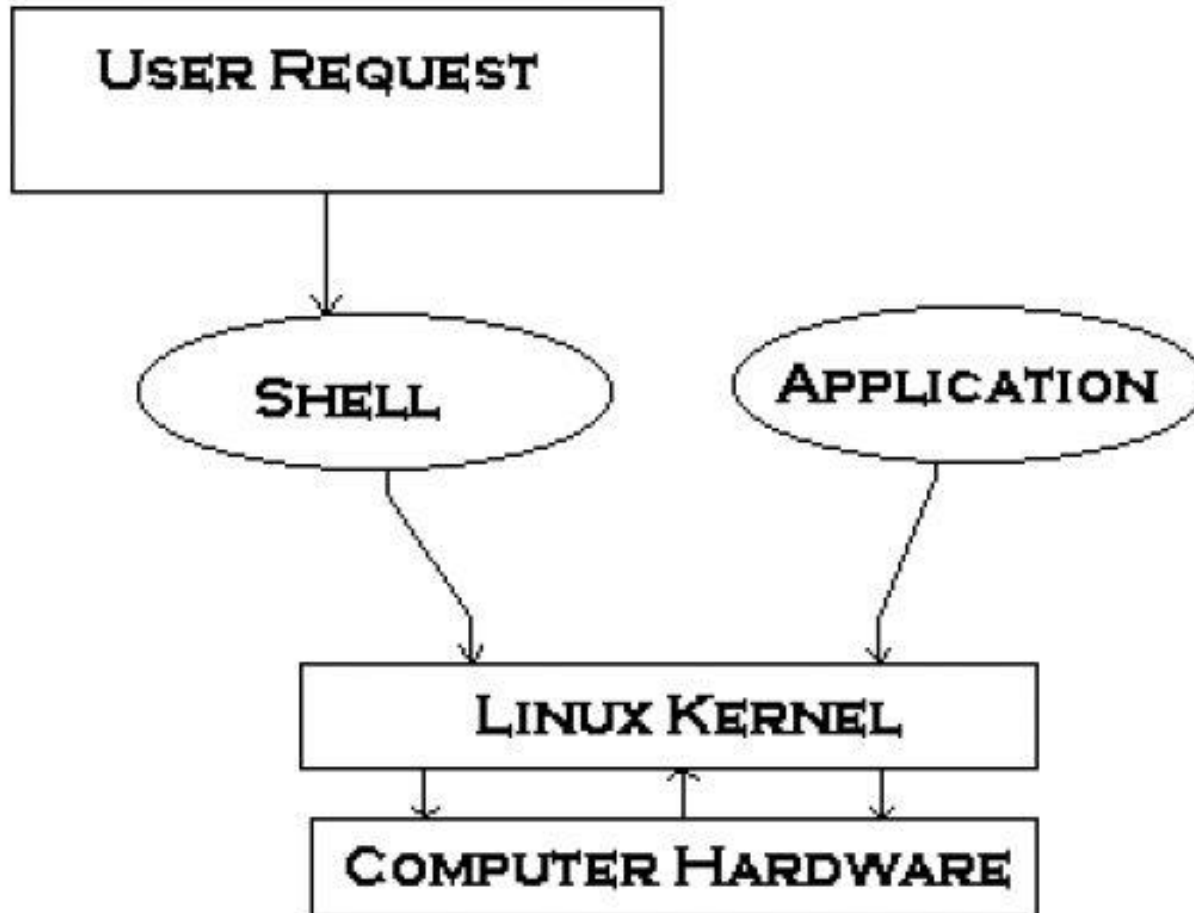
User mode	User applications	For example, <a href="#">bash</a> , <a href="#">LibreOffice</a> , <a href="#">Apache OpenOffice</a> , <a href="#">Blender</a> , <a href="#">0 A.D.</a> , <a href="#">Mozilla Firefox</a> , etc.				
	Low-level system components:	<b>System daemons:</b> <a href="#">systemd</a> , <a href="#">runit</a> , <a href="#">logind</a> , <a href="#">networkd</a> , <a href="#">soundd</a> ...	<b>Windowing system:</b> <a href="#">X11</a> , <a href="#">Wayland</a> , <a href="#">Mir</a> , <a href="#">SurfaceFlinger</a> ( <a href="#">Android</a> )	<b>Other libraries:</b> <a href="#">GTK+</a> , <a href="#">Qt</a> , <a href="#">EFL</a> , <a href="#">SDL</a> , <a href="#">SFML</a> , <a href="#">FLTK</a> , <a href="#">GNUstep</a> , etc.		<b>Graphics:</b> <a href="#">Mesa 3D</a> , <a href="#">AMD Catalyst</a> , ...
	<b>C standard library</b>	<a href="#">open()</a> , <a href="#">exec()</a> , <a href="#">sbrk()</a> , <a href="#">socket()</a> , <a href="#">fopen()</a> , <a href="#">calloc()</a> , ... (up to 2000 <a href="#">subroutines</a> ) <a href="#">glibc</a> aims to be <a href="#">POSIX/SUS</a> -compatible, <a href="#">uClibc</a> targets embedded systems, <a href="#">bionic</a> written for <a href="#">Android</a> , etc.				
Kernel mode	<b>Linux kernel</b>	<a href="#">stat</a> , <a href="#">splice</a> , <a href="#">dup</a> , <a href="#">read</a> , <a href="#">open</a> , <a href="#">ioctl</a> , <a href="#">write</a> , <a href="#">mmap</a> , <a href="#">close</a> , <a href="#">exit</a> , etc. (about 380 system calls) The Linux kernel <a href="#">System Call Interface</a> (SCI, aims to be <a href="#">POSIX/SUS</a> -compatible)				
		<b>Process scheduling subsystem</b>	<b>IPC subsystem</b>	<b>Memory management subsystem</b>	<b>Virtual files subsystem</b>	<b>Network subsystem</b>
		Other components: <a href="#">ALSA</a> , <a href="#">DRI</a> , <a href="#">evdev</a> , <a href="#">LVM</a> , <a href="#">device mapper</a> , <a href="#">Linux Network Scheduler</a> , <a href="#">Netfilter</a> Linux Security Modules: <a href="#">SELinux</a> , <a href="#">TOMOYO</a> , <a href="#">AppArmor</a> , <a href="#">Smack</a>				
Hardware ( <b>CPU</b> , <b>main memory</b> , <b>data storage devices</b> , etc.)						

# Linux boot process

BIOS	Basic Input/Output System executes MBR
MBR	Master Boot Record executes GRUB
GRUB	Grand Unified Bootloader executes Kernel
Kernel	Kernel executes /sbin/init
Init	Init executes runlevel programs
Runlevel	Runlevel programs are executed from /etc/rc.d/rc*.d/

[thegeekstuff.com](http://thegeekstuff.com)

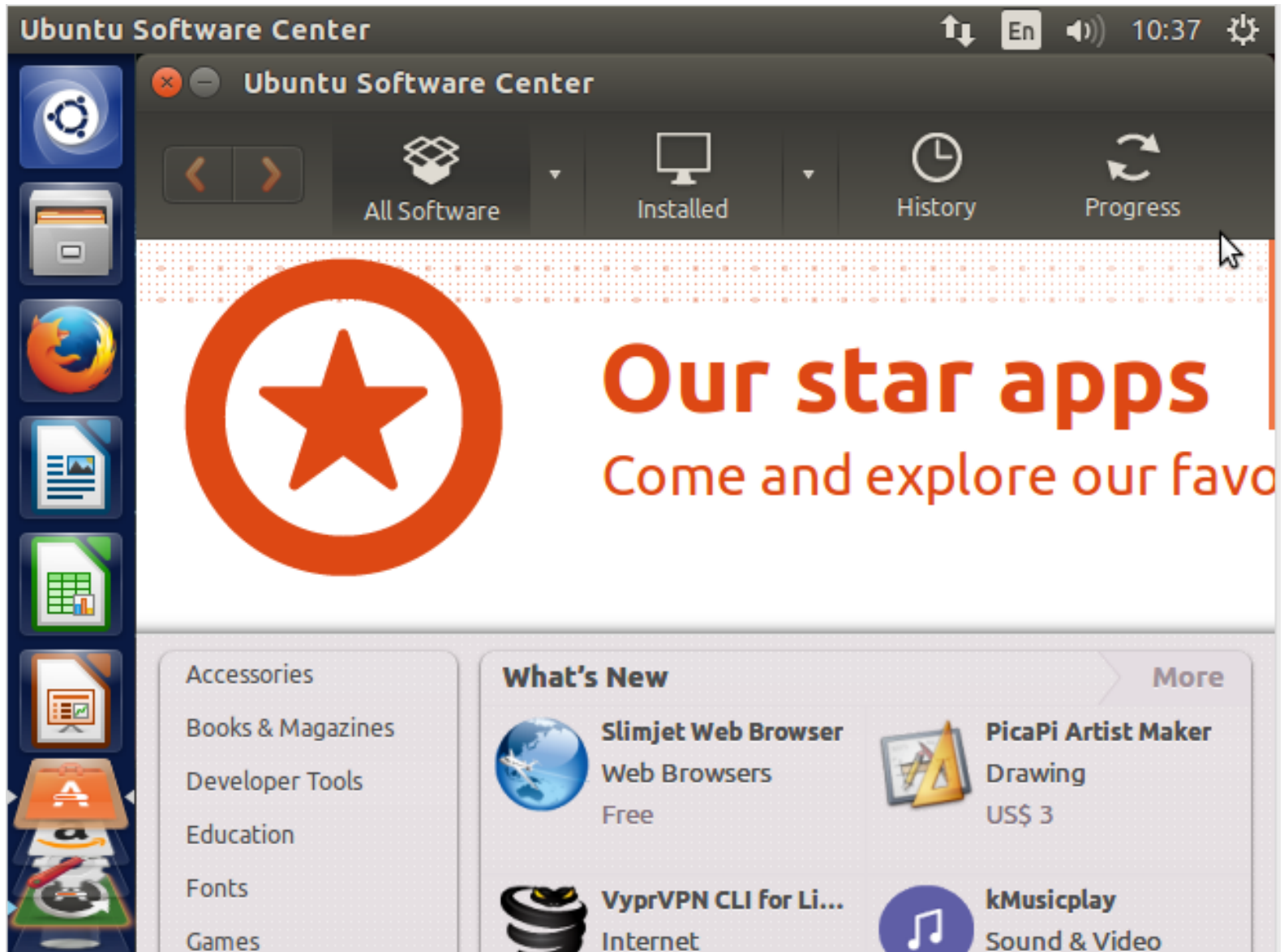
# Linux command line mode



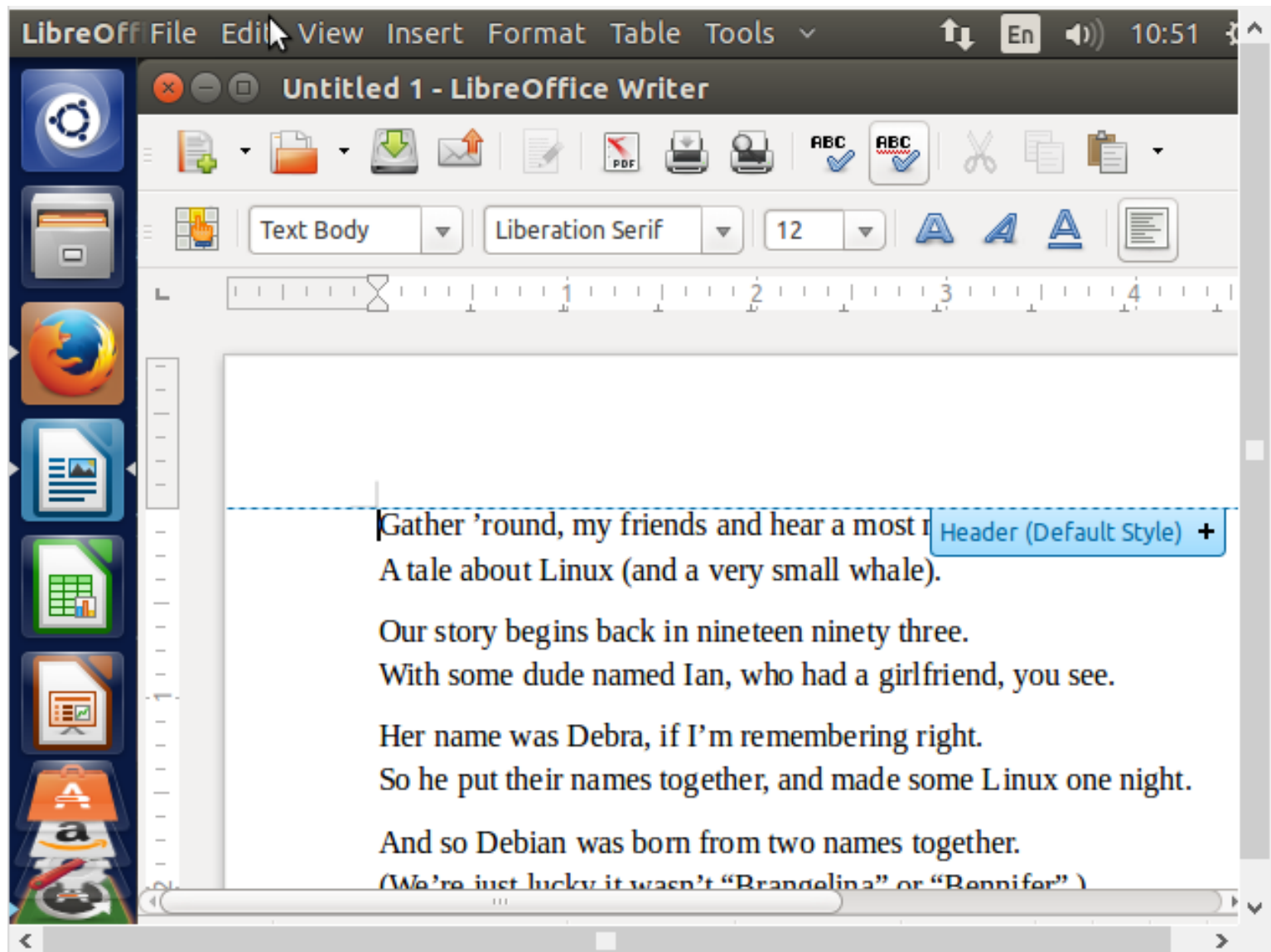
# Basic concepts

- Kernel, Daemons, and Applications
- Username, password, and group
- Terminals and Shells
- XWindow and Desktops

# Software center

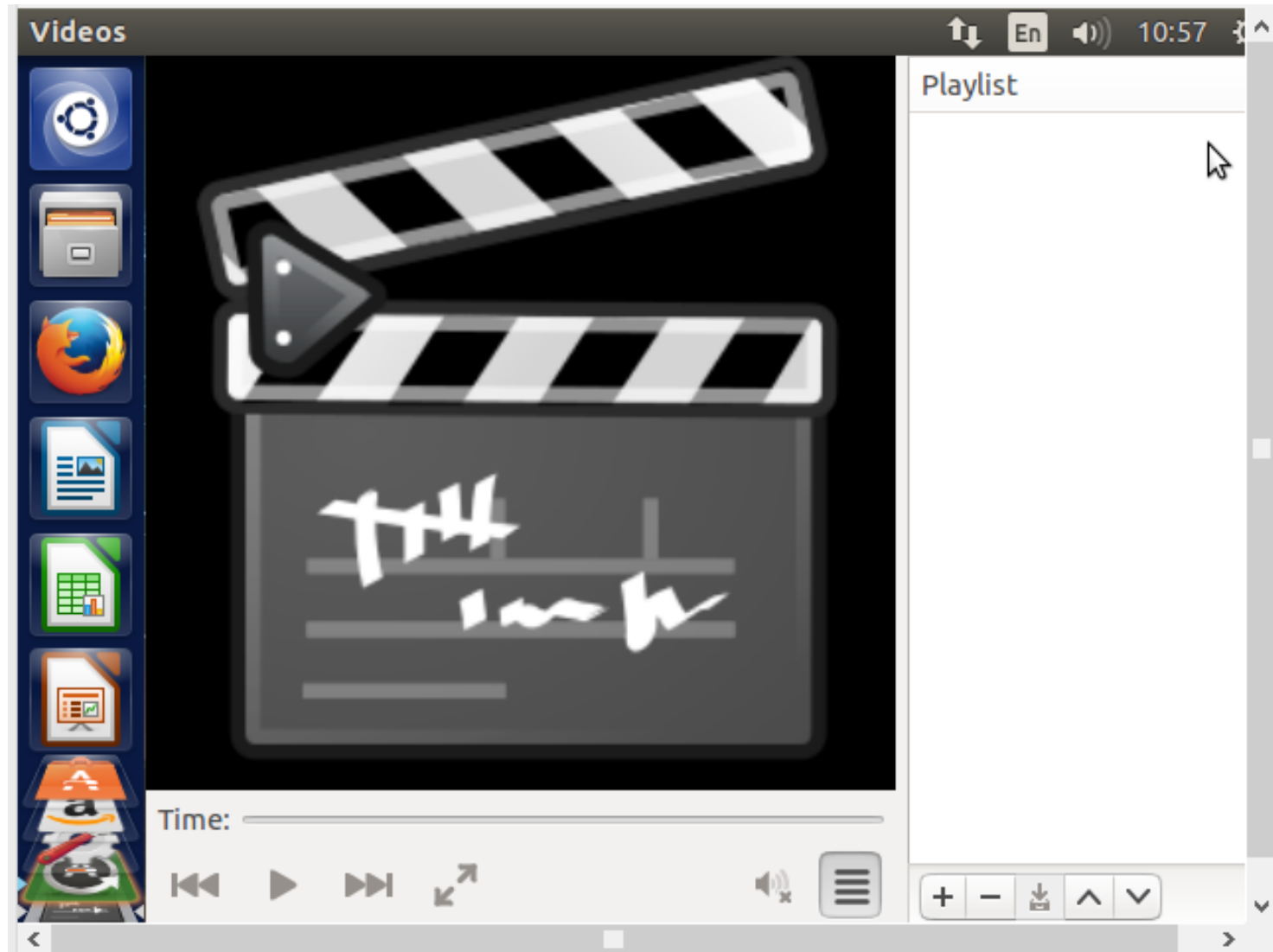


# Libre office

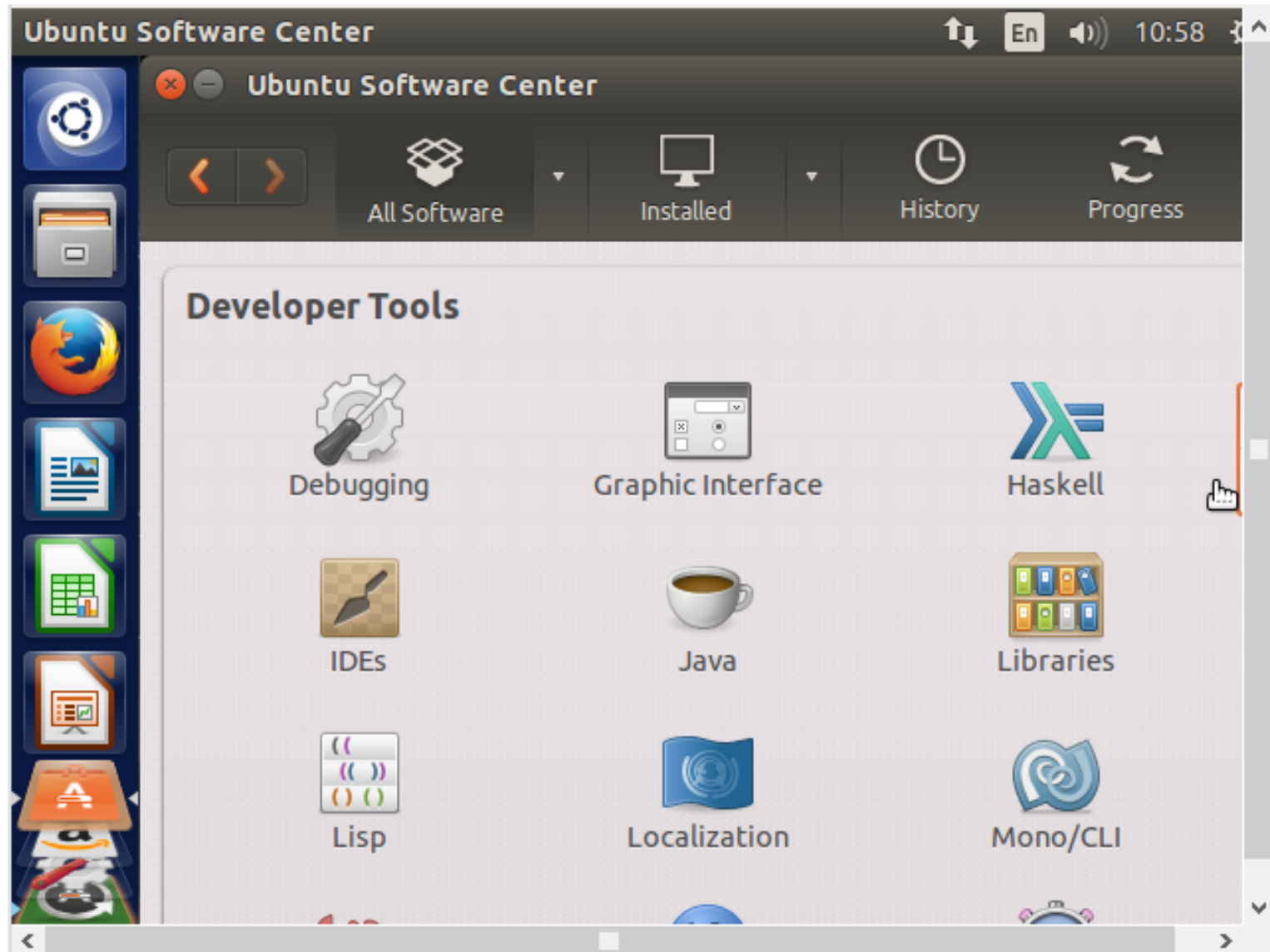




# Sound & Video



# Developer tools



# Installing ubuntu

- [www.ubuntu.com](http://www.ubuntu.com)
- Download a disc image
- Boot ubuntu image
- Live disc
- Install ubuntu
- Compress Windows partition
- Install & update