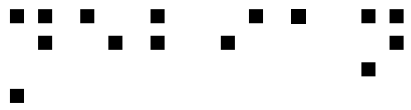


Supporting accessibility in your distribution

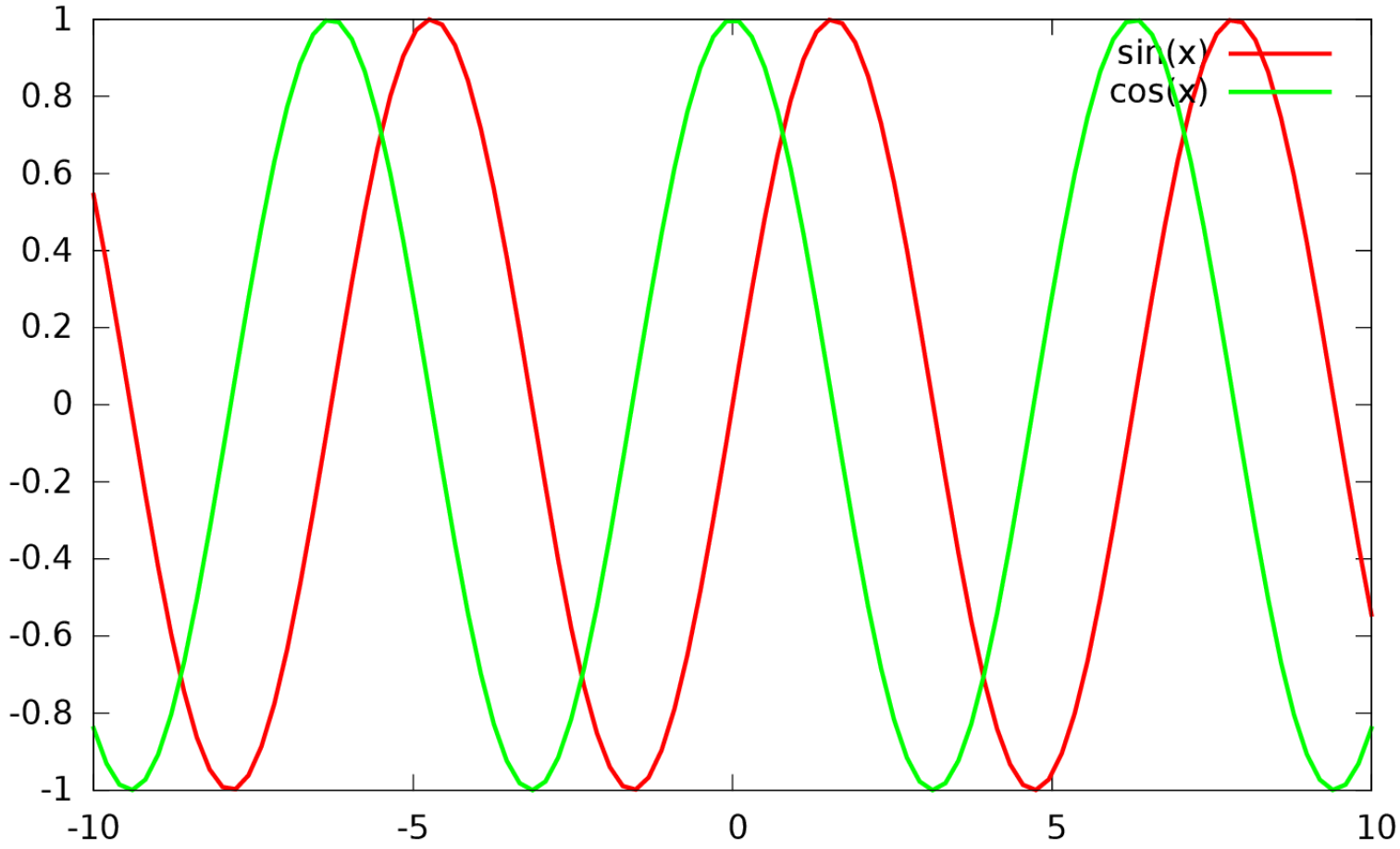
Some feedback from Debian

Samuel Thibault
Slides & stuff on http://brl.thefreecat.org/
http://liberte0.org/

Outline

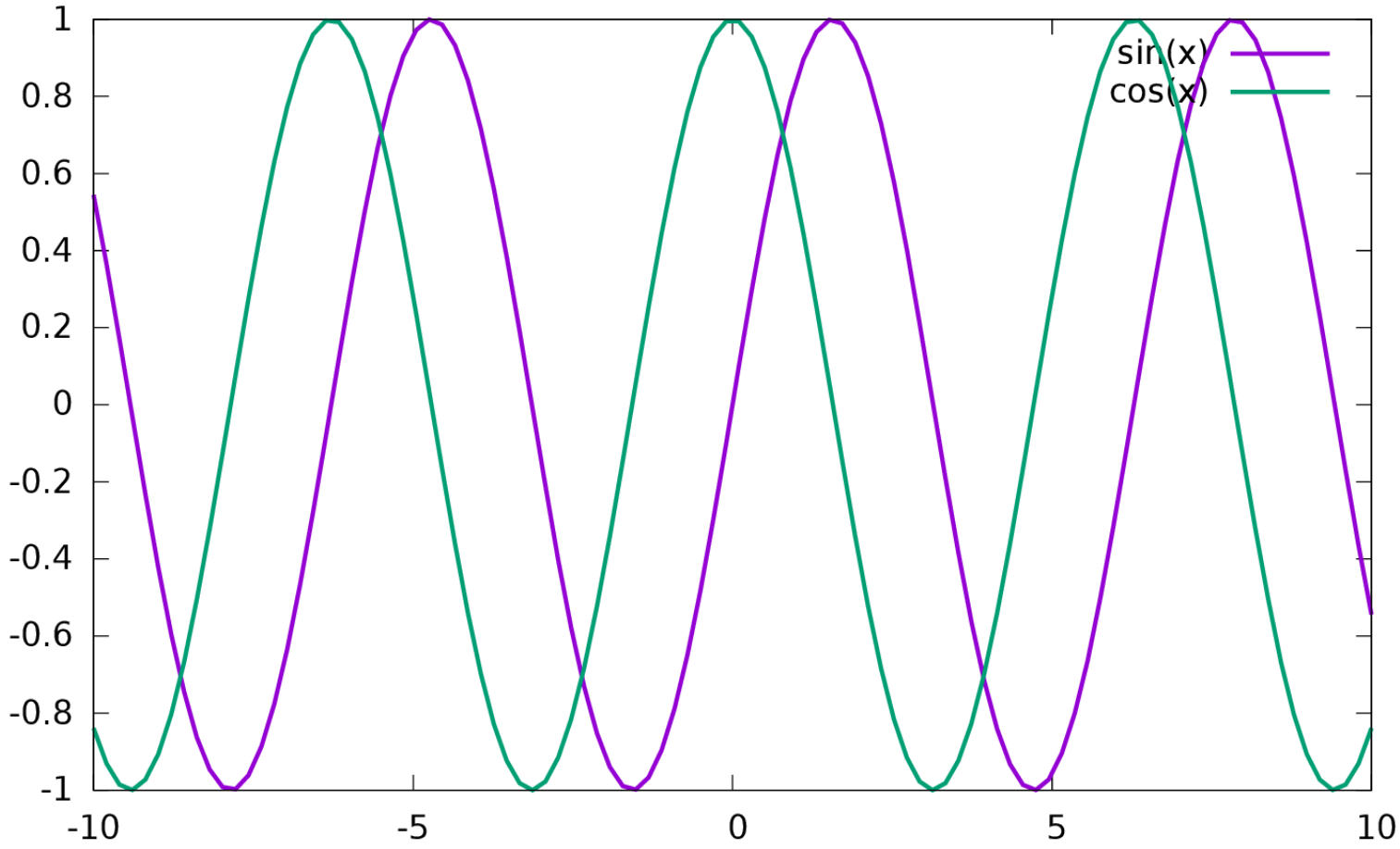
- Introduction to accessibility
- Hardware
- Software interfaces
- Discussion
- Guidelines

Gnuplot



Color blindness: 8% male, 0.5% female

Gnuplot 5!!



Color blindness: 8% male, 0.5% female

What is accessibility?

AKA a11y

Usable by people with specific needs

- Blind
- Low vision
- Deaf
- Colorblind
- One-handed
- Cognition (dyslexia, attention disorder, memory, ...)
- Motor disability (Parkinson, ...)
- Elderly

See Accessibility HOWTOs

- You

"Handicap" depends on the situation and is not necessarily permanent
10% handicapped – 20% limited

Hardware

Hardware

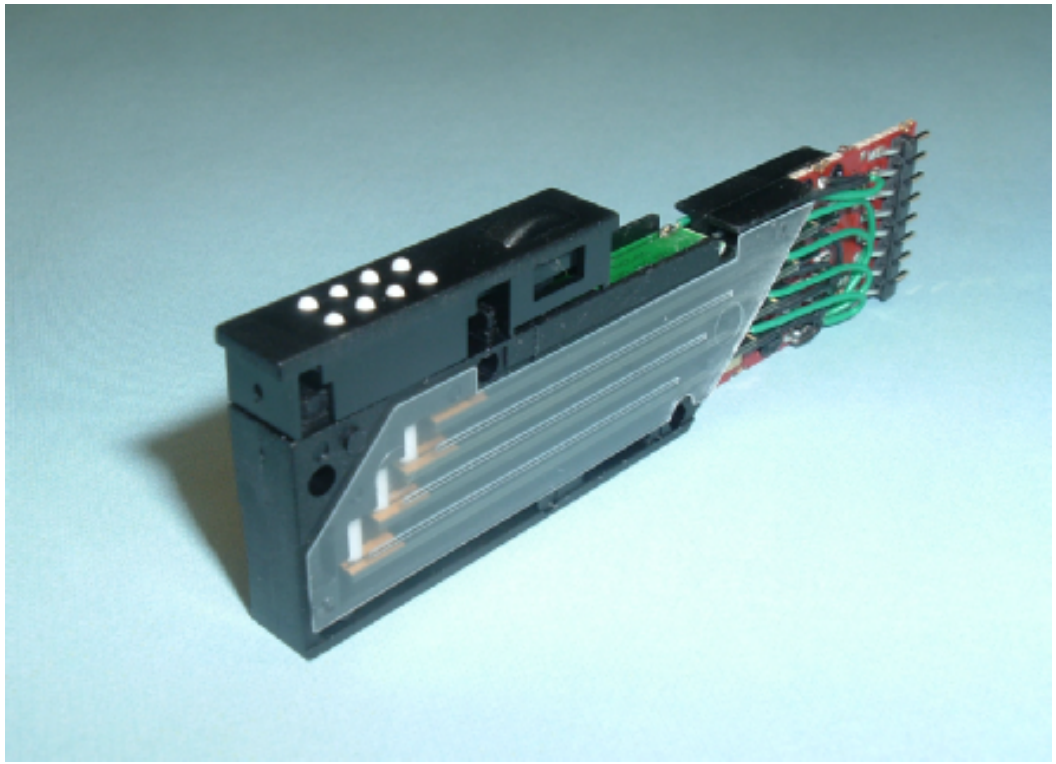
- Braille input/output
- Speech synthesis
- Joysticks
  - Basically replace mouse
- Press button
  - On-screen virtual keyboard
- Eye-tracking
- ...

⠠⠙⠕⠝⠞ ⠋⠕⠉⠥⠎ ⠕⠝ ⠕⠝⠑ ⠞⠑⠉⠓⠝⠕⠇⠕⠛⠽ Don't focus on one technology

Even for a given disability

- Braille is not perfect
  - A lot of blind people can't read braille
  - Braille devices are very expensive (several k€)
- Speech synthesis is not perfect
  - Noisy environments
  - Tedious for spelling issues

Piezo braille cell



- Usually 8 dots ~= one character
- Piezoelectric effect to move up/down

Braille devices

- Serial, USB, bluetooth connection
- 12 / 20 / 40 / 80 cells, price ~= 150*n €

Software interfaces

Why making GUI accessible?

(when textmode seems so easier to make accessible)

- A lot of stuff is not available in textmode
  - e.g. real javascript support
- Business applications
- Non-tech people need to get help from non-tech people around

Dedicated software?

- e.g. edbrowse, a blind-oriented editor/browser
- Generally a bad idea!
  - Oriented to just one disability
  - Lack of manpower
    - e.g. Web browser
      - javascript/flash/table/CSS support?
    - e.g. An office suite
      - MSOffice/OpenOffice compatibility?
  - Disabled & non-disabled working together
    - Better use the same software

➔ Better make **existing** applications accessible

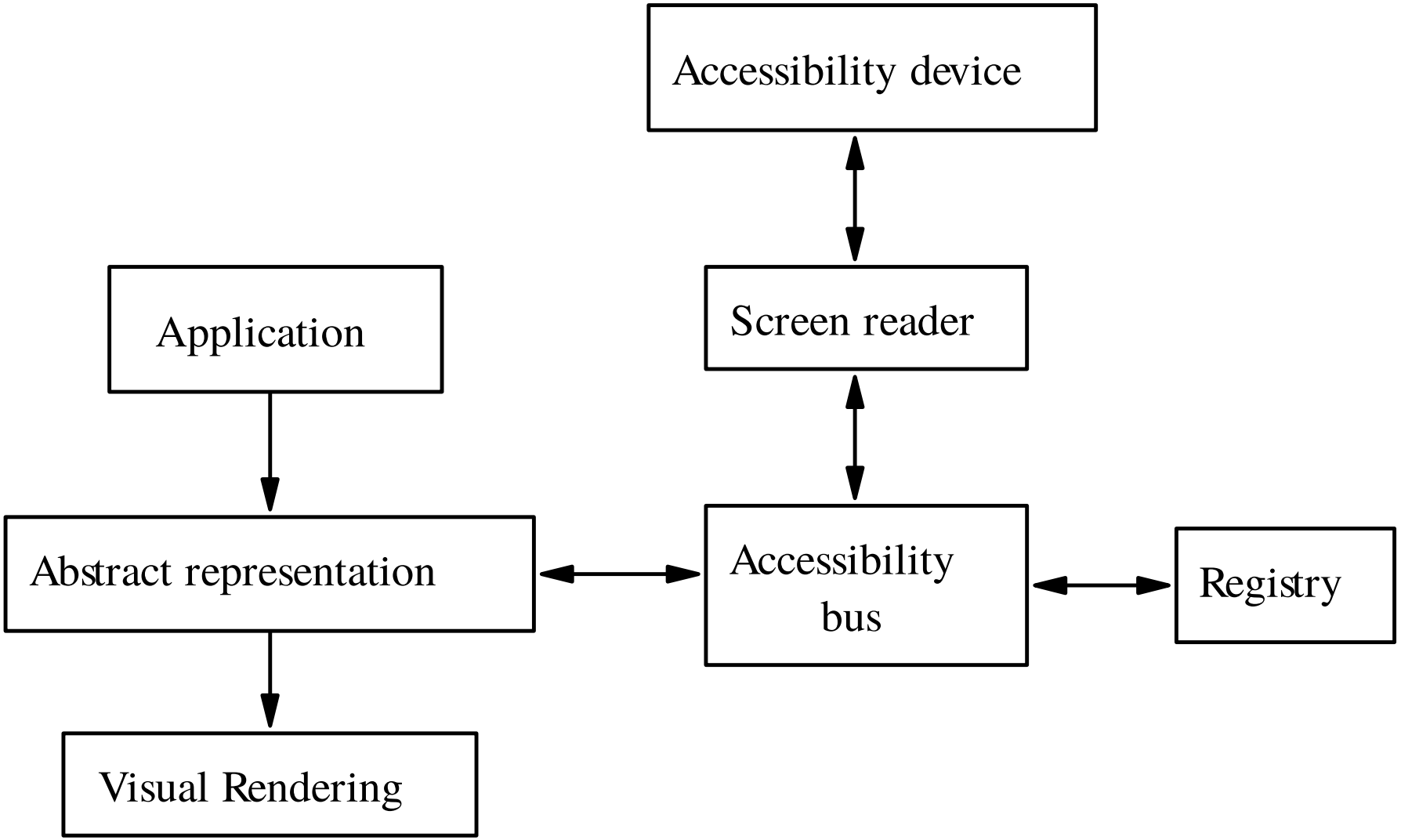
Design principles

- Same software, made accessible
  - Understand each other, get help, etc.
- Synchronized work
  - Just alternate input/output
  - Being able to work together
- Pervasive
  - Shouldn't have to ask for software installation / configuration

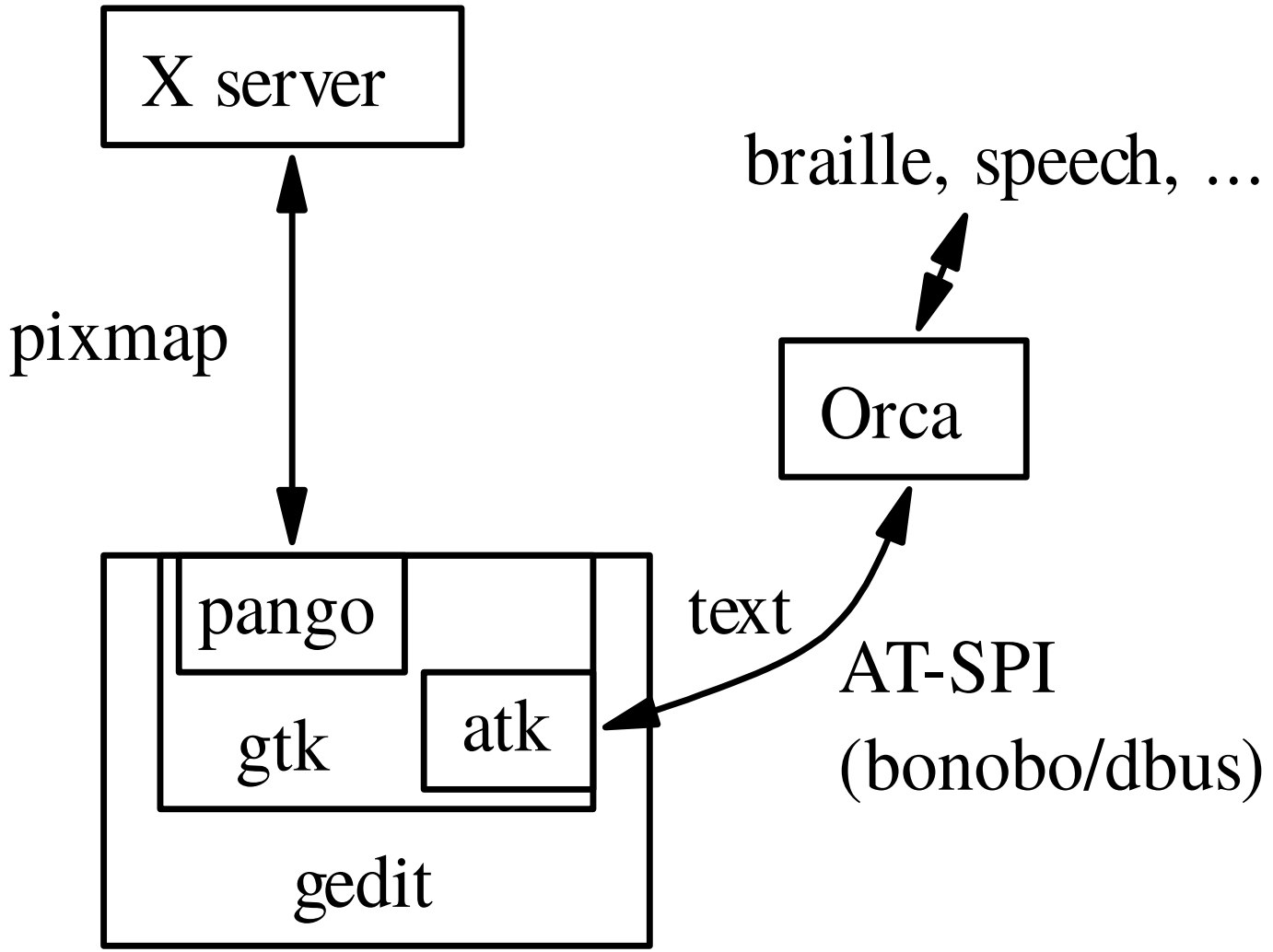
Status in a few words

- Text mode is generally quite well accessible
  - But not so well suited to beginners
- Gnome quite accessible
  - Gnome 3 was however almost a restart-from-scratch
- We're late compared to the Windows world
  - We started less than a dozen years ago
  - They started a couple of decades ago
- We're Stone Age compared to the Apple world
  - Really *good* and *integrated* support

Generic methodology



X accessibility, AT-SPI



Abstract representation

- Window
  - Vertical container
    - Menu bar
      - File Menu
        - Open Menu Item
        - …
      - ...
    - Horizontal container
      - Text area
      - Ok button

Technically speaking

- A lot of applications are already technically accessible
  - Console
  - GTK
  - KDE-Qt4/5 (“Real Soon Now”)
  - Acrobat Reader
- A lot are not
  - KDE-Qt3
  - Xt
  - Self-drawn (e.g. xpdf)

Text applications

- Usually work really great for braille output
- Always provide such equivalent of graphical applications, e.g. based on same shared lib
  - Useful for servers via ssh too!
- The default output of screen readers is what the cursor is on
  - Works great with shell, editor, etc.
  - Doesn't work so great with semigraphical apps

➔ Put the cursor appropriately!

  - Even when invisible, e.g. mutt, aumix

Graphical applications

- Design your application **without** gui in mind first
  - Logical order, just like CSS ☺
- Use standard widgets
  - e.g. *labeled* text fields
  - Avoid homemade widgets, or else implement atk yourself for them
  - Always provide alternative textual content for visual content
- Keep it simple!
  - Not only to make screen reading easier, but to make life easier for all users too!

Discussion

This is all about freedom #0

"The freedom to run the program, for any purpose"

What about being *able to use* the program?

- RMS said a11y was just a "desirable feature".
  - "Desirable" only, really?
- RMS said "this is free software, you can modify it" (freedom #1)
  - Can. Not. Happen.

⠠⠺⠓⠽ ⠊⠎ ⠁⠉⠉⠑⠎⠎⠊⠃⠊⠇⠊⠞⠽ ⠎⠕ ⠓⠁⠗⠙⠦ Why is accessibility so hard?

- Vint Cerf asked in Communications of the ACM November 2012:

  "Why is accessibility so hard?"

- Issues are mostly *not* technical, actually

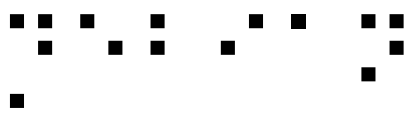
A question of priority

- Should be prioritized
  - Just like internationalization

A question of who doing it

- Concerns only a small fraction of population
  - Already a hard time using computers...
  - Almost nobody with both disabilities and programming skills
  - Almost nobody with awareness and programming skills either

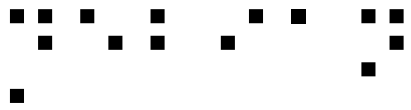
    → “This is free software, you can modify it” can not work.
- Support has to be integrated
  - Distributed among maintainers themselves
  - Not borne by the tiny a11y community



The specialized distribution trap

There shouldn't be specialized distributions

- Accessibility is orthogonal to any other concern
  - It's orthogonal to blends and tasks
  - Users should be able to choose blend&task
- All (music, medecine, teaching, …) distributions should be accessible
- Specialized distros tend to be specific
- Specialized distros are interesting testbeds, though



Graal: accessibility everywhere

- Using a computer at the library, the airport, the university practice room, etc.
  - First ask admin to install & configure software?!

→ Installed by default, ready for use

  - Requires very close integration
  - E.g. support in Debian Installer

So, what to do?

Software Distribution

Text-based distribution

Installation, configuration, ...

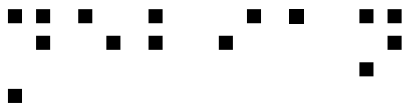
A plethora of software, often text equivalents

ogg123, mc, o3tohtml...

Please continue packaging those!

Accessibility-related packages

Brltty, AT-SPI, Orca, ...



Testing it

Make sure that it works

- In textmode
  - readers access VT & soundcard, before login
    - /dev/vcsa
  - they simulate keypresses
    - TIOCSTI
    - uinput

Testing it

In both dm then “joe” user GUI session

- at-spi-bus-launcher, at-spi2-registryd running as the proper user (dm then joe)
- session dbus gives user's AT-SPI bus address:

```
dbus-send --session --dest=org.a11y.Bus --print-reply
/org/a11y/bus org.a11y.Bus.GetAddress
```

- and `xprop -root AT_SPI_BUS` returns it
- “accerciser” tool seeing applications
- Orca runs and speaks

It needs to be enabled!

- GTK2

```
gconftool-2 --get
/desktop/gnome/applications/at/screen_reader_enabled
```

- GTK3 schema

```
gsettings get org.gnome.desktop.a11y.applications screen-
reader-enabled

gsettings get org.mate.interface accessibility
```

- KDE4/5

```
echo $QT_ACCESSIBILITY
```

- XFCE

```
Xfconf-query -c xfce4-session -p StartAssistiveTechnologies
```

More bits

Some applications need more

- GTK2: libgail module
- KDE4: qt-at-spi plugin
- Open/LibreOffice: GTK frontend
- Java: ~~Java-atk-wrapper~~
  - problem with multi-threading :(
- Typing from braille device: xbrlapi
- 32bit apps: 32bit equivalents!

How to bootstrap?

How to bootstrap?

Entering a cyber café, how to access computers?

- Autodetection
  - USB braille devices
- Shortcuts
  - Existing: XAccess (standard shortcut), Compiz zoom.
  - Speech synthesis?
- Accessibility panel
  - Needs to be accessible itself!

How to bootstrap? (2)

Accessibility installed by default

- You never know who will need it
  - At home
  - At workplace
  - At library
  - ...
- Ready to be easily enabled
- GPII: e.g. a USB key with a config file

How to bootstrap? (3)

Brand new computer, let's install Linux!

- Same issues and potential solutions
- Nowadays: “accessible” installation CDs
  - e.g. start speech synthesis by default
- But **all** installation CDs should be accessible!
  - Including e.g. all Debian forks for various uses
- Debian installer
  - USB braille auto-detection
  - High contrast or hardware speech by hand
  - Software speech synthesis (s <enter>)

Installer TODO

Details available on http://brl.thefreecat.org/

- Switch to text mode
  - and run brltty (udev script) or speakup
- Graphical accessibility
  - AT-SPI & Orca
- Color themes
- Enable same accessibility features at reboot!
- Being able to pass parameters for tuning them
  - Kernel cmdline or preseed

Has to be testable

By all maintainers

- Debian installer: wiki page documents testing
- Part of the regression tests
- No need for specific hardware
  - Qemu has virtual braille device

What about the bootloader?

Mostly not accessible nowadays, but improving

- Beep to tell that the menu is shown (done)
- Keyboard shortcuts (done)
- Beep to tell which item is selected
- Pre-synthesized ogg files saying entries
  - Sound drivers in the bootloader!?
- Screen reader
  - For the core, just another alternative terminal

About bugs

- Take users suggestions into consideration
  - E.g. bracketed links in text web browsers
- Be patient with disabled people
  - It's not easy for them to use your software
  - It's even more difficult for them to explain their problems in an understandable way
    - e.g. “braille doesn't follow”

➔ Discuss!

About bugs (2)

- Try to keep in mind their disability and their consequences
  - Yes, blind users don't care that the framebuffer doesn't show up properly!
- You could even contact your local institutes for disabled people, to discuss directly with users

More general ideas

- Getting people involved
  - Subscribe to foo-accessibility
- Make sure yourdistrib.org is accessible
- Add an “accessibility” chapter to the installation manual
- Add an “accessibility” chapter the Maintainers' guide
- Add an “accessibility” tag to bugs
  - Cc-ed to foo-accessibility

Discussions

Foo-accessibility mailing list

- Good to centralize user knowledge
- Shouldn't become a “side-park”
  - Discussions should happen on main lists
  - Cc foo-accessibility

Discussing is essential

- Find compromises so it can be mainstream
- Involve other maintainers
- Sustainability

Conclusion

- Quite a few of your distribution users need accessibility
- Right from the start
  - Yes, blind people do reinstall their PC at 2am too :)
  - No, they don't necessarily have a sighted sibling near them at 2am either :)
- In any situation
  - Library, practice rooms, etc.
- Please help us making accessibility **mainstream!**