

Ada in Debian GNU/Linux - slides suitable for a 50-minute presentation
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I originally wrote these slides for a 30-minute presentation that I gave at the Libre Software Meeting in Bordeaux in 2004, and modified them for a 50-minute presentation at FOSDEM 2006 in Brussels. I made sure these slides were reusable in the future.

Ada in Debian GNU/Linux

★ Why ?

- Contribute to free software
- Promote Ada to the Debian community
- Promote Debian to the Ada community
- Provide a development platform that is complete, integrated and consistent
- To have fun!

★ <http://www.debian.org>



debian

The Debian community

★ Debian is not a product, it is a community (1200 developers)

➔ Vendor independent

➔ The Debian Constitution brings developers together

➔ The distribution is 100% free and standards-compliant

➔ Anyone can contribute

➔ Stable releases are made “when they're ready”

➔ Emphasis on quality

- *testing* is at least as good as most other distributions's *stable* releases

- *stable* has long-term support (~3 years) by definition

★ 19% of GNU/Linux users (<http://counter.li.org>)

➔ These users tend to be sophisticated

➔ More like 40% if we count distributions derived from Debian

★ Mailing lists (<http://lists.debian.org>)

The Debian distribution

★ The largest GNU/Linux distribution

➤ Debian 5.0 “Lenny” consists of:

- 13200 source packages on 28 CD-ROMS or 4 DVDs
- 22100 binary packages on 31 binary CD-ROMs or 5 DVDs *per architecture*
- *(you don't have to download all of them! Just use the net-install CD-ROM)*

➤ 12 architectures supported: alpha, amd64, arm, armel, hppa, i386, ia64, mips, mipsel, powerpc, sparc, s390

➤ Additional unstable distributions:

- Debian GNU/kFreeBSD
- Debian GNU/Hurd
- Debian GNU/kNetBSD

★ All packages obey the same Debian Policy

★ Install once, upgrade many

How does Debian work?

- ★ The *unstable* distribution receives all new packages
 - ➔ Debian Developers may upload any package
 - ➔ Debian Maintainers may upload their own packages only
- ★ The *testing* distribution receives packages that:
 - ➔ stayed at least 10 days in *unstable* (5 or 2 days for important fixes)
 - ➔ have no release-critical bugs
 - ➔ depend on other packages that are already in *testing*
 - ➔ Scripts build *testing* daily
- ★ The *stable* distribution only receives critical fixes
 - ➔ Current stable is Debian 4.0 *Etch* (April 2007)
 - ➔ Next stable is 5.0 *Lenny*, scheduled for September 2008
 - Before you ask: it will be released *when it's ready*
 - Currently in testing: you can install it today anyway. Why wait?

Available Ada packages (1)

★ Development platform:

- ➔ **gnat** compiler (with **ASIS**), **gdb** debugger
- ➔ **gnat-gps** integrated development environment
- ➔ **ada-mode** for emacs
- ➔ **adabrowse** documentation system
- ➔ **adacontrol** ASIS-based style checker
- ➔ **libalog** logging framework
- ➔ **ahven** and **libaunit** unit testing frameworks
- ➔ **ghdl** VHDL compiler and simulator written in Ada

★ Documentation : Ada Reference Manual

Available Ada packages (2)

★ Libraries

- ➔ Operating System interface : **libflorist** (POSIX.5)
- ➔ Networking : **adacgi**, **libadsockets**, **libaws** (Ada Web Server)
- ➔ Graphical interfaces : **libgtkada2** (GTK+)
- ➔ Text-mode interfaces : **libtexttools**
- ➔ Data interchange : **libxmlada**
- ➔ Relational databases : **gnade** (GNU Ada Database Environment)
- ➔ Scientific plotting : **plplot-ada**
- ➔ Lexical analysis : **libopentoken**

★ 1.5 million lines of Ada, 296 MB installed

Versions of GNAT

- ★ GNAT GPL Edition from AdaCore

- once a year
- run-time library under pure GPL

- ★ GCC from the Free Software Foundation

- when it's ready
- run-time library under GNAT-Modified GPL

- ★ All versions have different ABIs, so are incompatible

- ★ Policy: use one version for all packages in Debian

- 3.0 *Woody*: GNAT 3.14p
- 3.1 *Sarge*: GNAT 3.15p
- 4.0 *Etch*: GCC 4.1
- 5.0 *Lenny*: GCC 4.3
- *Squeeze*: GCC 4.4?

- ★ Policy: backport fixes and maintain the chosen GNAT well

GCC vs. GNAT GPL

★ What is the GNAT-Modified GPL?

- Only affects the run-time library; the compiler has always been pure GPL.
- “Special exception” clause allows using the library in proprietary software
- Present in all public versions of GNAT until 3.15p
- Present in all versions of GNAT Pro
- Present in all versions of GCC
- Removed from GNAT GPL 2005 and subsequent Editions

```
-- GNAT is free software; you can redistribute it and/or modify it under --  
-- terms of the GNU General Public License as published by the Free Soft- --  
-- ware Foundation; either version 2, or (at your option) any later ver- --
```

```
[...]
```

```
-- As a special exception, if other files instantiate generics from this --  
-- unit, or you link this unit with other files to produce an executable, --  
-- this unit does not by itself cause the resulting executable to be --  
-- covered by the GNU General Public License. This exception does not --  
-- however invalidate any other reasons why the executable file might be --  
-- covered by the GNU Public License. --
```

Maintenance of GNAT (1)

- ★ Since July 2003

- ★ Bugs

- ➔ Use the Debian BTS as a public bug database on GNAT 3.15p
- ➔ Write test cases (~120 tests)
- ➔ Forward bug reports to GCC's bugzilla
- ➔ Backport fixes to GNAT 3.15p

- ★ libgnatvsn (GNAT Version and other internals)

- ➔ Build from the GNAT sources, share with ASIS, GLADE and others
- ➔ License: GNAT-Modified GPL

- ★ libgnatprj (GNAT Project Manager)

- ➔ Build from GNAT sources, share with ASIS, GLADE and others
- ➔ Link gnatmake et al dynamically instead of statically
- ➔ License: pure GPL (part of the compiler)

Maintenance of GNAT (2)

★ New in Debian 4.0 “Etch”:

- GCC 4.1 supports some Ada 2005 features
- Ada.Containers replace their ancestor, libcharles
- Support for amd64, powerpc64
- Support for mips, mipsel (thanks to the late Thiemo Seufer)
- Support for GNU/kFreeBSD on i386 and amd64 (thanks to Aurélien Jarno)

★ New in Debian 5.0 “Lenny”:

- GCC 4.3 supports most Ada 2005 features
- Setjump/Longjump (aka SJLJ) exception handling mechanism
- **-dbg** packages containing debugging symbols for shared libraries
- bug fixes backported from GCC 4.4 (thanks to Samuel Tardieu)

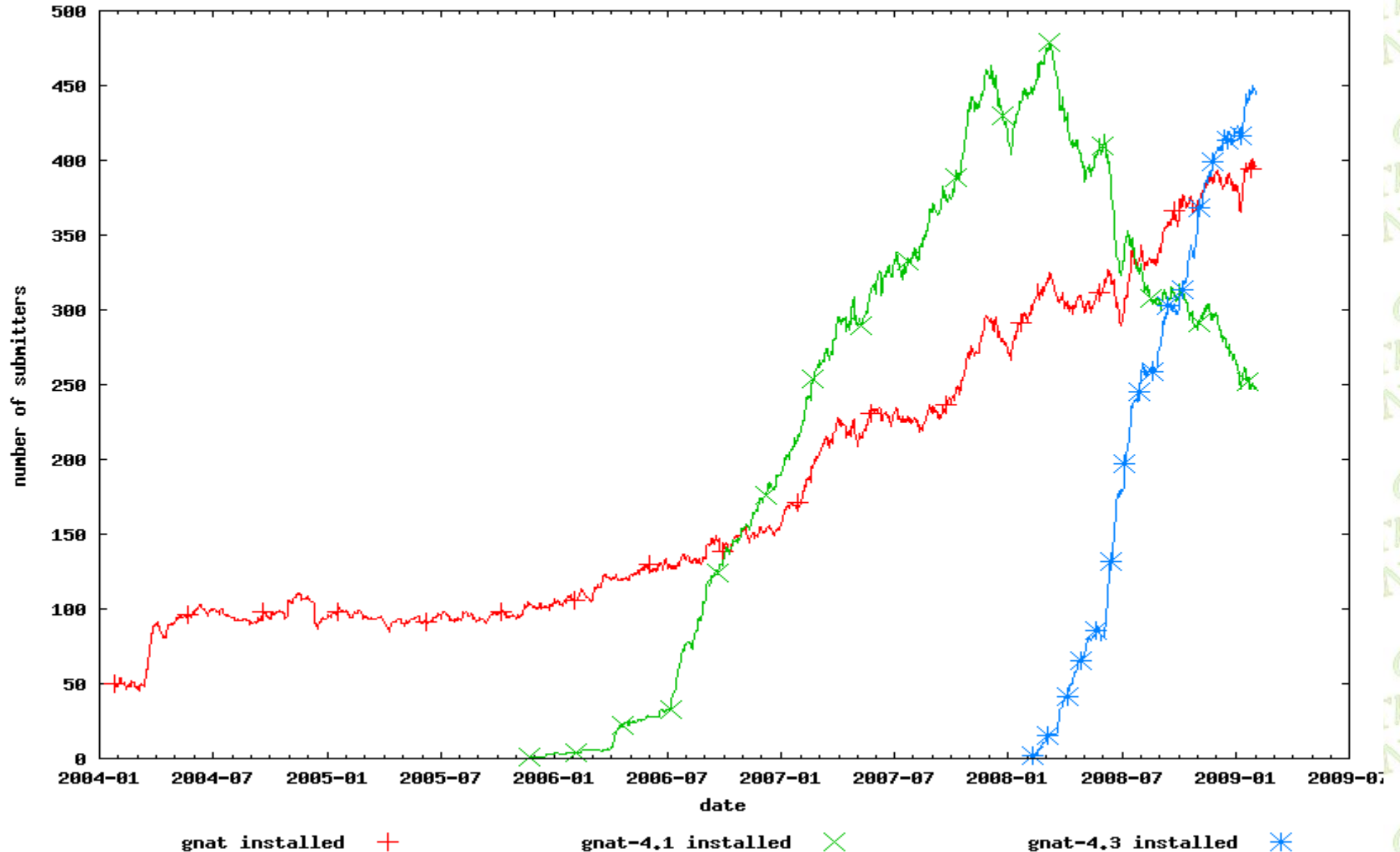
Maintenance of GNAT (3)

★ Planned for Debian *Squeeze* (mid-2010?)

- GCC 4.4 with multilib support
 - i.e. i386/amd64, sparc32/sparc64, etc.
- Better support for cross-compilers

My reward:

popcon graph



Libraries (1)

★ Goal : offer a consistent and integrated development platform

★ Consistent:

- All libraries are packaged according to the same principles
- 1 source package yields 3 or 4 binary packages:
- libLIBRARY1 (/usr/lib/libLIBRARY.so.1.2.3)
- libLIBRARY-dev
- libLIBRARY-dbg
- libLIBRARY-doc (optional)

★ Integrated:

- Three dependency kinds between packages
- *depends, recommends, suggests*

Libraries (2)

★ GNU Ada Environment Specification for file system hierarchy

- ➔ Sources : `/usr/share/ada/adainclude/LIBRARY/*.ad[bs]`
- ➔ ALI : `/usr/lib/ada/adalib/LIBRARY/*.ali`
- ➔ Project file : `/usr/share/ada/adalib/LIBRARY.gpr`
- ➔ Symlink to the shared library : `/usr/lib/libLIBRARY.so`
- ➔ Static library : `/usr/lib/libLIBRARY.a`
- ➔ All these files are in the -dev package

★ Documentation is in -dev or -doc

- ➔ `/usr/share/doc/libLIBRARY-doc/*`

★ Actual shared library is in the library package

- ➔ `/usr/lib/libLIBRARY.so.1.2.3`
- ➔ `/usr/lib/libLIBRARY.so.1 -> libLIBRARY.so.1.2.3`

Libraries (3)

```
with "gtkada2.gpr";
project Testgtk is
for Source_Dirs use (".", "opengl");
for Object_Dir use "obj";
for Exec_Dir use ".";
for Main use ("testgtk");
package Compiler is
  for Default_Switches ("Ada") use ("-g", "-O1", "-gnatafo");
end Compiler;
package Binder is
  for Default_Switches ("Ada") use ("-E");
end Binder;
package Linker is
  for Default_Switches ("Ada") use ("-lgtkada2_gl", "lw.o");
end Linker;
end Testgtk;
```

Libraries (4)

★ New in Debian 5.0 “Lenny”:

- -dbg packages containing debugging symbols for shared libraries
- “library project files” simplify usage even further

-- BEFORE:

```
with "LIBRARY.gpr";
project My_Program is
  for Source_Dirs use (".");
  for Object_Dir use (".");
  package Linker is
    for Default_Switches ("Ada")
      use (LIBRARY.Linker_Switches);
  end Linker;
end My_Program;
```

-- AFTER:

```
with "LIBRARY.gpr";
project My_Program is
  for Source_Dirs use (".");
  for Object_Dir use (".");
end My_Program;
```

Call for contributions

★ You can help!

★ Report bugs, provide patches

- ➔ GCC 4.4 with multilib support
- ➔ Make it easy to build cross-compilers

➔ Provide cross-compilers as prebuilt packages

★ Co-maintain existing packages

- ➔ I especially need a co-maintainer for gnat-gps
- ➔ All packaging scripts and patches are public
 - see <http://www.ada-france.org/article131.html>

★ Introduce new packages

- ➔ PolyORB, BUSH (BUsiness SHell), Booch Components, Ada Image Server, Adagio, Grace, AdaCL, Adasubst/Adadep, etc. etc.
- ➔ probably another million lines of Ada waiting to be packaged

How to become a Debian Developer

★ Identify yourself

- ➔ Generate a GPG key
- ➔ Have your key signed by a Debian Developer

★ Adopt one or more packages

★ Announce them on debian-mentors@lists.debian.org

★ Find a sponsor

- ➔ He will check your packages
- ➔ He will upload them to Debian

★ Apply and find an advocate

- ➔ The advocate recommends the applicant
- ➔ The applicant is accepted as a Debian Developer

Conclusions

★ Debian today offers

- ➔ the most complete Ada development environment
- ➔ the most complete Ada deployment environment

★ Promotion of Debian to the Ada community works

★ Promotion of Ada to the Debian community is in progress

★ References

- ➔ Debian Policy for Ada :
<http://people.debian.org/~lbrenta/debian-ada-policy.html>
- ➔ Debian : <http://www.debian.org>
- ➔ Newsgroups comp.lang.ada and fr.comp.lang.ada