Are distributions really boring and a solved problem?

Lucas Nussbaum

lucas@debian.org

Debian Project Leader

(Slides will be available)

Alternate title, briefly considered, but rejected (thankfully):

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Debian Jessie is released, now what?

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The truth about this talk:

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Hard problems I would like someone to solve :-)

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The problems that distros were trying to solve a decade ago largely are seen as not only solved, but kind of boring.

Matthew Miller (Fedora Project Leader)

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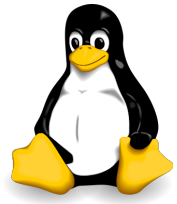
OK, which problems should we try to solve today?

Distributions in the Free Software world



Alice

Bob

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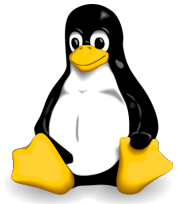

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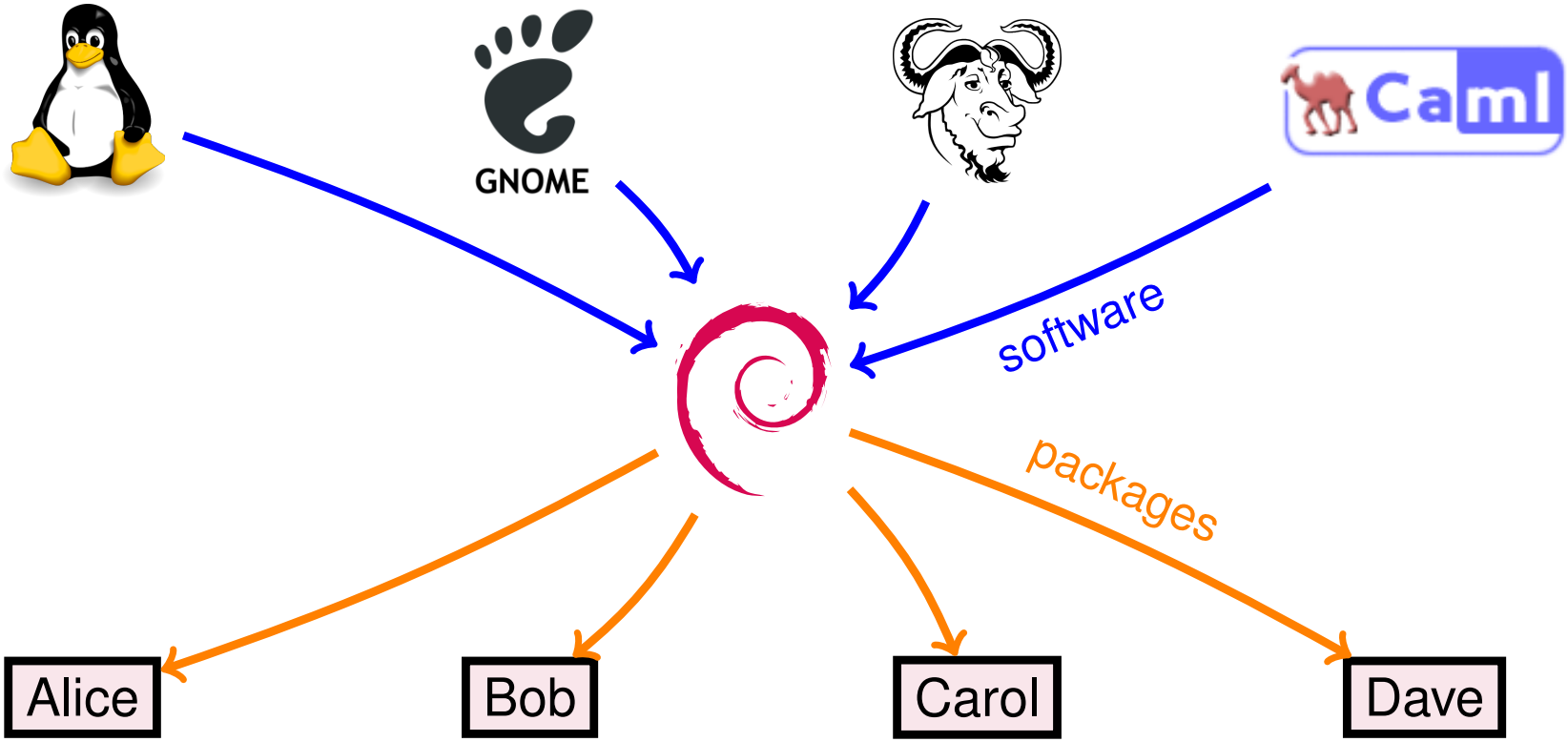

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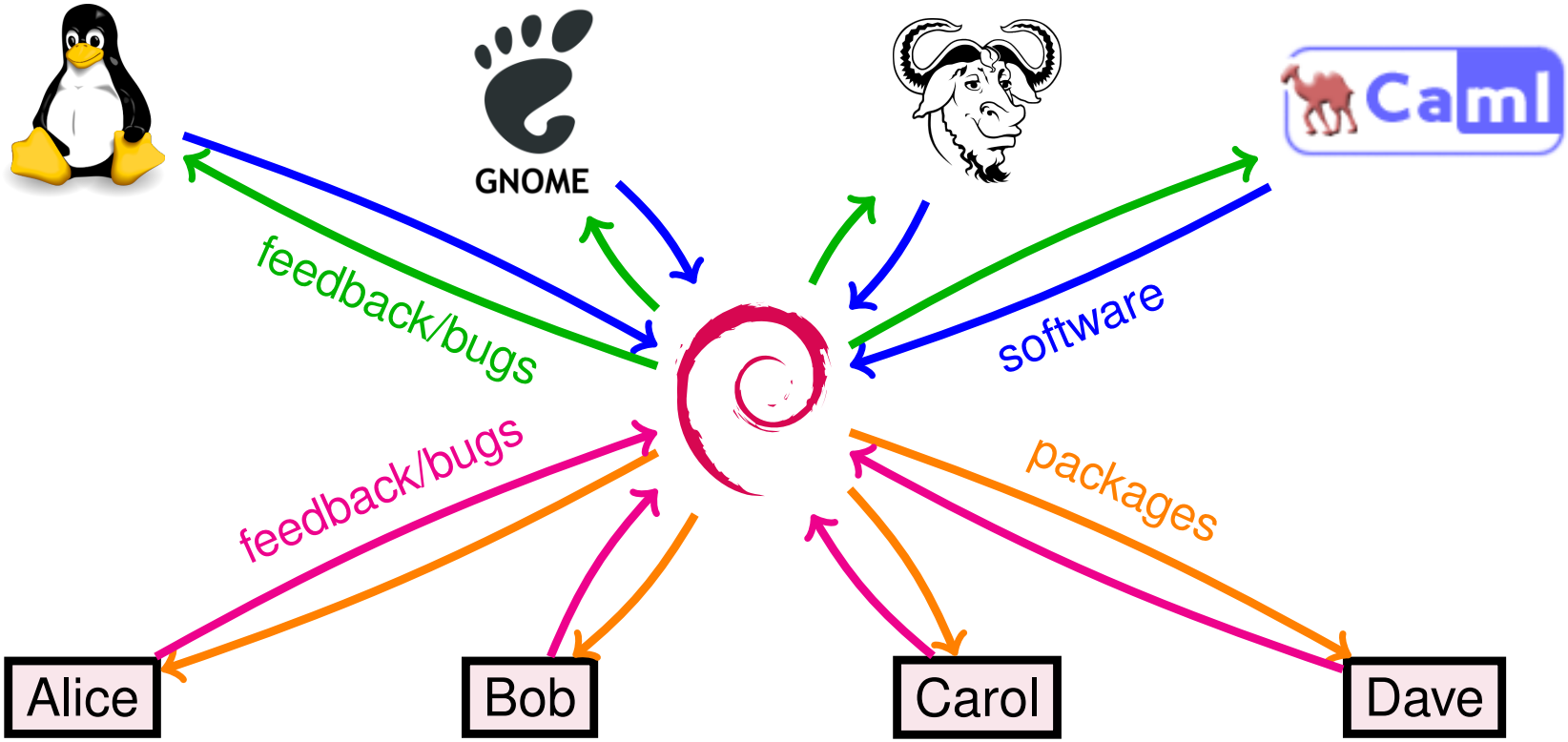

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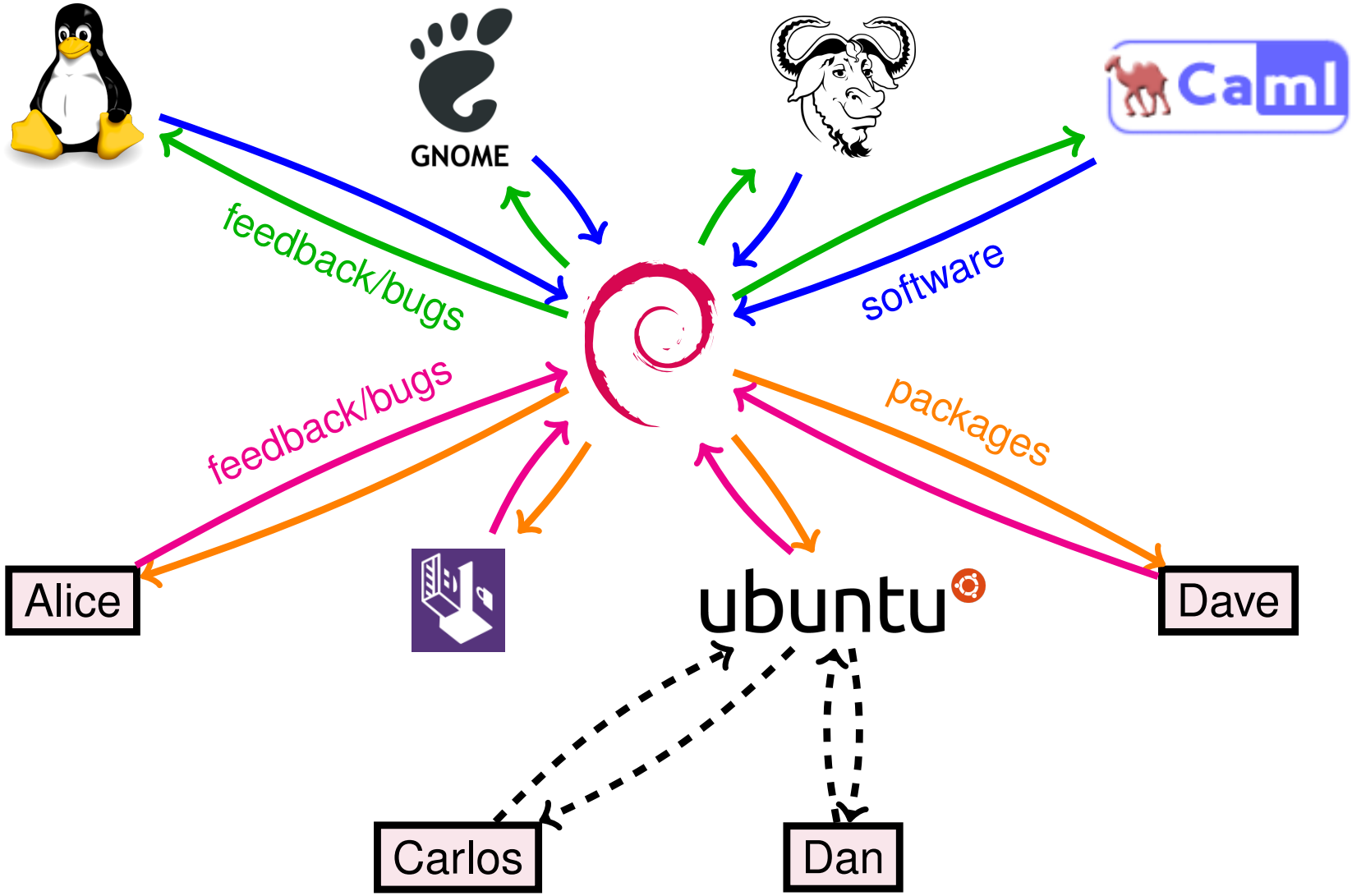

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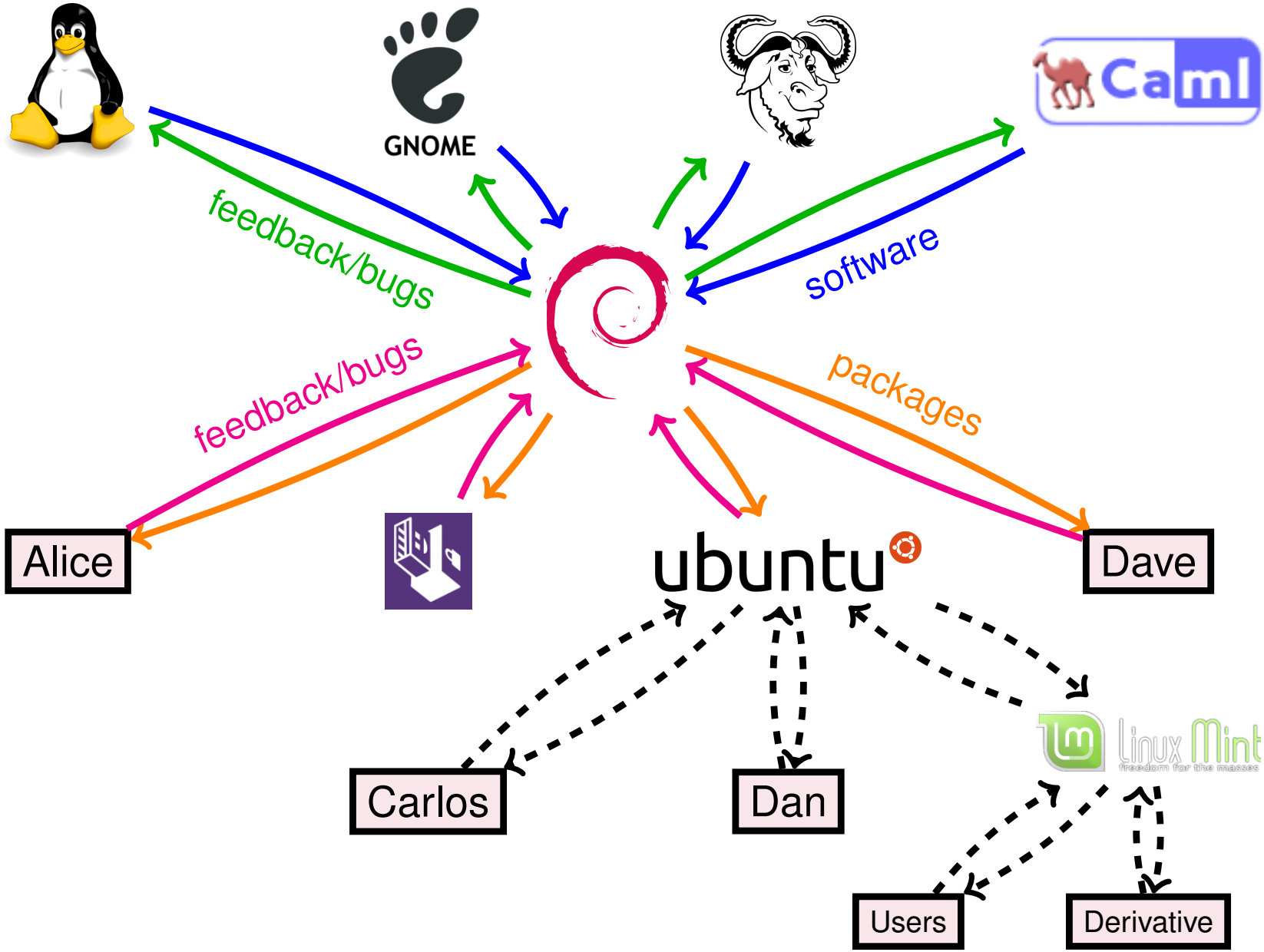

Distributions' role in Free Software

What we do well:

- Provide a unified interface for users to upstream projects: package managers, mirrors network
  - Hiding all the subtle, annoying differences
  - Supplementing upstreams, sometimes
- Integrate upstream projects, resolving incompatibilities
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Can we do better?

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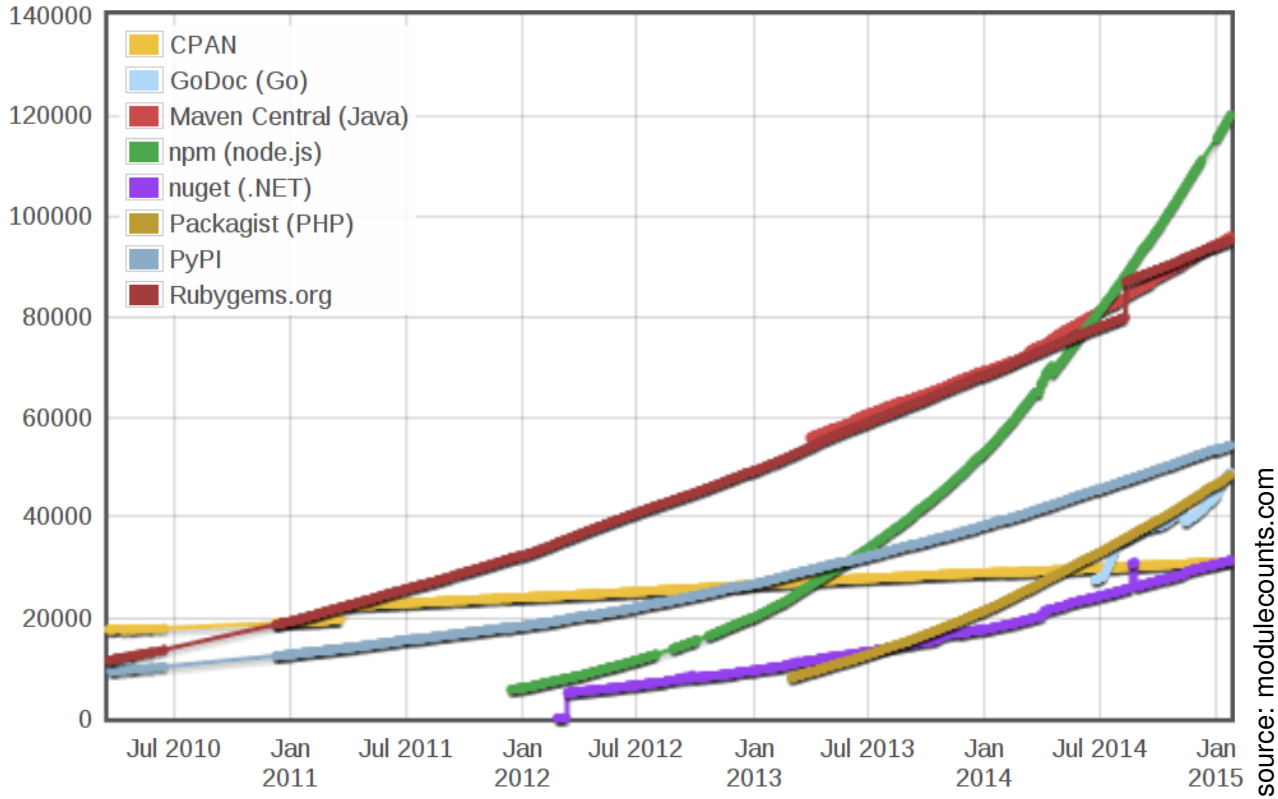

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How can aim for 100% coverage of our users' needs?

1. Get more efficient at packaging
2. Provide additional levels of support

Distributions contributors

- More devops than pure developers
  - Started by scratching an itch: ease installation of software
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  - Community that is excellent at:
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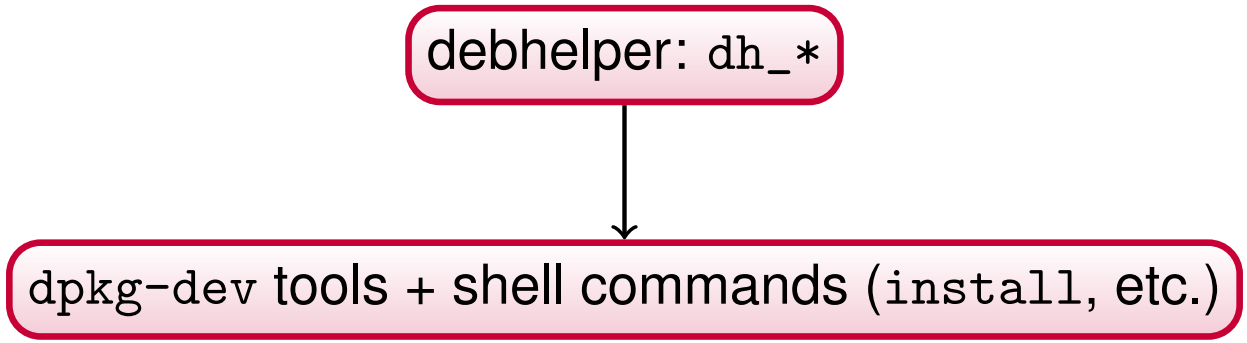
- That's also why it's harder to recruit compared to other projects
  - Mismatch with typical university curriculums

Debian packaging stack

`dpkg-dev` tools + shell commands (`install`, etc.)

Debian packaging stack



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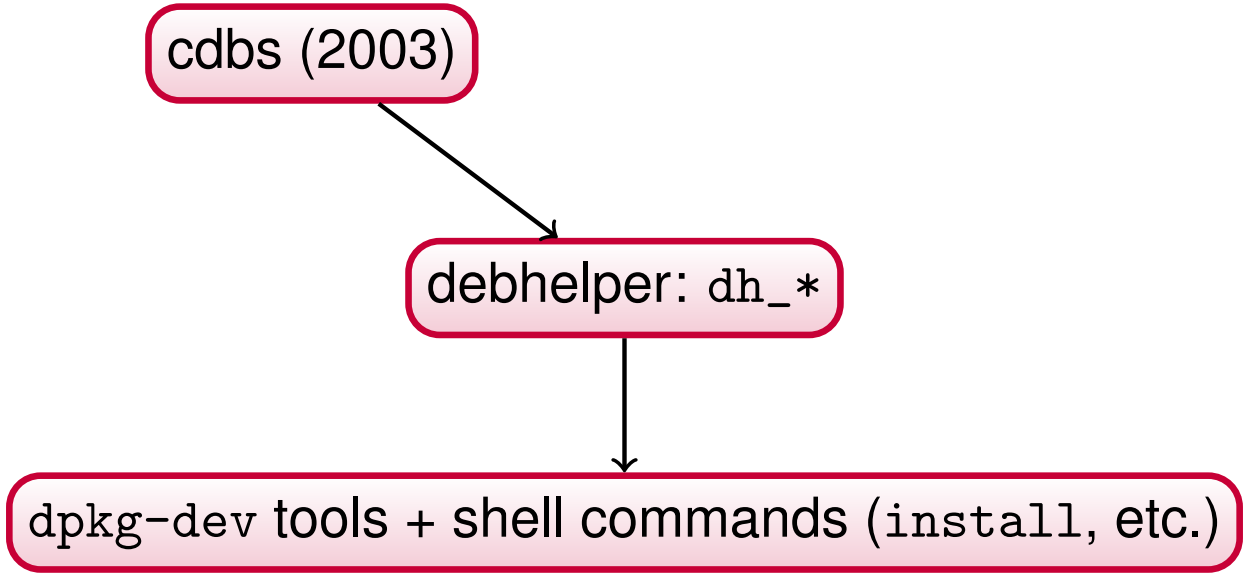

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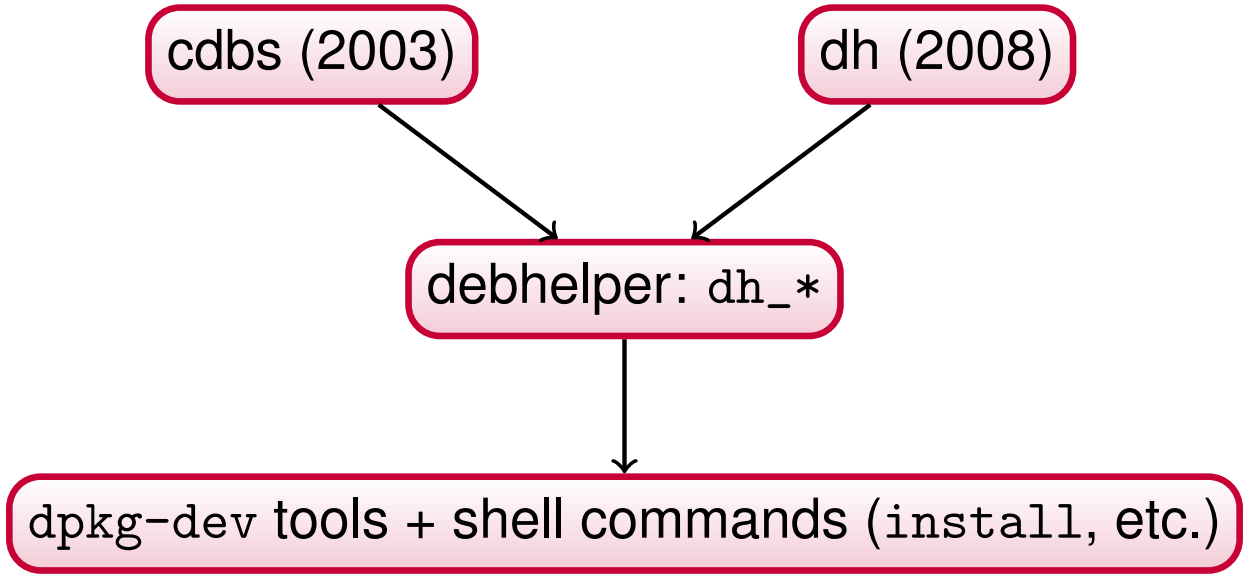

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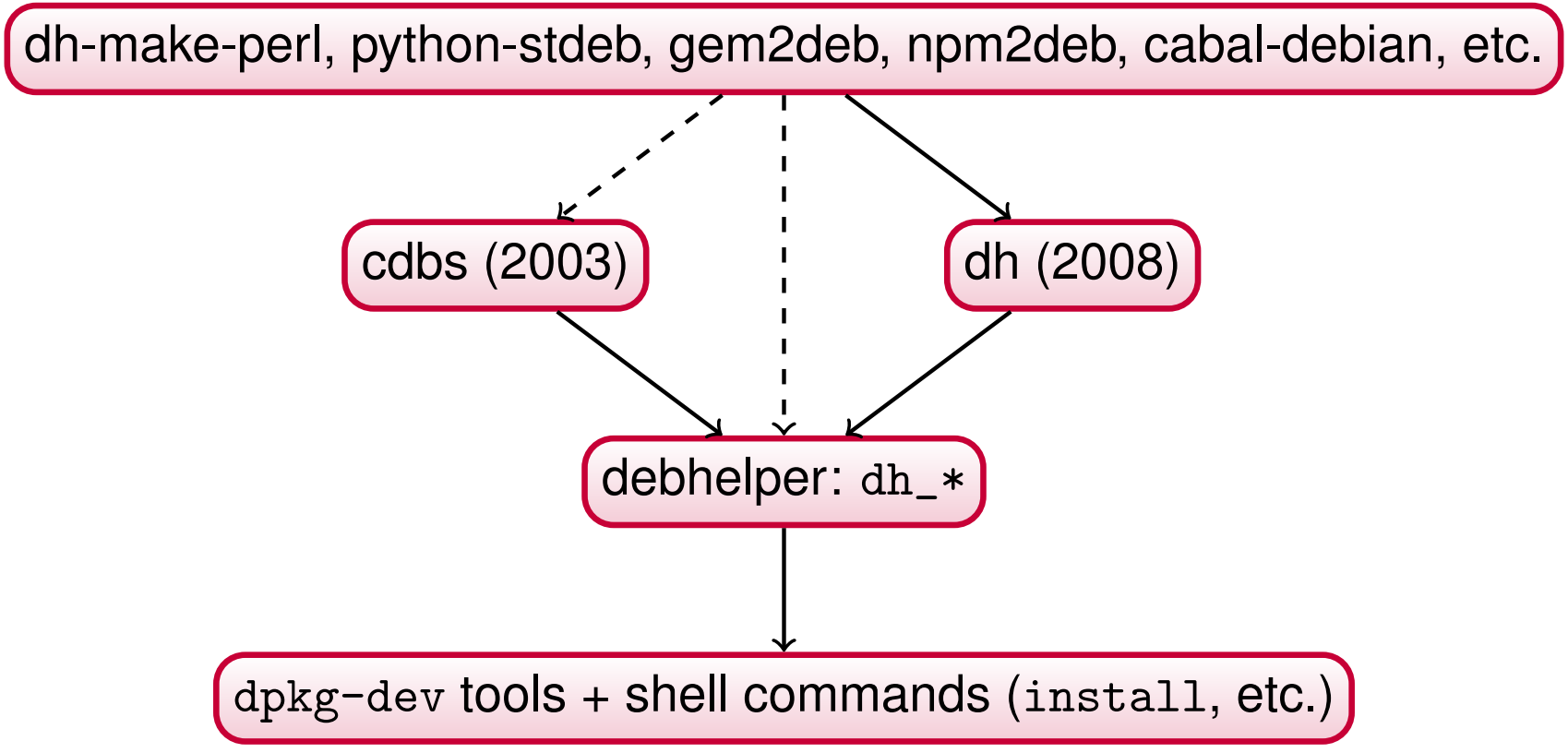

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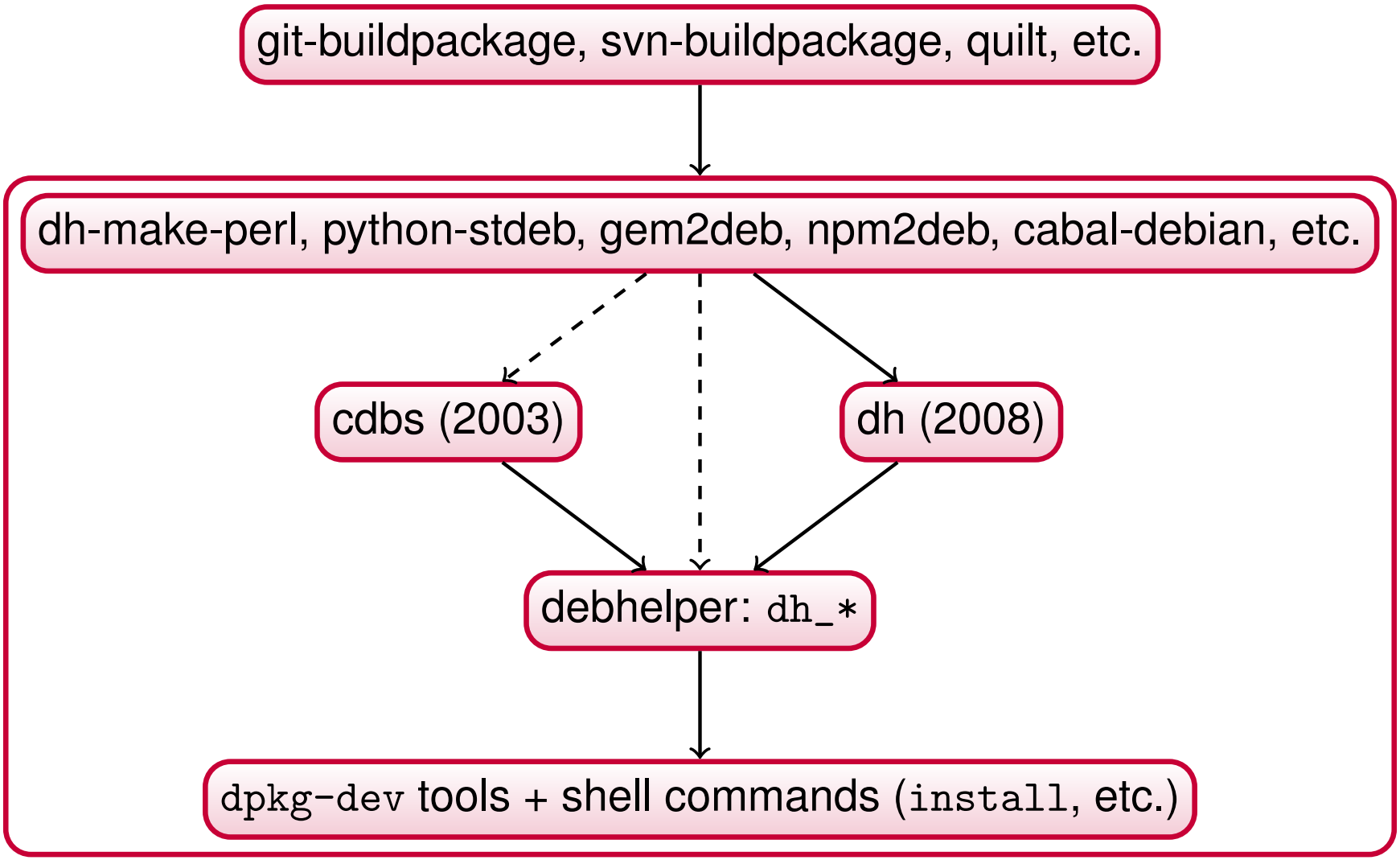
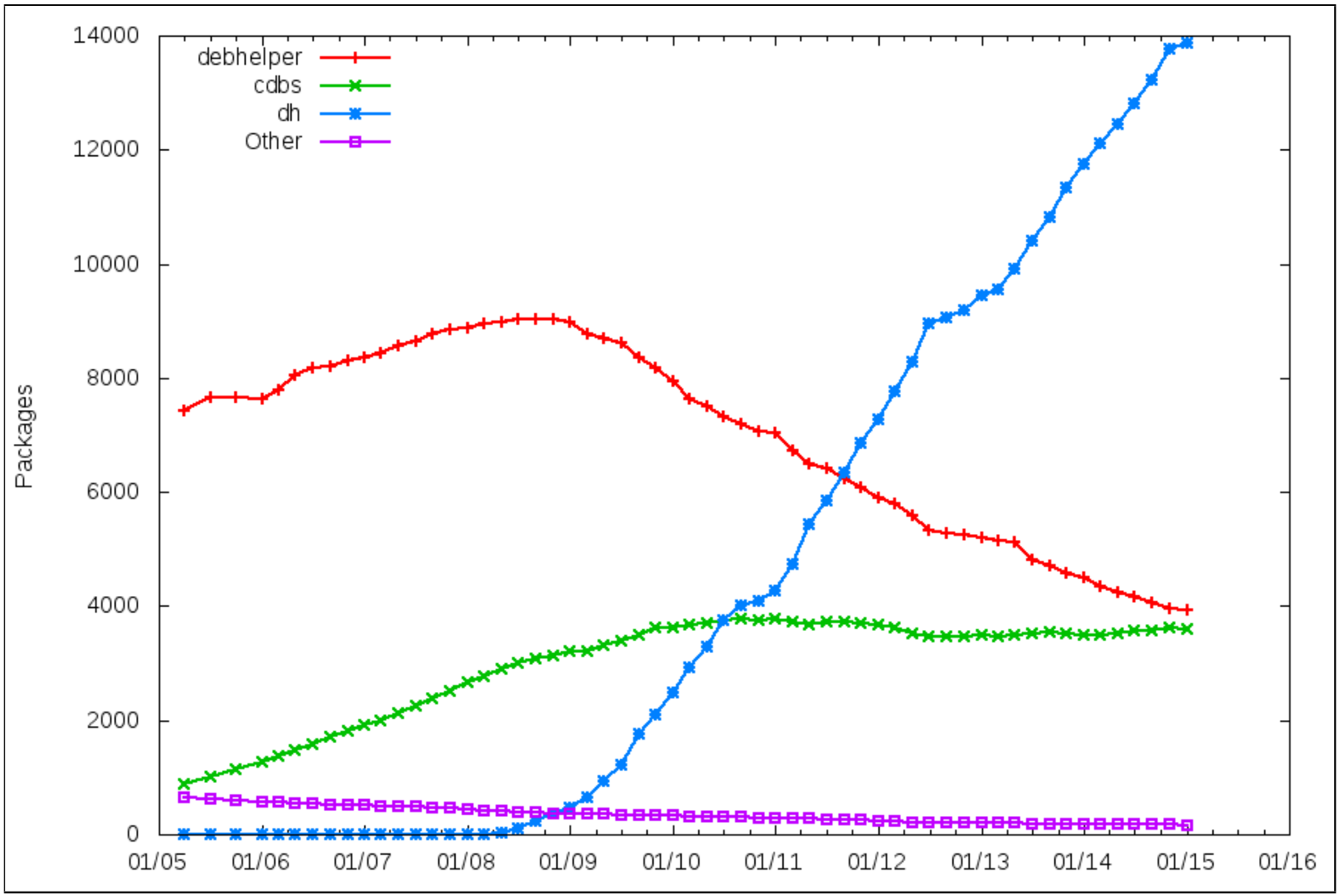


Debian packaging stack: problems

1. **We are not really moving away from deprecated tools**



Debian packaging stack: problems

2. **We are not hiding lower-level tools**

visible surface area: debhelper

-- --add-udeb --autodest --dbg-package --destdir --dirs-only --dpkg-gencontrol-params --dpkg-shlibdeps-params
--error-handler --fail-missing --filename --flavor --ignore --init-script --keep-debug --language --list-missing
--mainpackage --name --no-act --no-restart-on-upgrade --no-start --priority --remove-d --restart-after-upgrade
--sourcedir --version-info

-A -L -N -P -V -X -a -d -i -k -l -m -n -o -p -s -u -v -x

DH_ALWAYS_EXCLUDE DH_COMPAT DH_NO_ACT DH_OPTIONS DH_VERBOSE

138 items

debian/<package>.bug-control debian/<package>.bug-presubj debian/<package>.bug-script
debian/<package>.compress debian/<package>.cron.<type> debian/<package>.default debian/<package>.dirs
debian/<package>.docs debian/<package>.emacsen-install debian/<package>.emacsen-remove
debian/<package>.emacsen-startup debian/<package>.examples debian/<package>.files
debian/<package>.gconf-defaults debian/<package>.gconf-mandatory debian/<package>.if-<script>
debian/<package>.info debian/<package>.init debian/<package>.init.d debian/<package>.links
debian/<package>.lintian-overrides debian/<package>.logcheck.<type> debian/<package>.logrotate
debian/<package>.manpages debian/<package>.menu debian/<package>.modprobe debian/<package>.modules
debian/<package>.pam debian/<package>.ppp.ip-<script> debian/<package>.sharedmimeinfo
debian/<package>.suid debian/<package>.symbols debian/<package>.udev debian/<package>.wm
debian/compat

dh_bugfiles dh_builddeb dh_clean dh_compress dh_desktop dh_fixperms dh_gconf dh_gencontrol dh_icons
dh_install dh_installcatalogs dh_installchangelogs dh_installcron dh_installdeb dh_installdebconf dh_installdirs
dh_installdocs dh_installemacsen dh_installexamples dh_installifupdown dh_installinfo dh_installinit
dh_installlogcheck dh_installlogrotate dh_installman dh_installmanpages dh_installmenu dh_installmime
dh_installmodules dh_installpam dh_installppp dh_installudev dh_installwm dh_installxfonts dh_link dh_lintian
dh_listpackages dh_makeshlibs dh_md5sums dh_movefiles dh_perl dh_prep dh_python dh_scrollkeeper
dh_shlibdeps dh_strip dh_suidregister dh_testdir dh_testroot dh_testversion dh_undocumented dh_usrlocal

(Joey Hess at DebConf 9: *Not Your Grandpa's Debhelper*)

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visible surface area: CDBS

/usr/share/cdbs/1/class/ant.mk /usr/share/cdbs/1/class/autotools.mk /usr/share/cdbs/1/class/cmake.mk /usr/share/cdbs/1/class/docbookxml.mk
/usr/share/cdbs/1/class/gnome.mk /usr/share/cdbs/1/class/hbuild.mk /usr/share/cdbs/1/class/hlibrary.mk /usr/share/cdbs/1/class/kde.mk
/usr/share/cdbs/1/class/langcore.mk /usr/share/cdbs/1/class/makefile.mk /usr/share/cdbs/1/class/perlmodule.mk /usr/share/cdbs/1/class/python-distutils.mk
/usr/share/cdbs/1/class/qmake.mk /usr/share/cdbs/1/rules/buildcore.mk /usr/share/cdbs/1/rules/debhelper.mk /usr/share/cdbs/1/rules/dpatch.mk
/usr/share/cdbs/1/rules/patchsys-quilt.mk /usr/share/cdbs/1/rules/simple-patchsys.mk /usr/share/cdbs/1/rules/tarball.mk

ANT_ARGS ANT_ARGS_<package> ANT_HOME ANT_OPTS BUILD_GHC6 CABAL_PACKAGE CFLAGS CMAKE CXXFLAGS DEB_AC_AUX_DIR
DEB_ALL_PACKAGES DEB_ANT_BUILD_TARGET DEB_ANT_CHECK_TARGET DEB_ANT_CLEAN_TARGET DEB_ANT_INSTALL_TARGET DEB_ARCH
DEB_ARCH_PACKAGES DEB_AUTO_UPDATE_ACLOCAL DEB_AUTO_UPDATE_AUTOCONF DEB_AUTO_UPDATE_AUTOHEADER
DEB_AUTO_UPDATE_AUTOMAKE DEB_AUTO_UPDATE_DEBIAN_CONTROL DEB_AUTO_UPDATE_LIBTOOL DEB_BUILDDIR
DEB_BUILD_DEPENDENCIES DEB_BUILD_MAKE_TARGET DEB_CLASSPATH DEB_CLEAN_ARGS DEB_CLEAN_MAKE_TARGET
DEB_CMAKE_INSTALL_PREFIX DEB_CMAKE_NORMAL_ARGS DEB_COMPLETE_EXCLUDE DEB_CONFIGURE_EXTRA_FLAGS
DEB_CONFIGURE_INCLUDEDIR DEB_CONFIGURE_INFODIR DEB_CONFIGURE_INVOKE DEB_CONFIGURE_LIBEXECDIR
DEB_CONFIGURE_LOCALSTATEDIR DEB_CONFIGURE_MANDIR DEB_CONFIGURE_NORMAL_ARGS DEB_CONFIGURE_PREFIX
DEB_CONFIGURE_SCRIPT DEB_CONFIGURE_SCRIPT_ENV DEB_CONFIGURE_SYSCONFDIR DEB_DESTDIR DEB_DH_ALWAYS_EXCLUDE
DEB_DH_DESKTOP_ARGS DEB_DH_GCONF_ARGS DEB_DH_GENCONTROL_ARGS DEB_DH_GENCONTROL_ARGS_<package>
DEB_DH_GENCONTROL_ARGS_ALL DEB_DH_ICONS_ARGS DEB_DH_MAKESHLIBS_ARGS DEB_DH_MAKESHLIBS_ARGS_<package>
DEB_DH_MAKESHLIBS_ARGS_ALL DEB_DH_PERL_ARGS DEB_DH_PREP DEB_DH_SCROLLKEEPER_ARGS DEB_DH_SHLIBDEPS_ARGS
DEB_DH_SHLIBDEPS_ARGS_<package> DEB_DH_SHLIBDEPS_ARGS_ALL DEB_FIXPERMS_EXCLUDE DEB_HADDOCK_DIR
DEB_HADDOCK_HTML_DIR DEB_HBUILD_INVOKE DEB_HOST_ARCH_CPU DEB_HOST_ARCH_OS DEB_INDEP_PACKAGES
DEB_INSTALL_CHANGELOGS_ALL DEB_INSTALL_DIRS_<package> DEB_INSTALL_DIRS_ALL DEB_INSTALL_DOCS_<package>
DEB_INSTALL_DOCS_ALL DEB_ISNATIVE DEB_JARS DEB_KDE_APIDOX DEB_KDE_ENABLE_FINAL DEB_MAKEMAKER_INVOKE
DEB_MAKEMAKER_PACKAGE DEB_MAKEMAKER_USER_FLAGS DEB_MAKE_BUILD_TARGET DEB_MAKE_CHECK_TARGET
DEB_MAKE_CLEAN_TARGET DEB_MAKE_ENVVARS DEB_MAKE_INSTALL_TARGET DEB_MAKE_INVOKE DEB_MAKE_MAKEFILE
DEB_MAKE_TEST_TARGET DEB_NOEPOCH_VERSION DEB_NOREVISION_VERSION DEB_NO_IMPLICIT_HADDOCK_HYPERLINK DEB_PACKAGES
DEB_PATCHDIRS DEB_PATCHDIRS_READONLY DEB_PATCH_SUFFIX DEB_PERL_INCLUDE DEB_PERL_INCLUDE_package DEB_PHONY_RULES
DEB_PYTHON_BUILD_ARGS DEB_PYTHON_CLEAN_ARGS DEB_PYTHON_DESTDIR DEB_PYTHON_INSTALL_ARGS_ALL
DEB_PYTHON_MODULE_PACKAGE DEB_PYTHON_MODULE_PACKAGES DEB_PYTHON_PRIVATE_MODULES_DIRS DEB_PYTHON_SETUP_CMD
DEB_PYTHON_SYSTEM DEB_QMAKE_CONFIG_VAL DEB_QUILT_TOPDIR DEB_SETUP_BIN_NAME DEB_SHLIBDEPS_INCLUDE
DEB_SHLIBDEPS_INCLUDE_<package> DEB_SHLIBDEPS_LIBRARY_<package> DEB_SHLIBDEPS_LIBRARY_package DEB_SOURCE_PACKAGE
DEB_SRCDIR DEB_TARBALL DEB_TAR_SRCDIR DEB_UDEB_PACKAGES DEB_UPDATE_RCD_PARAMS DEB_VERBOSE_ALL DEB_VERSION
GHC6_VERSION JAVACMD JAVA_HOME MAKEFILE MAKEFLAGS NUMJOBS OPTIMIZE QMAKE

+153 items

binary-install/<package>:: clean:: debian/ant.properties install/<package>::

(Joey Hess at DebConf 9: *Not Your Grandpa's Debhelper*)

Debian packaging stack: problems

2. **We are not hiding lower-level tools**

visible surface area: dh

+12 items

dh override_dh_<command>:

dh_auto_clean dh_auto_build dh_auto_install dh_auto_test

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Still, 138 + 12 = 150 visible items!

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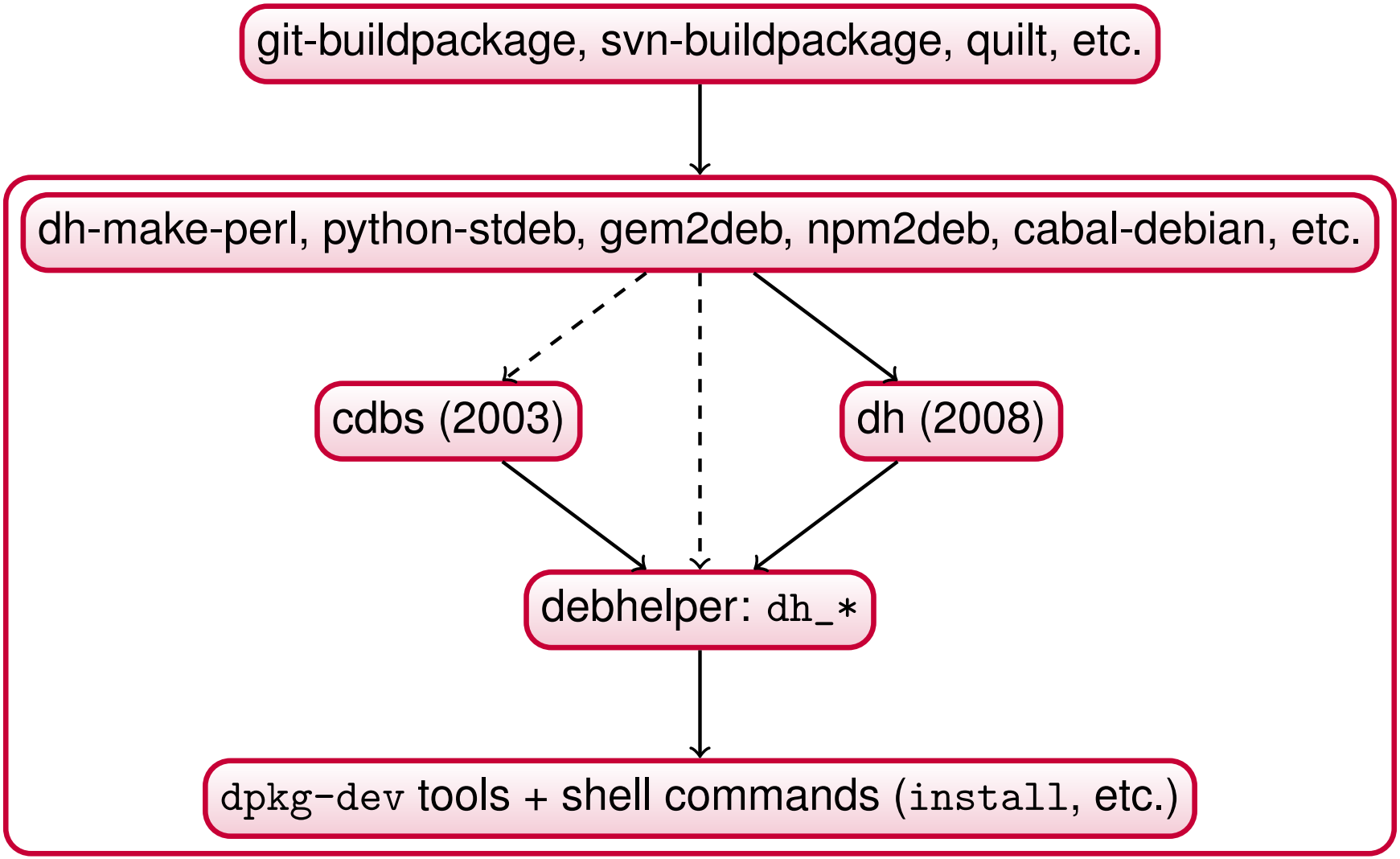

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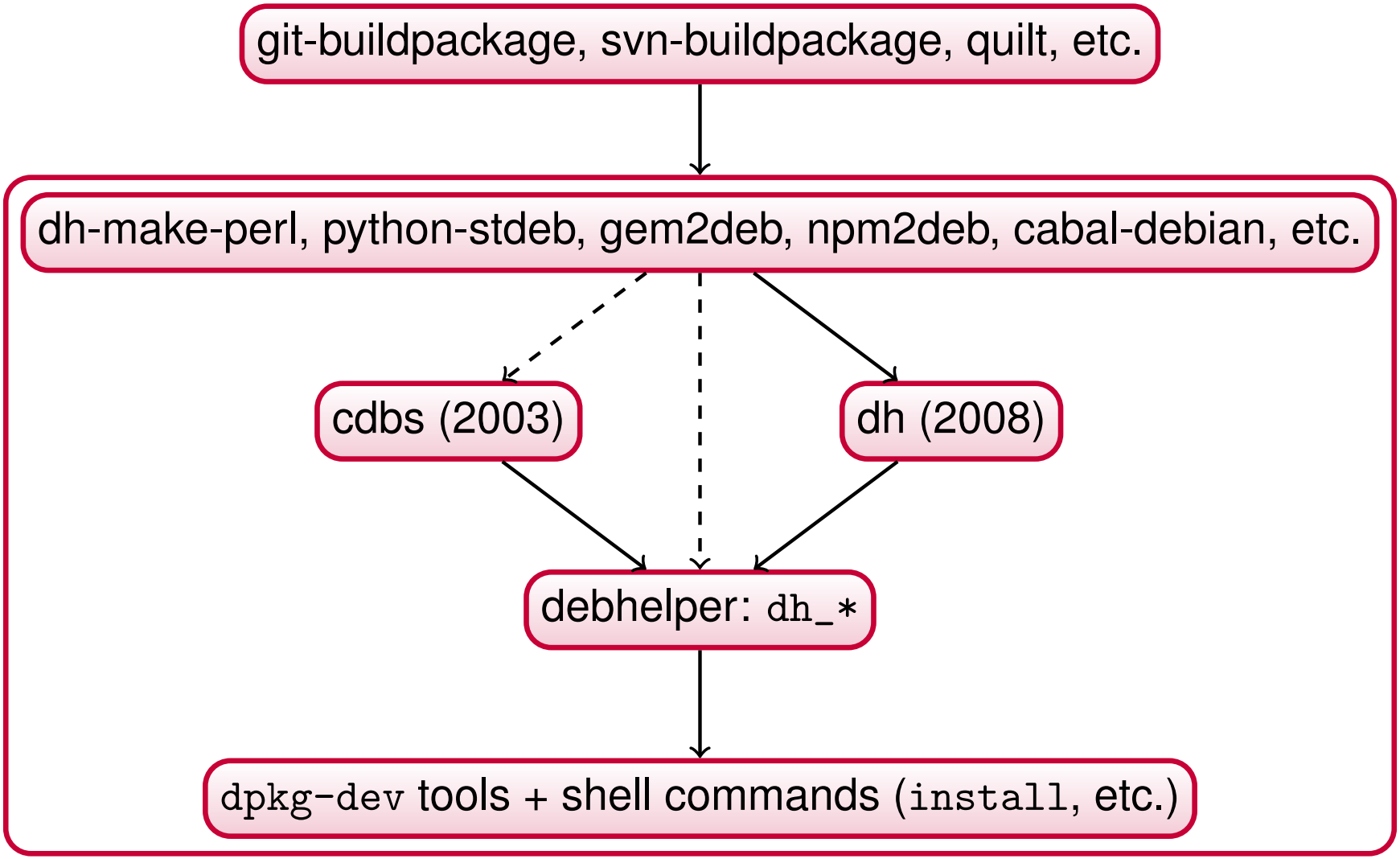

What you need to master to do Debian packaging

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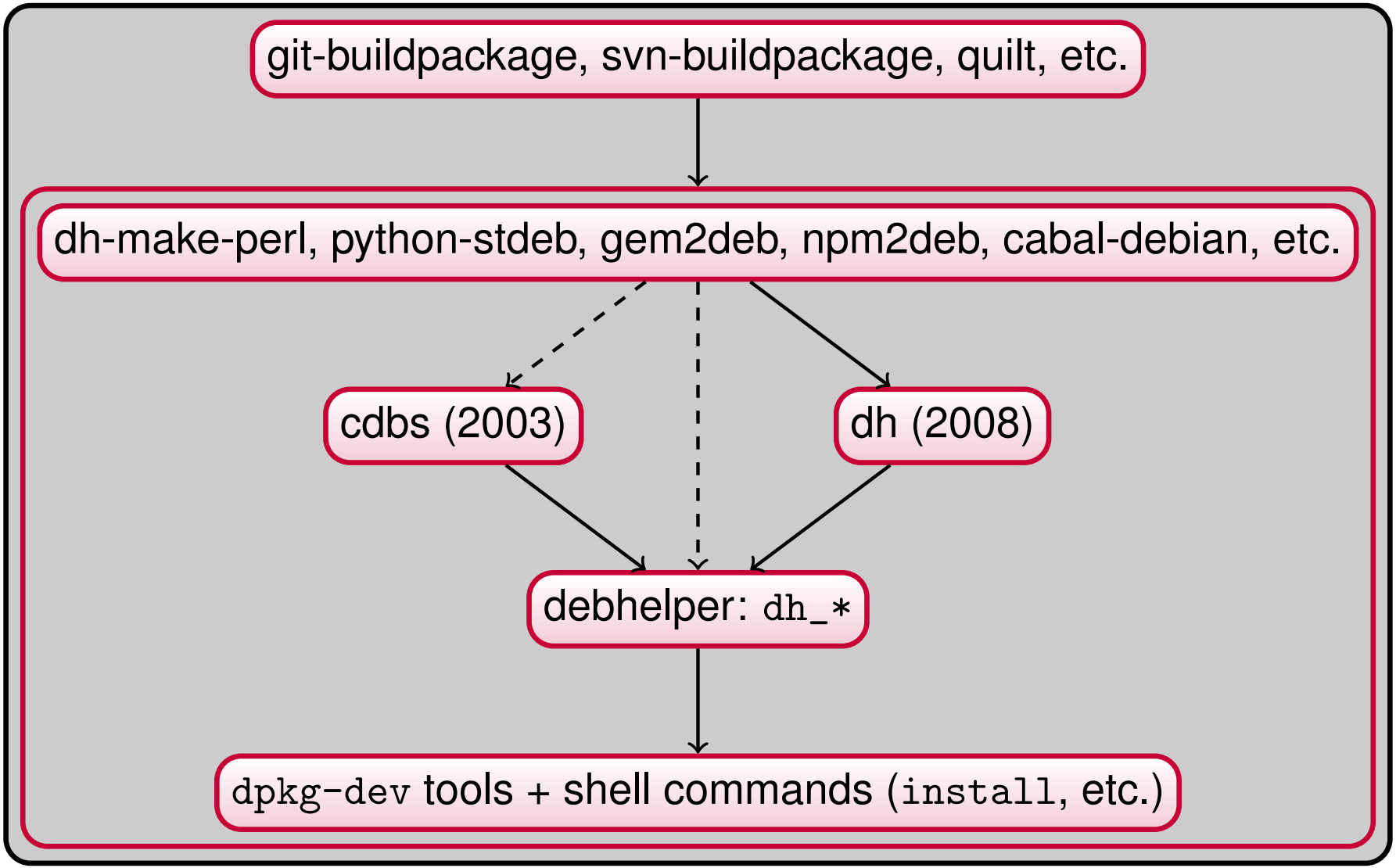

What you need to master to do Debian packaging

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- A lot of duplication in our 3000 Perl modules, or 700 Python libs
- A lot of outdated packaging code

What should we do?

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- Design a higher-level packaging framework

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debdry

- When `debdry` is run, it:
  1. Moves the contents of your `debian/` directory aside;
  2. Chooses and runs an automatic debianisation tool;
  3. Applies your manual changes on top of the autogenerated `debian/`, to produce the final source package;
  4. Stores the original `debian/` directory in `debian/debdry` so that the process can be reversed.
- So your packaging code becomes
  (output of `dh_make_*`) + (diff of `debian/` for manual changes)
- Clearly a step in the right direction
- But the maintainer is still editing files in `debian/`
  - Low-level
  - Diffing+patching/merging will likely fail for some cases
    (e.g. SOVERSION change)
  - Yet another tool $\rightsquigarrow$ higher entry barrier

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Note: The legal side of this needs to be carefully thought. But CPAN & RubyGems are doing it.
Mailing list thread: `https://lists.debian.org/debian-project/2015/01/msg00046.html`

Other challenges

Applications and services $\neq$ packages

- What users want: (working) applications and services
- What we provide: (working) packages

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- But complex services requiring interaction between packages?
  (Mail server, Cloud infrastructure, web application using a complex stack, etc.)
- Important to enable users to keep controlling their computing

Debian in the Dark Ages of Free Software
(Stefano Zacchiroli @ DebConf'14)

Applications and services ≠ packages (2)

- Technical issue: packages that configure other packages is hard
  (Policy §10.7.4)
- What can we learn from configuration management and containers?
  - Packages are *ingredients*, not really the *cooking recipe*
  - Should we package *cooking recipes*?
    Puppet/Chef recipes to automate the configuration of sets of packages?
  - Should we ship fully-prepared meals? containers?
    - What about *preferred form for making modifications*?
    - What about all-you-can-eat buffets?
  - Should we help users install complex applications and services by inventing something merging packages, containers, *tasks*, blends?

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- Can we help users re-gain those without losing comfort?
  - What could we bring with a Debian-powered smartphone/tablet?
  - Improve the quality of semi-official images in Clouds, and enforce it?
    - Certification kit for Cloud providers?

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- Trustable runtime environment?

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- Services to monitor new upstream versions (using `debian/watch`)
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Next step: a real cross-distro+upstreams dashboard or hub?

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(but let's release jessie first!)

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