Connecting the Debian and PostgreSQL worlds

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The Speaker

- Debian Developer
  - Quality Assurance, New Members
  - maintaining PostgreSQL programs and extensions
- senior consultant at credativ GmbH in Mönchengladbach, Germany (not too far from here)
  - PostgreSQL support and operation
  - general Debian topics

Agenda

- PostgreSQL and Debian Releases
- Packaging PostgreSQL Extensions
- Repository
- Open Ends
- Wrapup

PostgreSQL and Debian Releases

PostgreSQL and Debian Releases

PostgreSQL		Debian	
7.4	November 2003		
8.0	January 2005	3.1 Sarge	June 2005
8.1	November 2005		
8.2	December 2006	4.0 Etch	April 2007
8.3	February 2008	5.0 Lenny	February 2009
8.4	July 2009		
9.0	September 2010	6.0 Squeeze	February 2011
9.1	September 2011	7.0 Wheezy	Freeze June 2012

- PostgreSQL: about every year
- Debian: about every 2 years

Version Matrix

	7.4	8.0	8.1	8.2	8.3	8.4	9.0	9.1
3.1 Sarge	X							
4.0 Etch	X		X					
5.0 Lenny				·	X	·	·	·
6.0 Squeeze				·	·	X	·	·
7.0 Wheezy						(X)	(X)	X
unstable				·	·	(X)	(X)	X

- since Etch: several PostgreSQL versions installable in parallel
- usually only one shipped
- server extension packages are available for a subset of these
- **goal: fill in missing X/·, and build extensions for them**
- http://qa.debian.org/developer.php?login=pkg-postgresql-public@lists.alioth.debian.org

Packaging PostgreSQL Extensions

Debian Packages in a Nutshell

- source package = orig.tar.gz + diff + pkg_version.dsc file
- binary package = pkg_version_arch.deb file
- debian/control: package name, (build) dependencies, description, maintainer
- debian/rules: Makefile with targets to build, install, and build binary package
- dpkg-buildpackage invokes targets to build one or more binary packages from source tree
- example: source postgresql-plproxy_2.1-1.dsc builds postgresql-8.4-plproxy_2.1-1_amd64.deb (armel, i386, ia64, kfreebsd-amd64, kfreebsd-i386, mips, mipsel, powerpc, s390, sparc)

Status Quo

- extension packages build-depend on postgresql-server-dev-X.Y
- version change needs manual editing of several files in debian/
- usually no support to build for two PostgreSQL versions

debian/control:

```
Source: postgresql-plproxy
Build-Depends: debhelper (>= 7), postgresql-server-dev-8.4,
 flex, bison
Standards-Version: 3.9.1

Package: postgresql-8.4-plproxy
Architecture: any
Depends: postgresql-8.4, ${misc:Depends}, ${shlibs:Depends}
Description: PL/Proxy is a proxy language for PostgreSQL 8.4
```

Status Quo – debian/rules hard-coded

```
#!/usr/bin/make -f

PG_CFG84 = /usr/lib/postgresql/8.4/bin/pg_config
CFLAGS84 = $(shell $(PG_CFG84) --cflags)
SRCDIR = $(CURDIR)
TGT84  = $(CURDIR)/debian/prefix-8.4

install: build
    mkdir -p $(TGT84)
    cd $(TGT84) && $(MAKE) -f $(SRCDIR)/Makefile \
        CFLAGS="$(CFLAGS)" PG_CONFIG="$(PG_CFG84)" \
        VPATH="$(SRCDIR)"
    dh_install -ppostgresql-8.4-prefix
```

Status Quo – smarter debian/rules

```
#!/usr/bin/make -f

PACKAGE := $(shell dh_listpackages)
PGVERSION = $(patsubst postgresql-%-plproxy,%,$(PACKAGE))
PG_CONFIG = /usr/lib/postgresql/$(PGVERSION)/bin/pg_config

build:
    $(MAKE) PG_CONFIG=$(PG_CONFIG) PG_CPPFLAGS='$(PG_INC)'

install: build
    $(MAKE) install PG_CONFIG=$(PG_CONFIG) \
      DESTDIR=$(CURDIR)/debian/postgresql-$(PGVERSION)-plproxy
```

The Future: pg_buildext

- system provides /usr/share/postgresql-common/supported-versions
- package provides debian/pgversions
- **pg_buildext** works on intersection of these lists
- Build-Depends: postgresql-server-dev-all

debian/rules:

```
build:
        +pg_buildext build $(CURDIR) build-%v

install: build
        +pg_buildext install $(CURDIR) build-%v \
             postgresql-%v-plsh
```

pg_buildext – debian/control.in

- debian/control generated from debian/control.in:

```
Source: postgresql-plproxy
Build-Depends: debhelper (>= 7), flex, bison, asciidoc,
 postgresql-server-dev-all (>= 119~)
Standards-Version: 3.9.2

Package: postgresql-PGVERSION-plproxy
Architecture: any
Depends: postgresql-PGVERSION, ${misc:Depends},
 ${shlibs:Depends}
Description: database partitioning for PostgreSQL PGVERSION
```

Repository

Repository

- http://pgapt.debian.net/
- repository with PostgreSQL server and extension packages
  - Debian Lenny/Squeeze/Wheezy/unstable
  - PostgreSQL 8.2/8.3/8.4/9.0/9.1
- packages are imported from unstable
- build daemons build for all releases
- http://pgapt.debian.net/bin/packages.cgi
- currently: hstore-new, ip4r, pgfincore, plr, pljava, pllua, plproxy, plsh, prefix, preprepare, skytools(3)

/etc/apt/sources.list:

```
deb http://pgapt.debian.net/ lenny-pgapt main    # 5.0
deb http://pgapt.debian.net/ squeeze-pgapt main  # 6.0
```

Building Packages

- custom /usr/share/postgresql-common/supported-versions file to cover all PostgreSQL versions
- debian/pgversions extended where needed
- add new changelog entry && dpkg-buildpackage

- packages built have version suffix ~pgapt+1 (unstable) ~pgaptNN+1 (others)
- ~ sorts before “empty string”
- 1.0~pgapt50+1 < 1.0~pgapt60+1 < 1.0~pgapt+1 < 1.0
- postgresql-9.1-plproxy_2.2-3~pgapt60+1_i386.deb

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Packages Database

- repository is imported in a PostgreSQL database (qa.debian.org schema)
  - package (version, architecture, maintainer, . . .)
  - suite (distribution, architecture)
  - packagelist (suite_id, package_id)
  - package_source (package_id, source_id)
  - other meta data
- extended to cover new package–PostgreSQL version combinations

New Package–Version Combinations

- table pgversion – list of targeted versions
  - 8.2 8.3 8.4 9.0 9.1
- view all_versioned_packages – synthetic list of all possible packages (postgresql-*-extension)

```
SELECT DISTINCT
-- prefix, e.g. ’postgresql-’
 regexp_replace (package, E’[0-9]+\\.[0-9].*’, ’’) ||
 pgversion ||
-- suffix, e.g. ’-plproxy’
 regexp_replace (package, E’.*[0-9]+\\.[0-9]’, ’’) AS package
FROM package NATURAL JOIN pgversion
WHERE package ~ E’[0-9]\\.[0-9]’;
```

What to Build

- view missing_packages – packages not yet built (per Debian release/architecture)
- view outdated_packages – packages needing rebuild

```
CREATE VIEW outdated_packages AS
SELECT ap.*, s.suite, s.architecture, p.version AS oldversion
FROM all_versioned_packages ap
 JOIN package p ON (ap.package = p.package)
 JOIN packagelist pl ON (p.package_id = pl.package_id)
 JOIN suite s ON (pl.suite_id = s.suite_id)
WHERE p.version::debversion < ap.version::debversion; -- FIXME
```

```
-[ RECORD 1 ]+-------------------------
pgversion    | 9.0
package      | postgresql-9.0-pljava-gcj
source       | postgresql-pljava
version      | 1.4.3-1~pgapt70+1
suite        | wheezy-pgapt
architecture | i386
oldversion   | 1.4.2-4
```

Open Ends

Repository

- actually use the database for automated building
- pgq?
- remember package-version combinations that are not supported
- “best-effort” support for old releases

pg_buildext

- many packages not yet converted
- many extensions do not support out-of-tree builds – “VPATH”
-
  ```
  mkdir build-8.4
  cd build-8.4
  make -f ../Makefile VPATH=$PWD/..
  ```
- maybe a PGXS deficiency
- pg_buildext might do in-place build&&install instead

pg_regress

- testing extensions manually on all PostgreSQL versions is infeasible
- pg_regress supported by many extensions
- but pg_regress wants files in their final location (:libdir)
- at build time only present in debian/$pkg/usr/...
- idea: fakeroot/fakechroot-like wrapper to create an overlay filesystem (LD_PRELOAD)

Wrapup

What you can do as an extension author

- document PostgreSQL versions supported
- support 9.1's extension control files
- make your Makefile VPATH-friendly
- provide regression tests

What you can do as a package maintainer

- use pg_buildext (at least “supported-versions”)
- put all supported versions into debian/pgversions, not just the current one
- try to avoid debian/$pkg.install and friends

What you can do as a DBA and User

- test & report
- does this meet your needs?

Wrapup

- building extensions for many targets
- ongoing work
- visit http://pgapt.debian.net/
- thanks to Dimitri Fontaine!