

Making apt.postgresql.org a Reality

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Debian
PostgreSQL
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Agenda

1 What

2 How

apt.postgresql.org

- Repository of PostgreSQL(-related) packages for Debian and Ubuntu
- Debian: squeeze (6.0), wheezy (7.0), sid
- Ubuntu: lucid (10.4), precise (12.4)
- i386 (x86, 32bit), amd64 (x86_64, 64bit)
- PostgreSQL: 8.3 8.4 9.0 9.1 9.2 9.3
- pgadmin3, pgbouncer, pl/proxy, ...
- *Build all PostgreSQL versions for all Debian/Ubuntu versions, build all extensions for all of these*

<http://apt.postgresql.org/pub/repos/apt/>

Index of /pub/repos/apt/

Name	Last Modified	Size	Type
Parent Directory/		-	Directory
dists/	2012-Nov-27 10:27:15	-	Directory
pool/	2013-Jan-03 11:45:49	-	Directory
ACCC4CF8.asc	2012-Oct-13 08:54:04	2.4K	text/plain
README	2012-Dec-06 16:12:15	0.9K	application/octet-stream

lighttpd/1.4.28

Using the repository

- Instructions etc. at **<https://wiki.postgresql.org/wiki/Apt>**
- `/etc/apt/sources.list`:

```
deb http://apt.postgresql.org/pub/repos/apt/ squeeze-pgdg main
```

- `apt-get update`
- `apt-get install postgresql-9.2 pgadmin3 postgresql-9.2-plproxy`

Statistics

- 2 architectures, 5 distributions = everything times 10
- 43 source packages in 215 versions
- 223 distinct binary packages, 2797 real .deb packages
- 3GB in the pool/ directory



People

- Martin Pitt: PostgreSQL packages, postgresql-common
- Dimitri Fontaine: initial idea, extension modules
- Christoph Berg: build scripts, tests integration
- Magnus Hagander: hosting infrastructure
- More help welcome!



Agenda

1 What

2 How



PostgreSQL on Debian/Ubuntu

- Several PostgreSQL versions installable in parallel
- Binaries in `/usr/lib/postgresql/MAJOR/bin/` and `.../lib/`
- SQL stuff in `/usr/share/postgresql/MAJOR/`
- PGDATA in `/var/lib/postgresql/MAJOR/CLUSTER/` (usually "main")
- Config in `/etc/postgresql/MAJOR/CLUSTER/`
- Scripts to manage clusters in package **postgresql-common**

```
$ pg_lsclusters
```

Version	Cluster	Port	Status	Owner	Data directory	Log file
9.0	main	5430	down	postgres	/var/lib/postgresql/9.0/main	/var/log/postgresql/postgresql-9.0-main.log
9.2	main	5432	online	postgres	/var/lib/postgresql/9.2/main	/var/log/postgresql/postgresql-9.2-main.log

Anatomy of a Debian package

- **Source package** = tarball + patches + .dsc file

```
16222148 postgresql-9.2_9.2.2.orig.tar.bz2
```

```
21072 postgresql-9.2_9.2.2-1.pgdg+1.debian.tar.gz
```

```
2431 postgresql-9.2_9.2.2-1.pgdg+1.dsc
```

- builds one or more **binary packages** = .deb files

```
516150 libpq5_9.2.2-1.pgdg+1_amd64.deb
```

```
581138 libpq-dev_9.2.2-1.pgdg+1_amd64.deb
```

```
3692524 postgresql-9.2_9.2.2-1.pgdg+1_amd64.deb
```

```
7474450 postgresql-9.2-dbg_9.2.2-1.pgdg+1_amd64.deb
```

```
1376692 postgresql-client-9.2_9.2.2-1.pgdg+1_amd64.deb
```

```
785986 postgresql-contrib-9.2_9.2.2-1.pgdg+1_amd64.deb
```

```
2067552 postgresql-doc-9.2_9.2.2-1.pgdg+1_all.deb
```

```
455108 postgresql-plperl-9.2_9.2.2-1.pgdg+1_amd64.deb
```

```
974714 postgresql-server-dev-9.2_9.2.2-1.pgdg+1_amd64.deb
```



Version numbers

- Need to be different per distribution so we can distinguish builds
- Need to be increasing so (dist-)upgrades work
- We rebuild from Debian's packaging VCS, so append suffix to Debian version
- squeeze → wheezy → sid:
.pgdg60+1 → .pgdg70+1 → .pgdg+1
- lucid → precise: .pgdg10.4+1 → .pgdg12.4+1
- Needs new source packages, generated by script

generate-pgdg-source

- Takes git/svn/bzr checkout from Debian VCS and builds source package for distribution given
- Applies package-specific tweaks
 - As little deviation as possible
 - PostgreSQL server packages: move libpq5 et. al into special archive component so packages don't overwrite each other
- Applies distribution-specific tweaks
 - lenny/lucid: disable xz compression of .deb files
- Generates new changelog entry with new version number

build-and-provide-package

- From Michael Prokops jenkins-debian-glue(.org) scripts, slightly patched
- Invokes cowbuilder
- Standard chroot, with some packages preinstalled to speed things up
- "pgdg-buildenv" package



Jenkins

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Build Queue
No builds in the queue.

Build Executor Status

#	Status
1	Idle
2	Idle

All	Auxiliary	Binaries	PostgreSQL	Sources	Templates	+
S	W	Name ↓	Last Success	Last Failure	Last Duration	
🌐		apt-source-template	N/A	N/A	N/A	🔄
🟢	☀	apt.postgresql.org	8 days 11 hr (#16)	N/A	1.8 sec	🔄
🟢	🌐	barman-binaries	26 days (#8)	26 days (#7)	2 min 47 sec	🔄
🟢	☀	barman-source	26 days (#15)	N/A	40 sec	🔄
🌐		binaries-template	N/A	N/A	N/A	🔄
🟢	☀	dput	42 min (#153)	N/A	5.1 sec	🔄
🌐		git-source-template	N/A	N/A	N/A	🔄
🔴	🌐	ip4r-binaries	N/A	2 mo 5 days (#2)	1 min 1 sec	🔄
🟢	☀	ip4r-source	2 mo 6 days (#1)	N/A	54 sec	🔄
🟡	🌐	JoeU Templating	4 mo 27 days (#3)	4 mo 27 days (#2)	12 min	🔄
🌐		newpkg-binaries	N/A	N/A	N/A	🔄
🟢	☀	newpkg-source	6 days 0 hr (#7)	N/A	43 sec	🔄
🟢	☀	ora2pg-binaries	2 mo 5 days (#1)	N/A	5 min 37 sec	🔄
🟢	🌐	ora2pg-source	2 mo 5 days (#2)	2 mo 5 days (#1)	1 min 1 sec	🔄
🟢	☀	orafce-binaries	1 mo 13 days (#1)	N/A	21 min	🔄

Jenkins

- Two jobs per package: foo-source and foo-binaries
- foo-source takes git/svn/bzr checkout and builds 5 source packages (.dsc files)
- foo-binaries takes output from foo-source and builds, well, binaries
- Common "dput" job uploads to repository
- Templating engine to keep Jenkins config in sync for similar jobs (we could use a nicer one)



Done?



Tests

- We need to test stuff
- postgresql-9.2 consists of 155 .deb files, no one is going to test that manually
- Regression tests
- Integration tests



Regression tests: server packages

- At build time, "make bigcheck" runs pg_regress
- Tests server functionality
- Runs SQL scripts and diffs psql output
- Nice (except that pg_regress doesn't like /var/run/postgresql/ not being writable, I just haven't sent the patch to -hackers yet)

Regression tests: extensions

- make installcheck
- Most packages need to be installed to be tested
- CREATE EXTENSION wants the control file in PGSHAREDIR
/usr/share/postgresql/... (Dimitri?!)
- Needs root
- pg_virtualenv creates throw-away database cluster for testing

Integration tests: postgresql-common testsuite

- `/usr/share/postgresql-common/testsuite`
- `/usr/share/postgresql-common/t/*`
- Tests server functionality, cluster management scripts, and properties of `.deb` packages
- Perl's `Test::More`
- Also capable of doing cluster upgrade tests
- Needs root
- More and more Linux-specific

Integration tests: postgresql-common testsuite

```
=== Running test 030_errors.t... ===
1..155
ok 1 - pg_createcluster --socketdir
ok 2 - pg_lsclusters -h
ok 3 - cluster was created
ok 4 - Port of created cluster is 5432
ok 5 - pg_createcluster --socketdir '/tmp/postgresql-testsuite/' 9.3 main
ok 6 - pg_createcluster on existing cluster
ok 7 - pg_lsclusters -h
ok 8 - original cluster still exists
ok 9 - pg_createcluster 9.3 test -p foo
ok 10 - pg_createcluster -p checks that port option is numeric
ok 11 - pg_createcluster 9.3 test -p 42
ok 12 - pg_createcluster -p checks valid port range
ok 13 - pg_createcluster 9.3 test -p 5432
ok 14 - pg_createcluster -p checks that port is already used
ok 15 - pg_ctlcluster fails on invalid cluster owner uid
ok 16 - pg_ctlcluster as root fails on invalid cluster owner gid
ok 17 - pg_ctlcluster as postgres fails on invalid cluster owner gid
ok 18 - pg_ctlcluster succeeds on valid cluster owner uid/gid
ok 19 - No sockets in /var/run/postgresql
ok 20 - Socket is in /tmp/postgresql-testsuite/
ok 21 - cluster stops after removing unix socket dir
```



Integration tests: applications

- Example: pgbouncer
- Install package
- Tweak default pgbouncer config to include a database definition
- Start pgbouncer and PostgreSQL database (pg_virtualenv)
- SELECT 1+2;
- Hope we get "3"



autopkgtest

- New standard for doing as-installed tests of .deb packages ("DEP-8")
- debian/tests/control

```
Tests: run-testsuite
```

```
Depends: @, hunspell-en-us, locales, netcat-openbsd
```

```
Restrictions: needs-root
```

- debian/tests/run-testsuite

```
#!/bin/sh
```

```
set -e
```

```
cd /usr/share/postgresql-common
```

```
./testsuite
```

Isolating test runs

- Several testsuites and builds should run in parallel
- testsuite wants port 5432
 - unshare(CLONE_NEWNET): unshare -n
- testsuite checks if it left cruft in `/var/run/postgresql/` etc. behind
 - unshare(CLONE_NEWNS): unshare -m
 - mount tmpfs in `/var/run/postgresql/` and friends
- At the end of each test, testsuite checks if there's postgres processes left
 - clone(CLONE_NEWPID): newpid (NIH)
- Proper virtualization might be easier (but the build host is already virtualized)

Acknowledgements

- credativ, 2ndQuadrant, Redpill Linpro
- DG-i is hosting the build server
- <https://wiki.postgresql.org/wiki/Apt>
- <https://github.com/dimitri/apt.postgresql.org>
- More hackers welcome
- User feedback? Architectures? Packages? ...?