News from EDOS: Finding Outdated Packages

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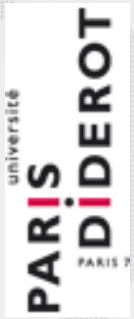

Debconf 12, July 14, 2012

Joint work with

Pietro Abate

Roberto Di Cosmo

Zack

Starting point: Edos-debcheck

- Find packages that are not installable
- by looking only at package relations (Depends, Conflicts, ...)
- Use a *complete* solving algorithm (search through all possible alternatives)
- Edos-{dist,deb,rpm}check: fast implementation based on a SAT solver.

Let's run distcheck on the Debian sid

Date	amd64	armel	ia64	i386	mips	mipsel	powerpc	s390	sparc
Fri Sep 2 6:04:12 2011	377 (249)	574 (291)	1321 (238)	394 (269)	847 (204)	902 (271)	530 (298)	510 (229)	515 (264)
Diff with next	+ 46 / - 47	+ 33 / - 25	+ 18 / - 0	+ 66 / - 35	+ 33 / - 61	+ 9 / - 0	+ 45 / - 79	+ 39 / - 26	+ 9 / - 2
Thu Sep 1 6:03:52 2011	378 (268)	566 (293)	1303 (231)	363 (267)	875 (242)	893 (264)	564 (352)	497 (236)	508 (259)
Diff with next	+ 8 / - 55	+ 3 / - 51	+ 2 / - 58	+ 0 / - 55	+ 3 / - 0	+ 66 / - 0	+ 0 / - 0	+ 1 / - 55	+ 0 / - 55
Wed Aug 31 6:03:46 2011	425 (321)	614 (340)	1359 (283)	418 (320)	872 (241)	827 (202)	564 (352)	551 (288)	563 (312)
Diff with next	+ 28 / - 26	+ 25 / - 31	+ 16 / - 34	+ 28 / - 31	+ 23 / - 31	+ 17 / - 35	+ 25 / - 32	+ 23 / - 31	+ 25 / - 31
Tue Aug 30 6:03:39 2011	423 (316)	620 (343)	1377 (301)	421 (320)	880 (245)	845 (216)	571 (355)	559 (292)	569 (314)

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Goal

Distinguish (3) and (4): Who is to blame when a package is not installable?

How to be sure when it is p's fault?

Idea

When is it the fault of package p in version n that it is not installable in a repository R?

- if (p, n) is not installable in R, and

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Definition

A package (p, n) is *outdated* in a repository R iff (p, n) is not installable in all possible futures of R.

Example 1: Is (*foo*,1) installable?

```
Package: foo
Version: 1
Depends: baz (= 2.5) | bar (= 2.3),
  bar (> 2.6) | baz (< 2.3)

Package: bar
Version: 2

Package: baz
Version: 2
Conflicts: bar (< 3)
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Example 2: Is (*foo*,1) outdated?

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Package: foo
Version: 1
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  bar (> 2.6) | baz (< 2.3)

Package: bar
Version: 2.3

Package: baz
Version: 2.5
Conflicts: bar (> 2.6)
```

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Possible Evolutions of a Repository

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Consequence

There are infinitely many possible futures.

Futures: do we have to care about package removals?

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We may ignore package removals from R.

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Consequence

We may assume that all future versions of packages behave as nicely as possible: no dependencies, no conflicts.

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Consequence

We only have to consider new packages that are mentioned in dependencies.

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When looking at all possible futures . . .

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Remaining problem

Infinitely many future versions of packages, hence infinitely many future repositories!

How to get finitely many versions

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We have package p in version 5.
Other packages have conflicts/dependencies on p :

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Representative versions

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- plus one between two versions, plus one that is greater than all

$$5, 6, 9, 10, 12, 13$$

Further reduction: observational equivalence

In the example:

- Conflicts/dependencies on p :

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Observational Equivalence

10 and 13 behave the same, as do 6 and 9:

$$5, 9, 10, 12$$

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- Put all present and future versions in *one big repository* U.
- Size: 2×35.000
- U allows precisely the same installations as all the future repositories together
- There is one problem with that solution ...

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- Finally : One single `distcheck` run on a large repository .

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- 34444 binary packages
- Not installable: 431 packages
- After adding dummies: 82075 package
- Runs 1m41s
- Reports 119 outdated packages

What packages do we find?

```
package: zhone-illume-glue
version: 0-git20090610-7
source: zhone (= 0-git20090610-7)
reasons:
 -
  missing:
   pkg:
    package: zhone-illume-glue
    version: 0-git20090610-7
    unsat-dependency: python (< 2.7)
```

Ignoring the python transition

Just add to the repository a dummy package

```
Package: python
Version: 2.6-1
```

Example: a very old python dependency

```
package: salome
version: 5.1.3-9
source: salome (= 5.1.3-9)
reasons:
 -
  missing:
   pkg:
    package: salome
    version: 5.1.3-9
    unsat-dependency: python (< 2.6)
```

Example: outdated dependency

```
package: asterisk-chan-capi
version: 1.1.5-1
source: asterisk-chan-capi (= 1.1.5-1)
reasons:
 -
  missing:
   pkg:
    package: asterisk-chan-capi
    version: 1.1.5-1
    unsat-dependency: asterisk (< 1:1.8)
```

Example: needs binNMU

```
package: nitpic
version: 0.1-12
source: nitpic (= 0.1-12)
 -
  missing:
   pkg:
    package: nitpic
    version: 0.1-12
    unsat-dependency: binutils (< 2.21.53.20110923)
```

Example: wrong dependencies

```
package: cyrus-admin-2.2
version: 2.4.12-1
source: cyrus-imapd-2.4 (= 2.4.12-1)
 -
  conflict:
   pkg1:
    package: cyrus-admin-2.4
    version: 2.4.12-1
    source: cyrus-imapd-2.4 (= 2.4.12-1)
    unsat-conflict: cyrus-admin-2.2
   pkg2:
    package: cyrus-admin-2.2
    version: 2.4.12-1
    source: cyrus-imapd-2.4 (= 2.4.12-1)
   depchain1:
       package: cyrus-admin-2.2
       version: 2.4.12-1
       depends: cyrus-admin-2.4
```

EDOS, Mancoosi, Dose

- EDOS European project: Jan 2004 $\longrightarrow$ Jun 2007
- Mancoosi European project: Feb 2008 $\longrightarrow$ May 2011
- New implementation: dose
- This tool: debian package `dose-outdated`
- Also has a much improved debcheck: debian-package `dose-distcheck`

What remains to do

- Better classification of results:
  - Cruft (packages no longer built from source)
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  - Packages that are involved in an official transition
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  - A more precise model how packages may evolve?
- Improve explanations