

Mancoosi: bridging communities to improve package-based systems

Roberto Di Cosmo
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Open World Forum 2009

Friday October 2nd, 2009

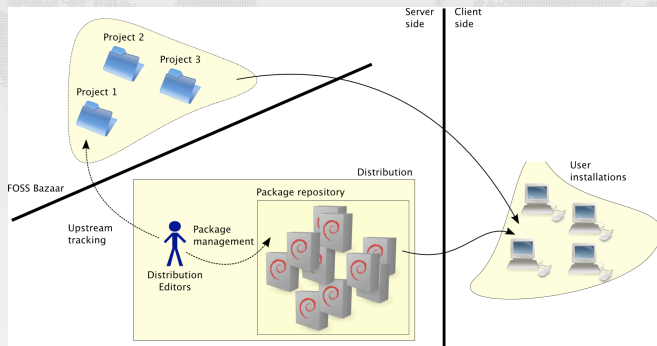


mancoosi
managing software complexity

- 
- 1 The Open Source Infrastructure and its Complexity
 - 2 Improving package managers
 - 3 Mancoosi in the big picture
 - Goals and strategy

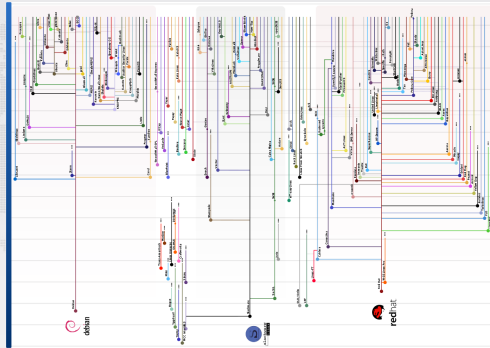
The promise of GNU/Linux distributions

GNU/Linux **distributions** are *intermediaries* between FOSS projects and their users



They factor the work needed to maintain, configure, test, package together tens of thousands of different software components.

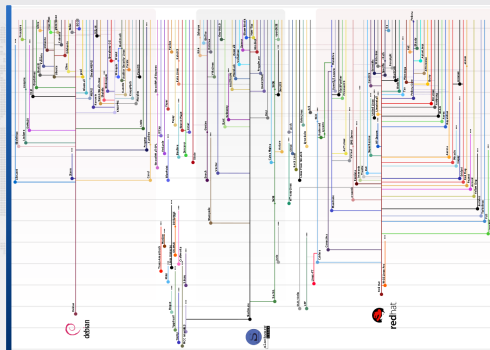
Package-based distributions: a very successful idea ...



Central notion : **package**, together with **package management software**

It is a challenging task: smooth upgrades, automatic dependency solving, up to date software ... are *NP-hard* problems!

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Package management: a key *industrial* issue

A few facts:

In 2011, 80% of commercial software will contain Open Source code... 49,7% of critical application come from the Open Source world...

Mark Driver (Gartner) sept.07

A key *industrial* issue is to build faster, stronger, harder, better, more user oriented packaging technology, to master the challenge of the Open Source success.

And yet, surprisingly little has been done in terms of R&D specifically related to package technology (as opposed to components or web services).

The goal of Mancoosi is to fill this gap both in the short term, and the long term.

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project step FP7 (2008–2011)

focus *coherence* and maintenance of a FOSS distribution

installation (user point of view)

- Tools for user-side package management (package managers / meta-installer)
 - installation
 - removal
 - upgrade
 - downgrade
 - ...

Goals, approach and strategy

Mancoosi's goal:

enable safe, efficient maintainability of the Open Source software infrastructure built out of software packages

A twofold *approach* to reach this objective:

- design algorithms and tools to tackle the upgradeability problem;
this allows to find good upgrade paths w.r.t. the user's needs.
- conceive and implement a transactional update process;
this allows to *roll-back* an unsatisfactory upgrade.

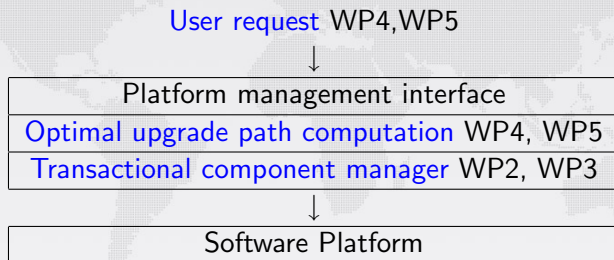
A long term, *ecosystem* strategy to reach this objective:

- bring users, distributions, developers and researchers together!
- set up virtuous cycles

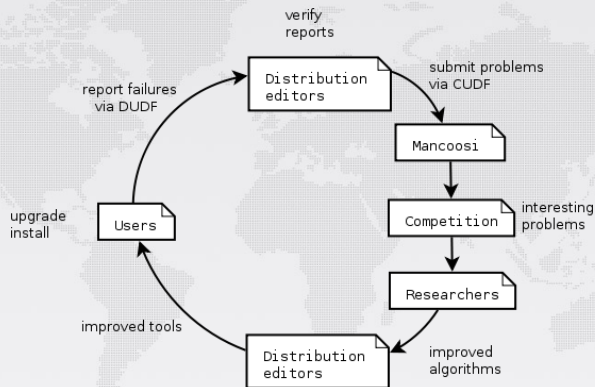
All in a picture

Mancoosi architecture

In Mancoosi, there are really two main activities, corresponding to the architecture of our design, and they are loosely coupled

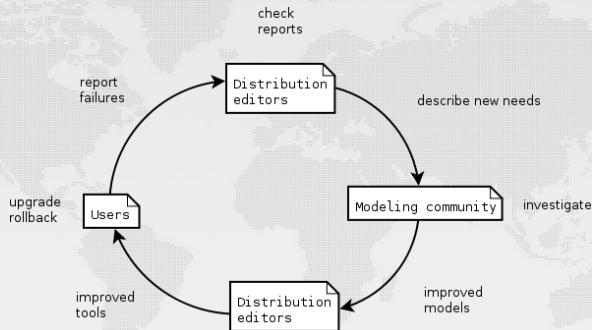


Upgrade resolution



Abstract view of packages through the metadata lens.

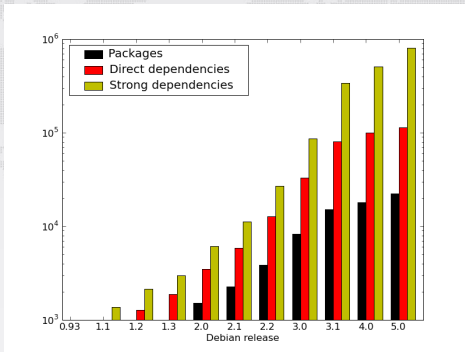
Transactional updates



Concrete view of packages through the maintainer scripts lens.

Mancoosi technology preview: strong dependencies

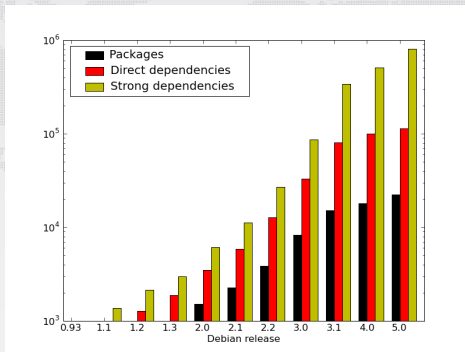
GNU/Linux software distributions: probably the most complex system of systems on the planet



HOW can you visualize such a system of systems?

Mancoosi technology preview: strong dependencies

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HOW can you visualize such a system of systems?

Draw a graph, no deep knowledge

kde-amusements and kde-toys in Debian 3.1 (aka *sarge*, 2005) were unnecessary components, overlapping kde-games and kde-edu. They are waste, and are gone today (2009).

Should be easy to spot, only 244 components are concerned!
Can you see this fact here?



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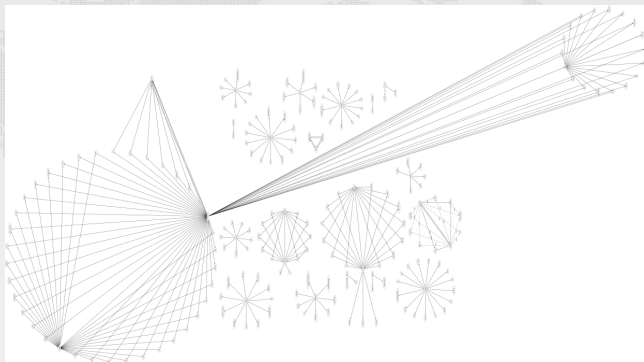
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Let's try a more systemic approach

Here is a graph of *strong dominators* for the KDE subsystem:

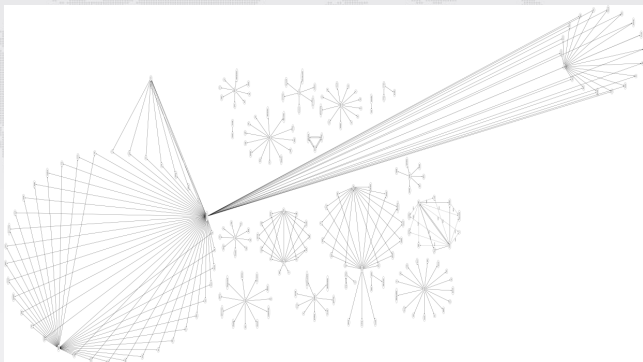


See the problem, now?

More on this at <http://www.mancoosi.org>

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Concluding remark

Everything developed in Mancoosi is *already* relevant for some, and will be increasingly relevant *to all* component based technologies

Linux : packages

Eclipse : plugins

Firefox : extensions

Java : beans

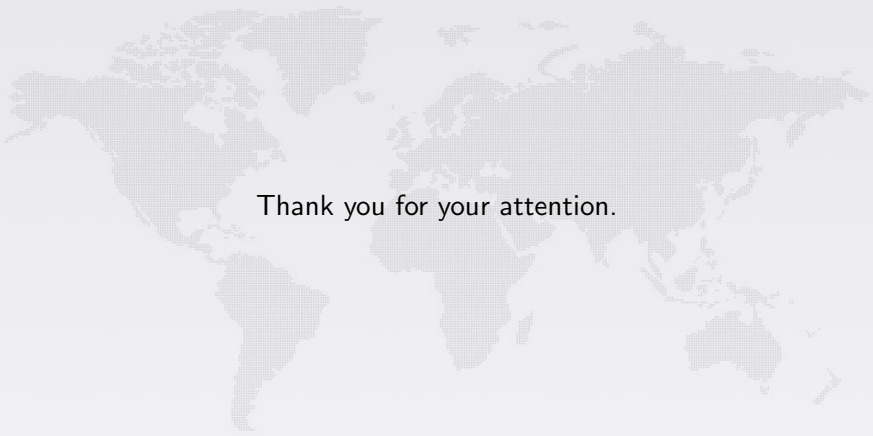
Web services : predictable service assembly

... ..

Project Partners



Questions



Thank you for your attention.