Zero Install
Decentralised cross-platform package management

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History

Started the ROX desktop in 1999...
Distribution problems

- Multiple packages needed
  - Debian, Red Hat, SUSE, ...
- Poor, missing or out-of-date packages
  - Everyone should have access to every version
- Slow feedback cycle
  - Bug reports are for last year's version
Zero Install (2003)

- Make one package that works everywhere
  - Linux, OS X, Unix, Windows
- Packages can come directly from upstream
  - (or from distribution)
- Switch to latest version easily
Availability

Zero Install is in most Linux distributions, e.g.

```
$ yaourt -S zeroinstall-injector   # Arch
$ sudo apt-get install zeroinstall-injector # Debian, Ubuntu
$ sudo yum install 0install        # Fedora
$ sudo zypper install zeroinstall-injector # OpenSUSE
```

OS X bundle and Windows .exe available too.

http://0install.net
Example: OPAM

```bash
$ opam add opam http://tools.ocaml.org/opam.xml

$ opam --version
1.1.1
```
Where did it go?

$ oinstall show opam
- URI: http://tools.ocaml.org/opam.xml
  Version: 1.1.1
  Path: /home/test/.cache/0install.net/implimentations/
    sha256new_RU0X6PWGDCHH5TDNEDRHQJ54YZZ4TSAGBB5AEBRNOKSHM3N7XORA

- URI: http://repo.roscidus.com/utils/aspcud
  Version: 1.9.0
  Path: /home/test/.cache/0install.net/implimentations/
    shalnew=5f838f78e489dabc2e2965ba100f14ae8350cbce

- URI: http://repo.roscidus.com/utils/curl
  Version: 7.32.0-10.20
  Path: (package: rpm: curl:7.32.0-10.20:x86_64)

(one 0install package and two distribution-provided dependencies)
Upgrading

By default, 0install prefers "stable" releases:

```
$ 0install update opam
A later version (http://tools.ocaml.org/opam.xml 1.2.0-pre4) exists but was not selected. Using 1.1.1 instead.
To select "testing" versions, use:
0install config help_with_testing True
```

Can change this globally, or by adding a local version restriction:

```
$ 0install update opam --not-before=1.2.0-pre4
http://tools.ocaml.org/opam.xml: 1.1.1 -> 1.2.0-pre4
$ opam --version
1.2.0-beta4
```
$ opam whatchanged
Last checked : 2014-08-26 11:00
Last update  : 2014-08-26
Previous update: 2014-07-03

http://tools.ocaml.org/opam.xml: 1.1.1 -> 1.2.0-pre4

To run using the previous selections, use:
  opam run /home/tal/.config/opam/install.net/apps/opam/
    selections-2014-07-03.xml
Publishing

Put up a web-page with your package's details:

**OPAM**

OCaml package manager

This page is a zero-install feed. If you don't know what that is or how to use it, you're in luck - see the instructions at the bottom of this page.

**Full URL**

https://tools.ocaml.org/opam.xml

**Description**

OPAM is an open-source package manager edited by OCamlPro. It supports multiple simultaneous compiler installations, flexible package constraints, and a Git-friendly development workflow.

**Homepage**

https://opam.ocaml.org/

**Required libraries**

(Zero install will automatically download any required libraries for you)

- http://repo.roscidus.com/ubifs/aspicud
- http://repo.roscidus.com/ubifs/curl

**Available versions**

(Zero install will automatically download one of these versions for you)

<table>
<thead>
<tr>
<th>Version</th>
<th>Released</th>
<th>Stability</th>
<th>Platform</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1</td>
<td>2014-04-17</td>
<td>stable</td>
<td>Linux-x86_64</td>
<td>Download [1470315 bytes]</td>
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<td>1.1.1</td>
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<td>stable</td>
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<td>Darwin-x64</td>
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</tbody>
</table>
OPAM is an open-source package manager edited by OCamlPro. It supports multiple simultaneous compiler installations, flexible package constraints, and a Git-friendly development workflow.
End of Part I

Questions?
Python problems (2013)

- Python 0install too slow:
  - On mobile platforms
  - Running small utilities
- Too unreliable:
  - No static checking
  - Python 3 breakage
  - PyGTK breakage
- So started looking for a new language...
Language comparison

http://roscidus.com/blog/blog/2013/06/09/choosing-a-python-replacement-for-0install/
OCaml: 1st impressions

• Bad:
  ▪ Top-level: no readline support!?!?
  ▪ Syntax errors hard to find
    ○ (not sensitive to indentation errors)
  ▪ Unhelpful errors: Not_found
  ▪ Binary compatibility (of OCaml libraries)

• Good:
  ▪ Fast!
  ▪ Reliable
  ▪ Mature
  ▪ Direct equivalents to Python features
  ▪ "Obvious" compiler behaviour
Suggestion: OCaml for...

- Python users: fast, static checking, unicode
- Java users: fast startup, no NullPointerExceptions
- Everyone: polymorphic variants, functors, abstract types

http://roscidus.com/blog/blog/2014/02/13/ocaml-what-you-gain/
Porting process

- Used old Python and new OCaml parts together.
- Communication was via JSON.
- Literal translation first; refactor later in OCaml.
Results

- Similar LOC (OCaml slightly shorter)
- OCaml around 10x faster
- Seems very reliable
- Community very helpful!

http://roscidus.com/blog/blog/2014/06/06/python-to-ocaml-retrospective/
Feedback

"I found modifying an unfamiliar OCaml codebase much easier than a Python one. [...] the explicit .mli files give a good summary of each module's surface area, [...] modifying the type of something and then fixing the errors gives you a good way to start figuring out how to actually enact a certain change."

-- Tim Cuthbertson (0install developer)
THE END

For more information:

http://0install.net/
http://roscidus.com/blog/blog/categories/ocaml/

Questions?