openSUSE.org Build Service

Maintain one source for all Linux platforms

Putting cross development support into OBS

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How to join such a FOSS project

- OBS is a corporate FOSS project, mostly Novell funded
- High entry level due to long SUSE history
- Reengineering of best practise and new technology
- **How did I then join?**
  - Pragmatic approach → fill a gap → Testing
  - Gain creditability
  - Gain write access to code
  - Provide packages for experimental users → New use cases
- **Result:**
  - Maintainer of Developer / Testing packages
  - Reengineered complete embedded knowhow inside OBS
  - Works

Types of Cross Development

Develop Software for another processor than the host

- **Type 1:** Build a complete set of packages using one big Package
  - e.g. busybox and buildroot
- **Type 2:** Put a complete distro including cross-tools into a Project
  - e.g. stlinux.com and OE
  - No original packages for the target can be used.
- **Type 3:** The build system is modified but use original source packages
  - No Examples outside OBS
- **Type 4:** Use emulation and/or virtualization and/or native build
  - e.g. scratchbox and mojo
  - orginial binaries can run
  - testsuites can run

Requirements I

- The goal was to put support for cross development into OBS as a generic, orthogonal feature
- Existing distributions should be usable as it is the case with x86 and ppc
- For the application developer, new targets should not be more than any other additional Linux target
- The codepath for normal operation (not cross-build) should behave exactly like without cross-build.

Requirements II

- Must work with server and with local build
- Normal OBS users without arrays of disks must be able to use it
- Existing meta data from .deb and .rpm FTP trees should be usable
- Split up in two sub-features:
  → Download on Demand
  → Cross Development

About Virtualization in OBS

- XEN/UML/QEMU/KVM can be used in workers
  - was in the first place a security feature
  - was a max compatibility feature on native Hardware
- For compatibility, system emulation was considered, but found too slow for cross development

→ Cross Development uses QEMU user emulation and Virtualization

Download on Demand I

- Big Distros need up to 20 GB / arch for the binary packages
- Remote OBS is only usable if one OBS stores all packages
- What about the FTP trees for all the distros ?
- What if I want to use also the update FTP trees ?

Download on Demand II

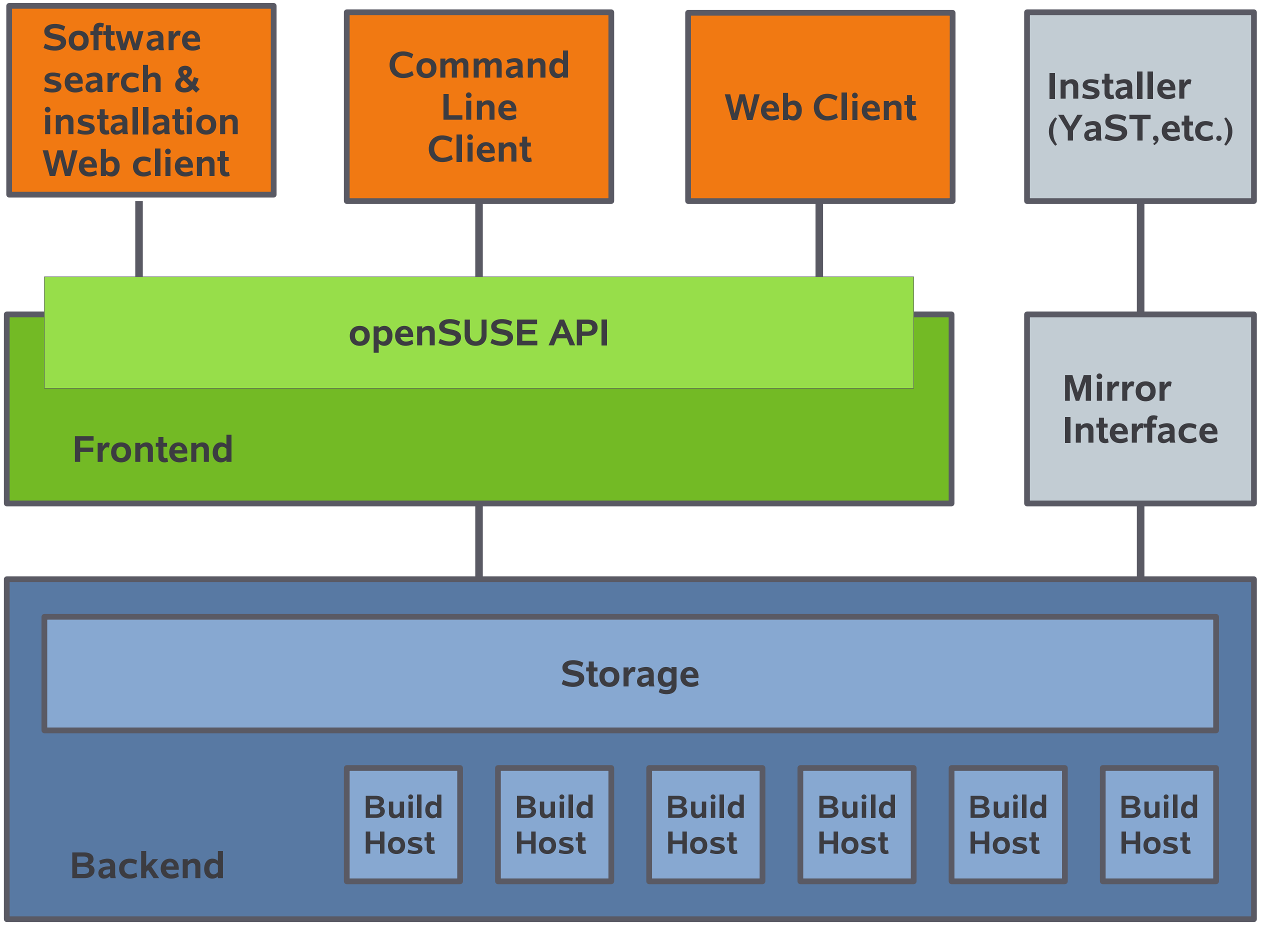
- Download on Demand caches only needed packages
- can read usual meta data from FTP trees:
  - debian md,
  - rpm md and
  - suse tags
- fire and forget (I did miss package xyz)

Implementation – the beginnings

- **MicroSUSE**
- **Type 1:** bring in uClibc buildroot
  - Put generic Infrastructure in place
  - Macro Processing works everywhere
  - Bring in notation of processor Architectures
  - Get powerpc working as first non x86 a
- **Type 2:** Import first Cross Build Distro stlinux.com

→ Now effort data present on amount of work for Type 1-4 to get a “real distro” building and running

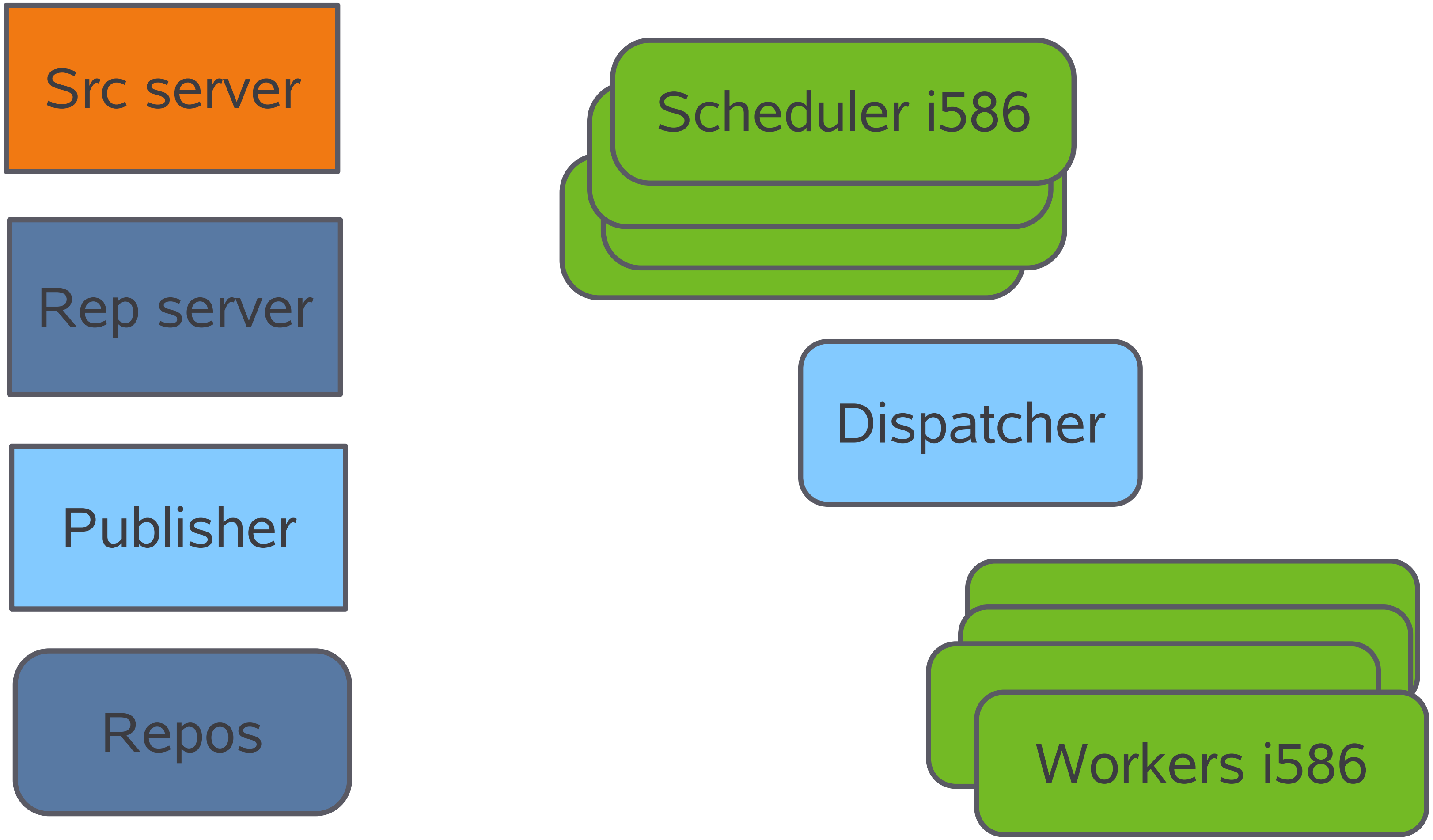
Components Overview



Implementation – Changes in OBS

- OSC
- Webclient
- Frontend
- Scheduler
- Dispatcher
- Repo Server
- Worker
- Build

Implementation in the Backend



Status I

- First Release implemented
- Code supplied in the svn trunk since Dec/2008
- Packages provided for testing even since first versions
- Some Instances running – got feedback from there
- Implemented Metadata:
    - RPM
    - Deb
    - Susetags

Status II

- Type 1-4 Cross Development implemented
    - even combinations possible
- Compatibility paradigm proven
    - Maemo SDK implementation in 3 days
- Tested with lots of ARM Distros
- Ready to be supplied in public OBS for ARM

Testing Results I

Widely tested on Distros mostly for ARM

- Debian
- Ubuntu
- Fedora
- Maemo
- STLinux (ARM9+11 + sh4) – Type 2

Testing Results II

- ARM processor levels
  - from armv4t (ARMv4 OABI) – Debian Etch
  - to armv7el (ARMv7 EABI + VFP) - Ubuntu/mojo
- Resultung packages installed on boards and run
- Most openSUSE Base system packages bootstrapped
  - inclusive running parts of the testsuites

Roadmap

- Activate ARM builds in public OBS
- Make Download on Demand more user friendly
- Implement optimizations
- Set up an ARM version of openSUSE
- Remove the bugs that pop up in public service
- Get also non ARM architectures running
  - mostly a QEMU user mode issue
- Support “non PC type” of Images

→ **Lots of embedded Devices to assimilate**

Resources

- http://build.opensuse.org
- A running instance of the Build Service.
- Contains links to documentation and source
- http://en.opensuse.org/Category:Build_Service
- Wiki documentation class for Build Service
- opensuse-buildservice@opensuse.de
- The mailing list for discussing the Build Service.
- #opensuse-buildservice on freenode
- Our IRC channel
- #opensuse-arm on freenode
- Our IRC channel for OBS and openSUSE @ ARM