Mocloudos

Feather-weight Cloud OS developed within
14 man-days

Who am I ?

- Embedded Software Engineer
- OSS developer
- Working at Monami-ya LLC.
    - Founder/CEO/CTO/CFO/and some more.

Some My Works

- Realtime OS
  - TOPPERS/FI4 (dev lead)
  - TOPPERS/HRP (dev member)

KR-107

RG-7 (C) TOPPERS Project

(C) JAXA

- OSS
  - GDB (committer / write after approval)
  - mruby (listed in AUTHOR file)
  - Android-x86 (develop member)

Wish

- Feather-weight cloud OS.
- Runs on virtualization framework.
- Works with VM based Light-weight Language like Ruby.

Wish

- Construct my Cloud OS within 14 man-days

My First Choice

- mruby - http://www.mruby.org/
- Xen + Stubdom - http://www.xen.org/

What's mruby

- New Ruby runtime. http://github.com/mruby/mruby/
  - Created by Matz. GitHub based CI development.
- Embedded systems oriented.
  - Small memory footprint.
  - High portability. (Device independent. ISO C99 style.)
  - Multiple VM state support (like Lua).
  - mrbgem - component model.

mrbgem

- Simple component system for mruby.
- Adds/modifies your feature to mruby core.
  - By writing C lang source or Ruby script.
- Linked statically to core runtime.
  - Easy to validate whole runtime statically.

Stubdom

- “Stub” for Xen instances in DomU.
  - IPv4 network support (with LWIP stack)
  - Block devices support.
  - Newlib based POSIX emulation (partly)
    - Device-File abstraction like VFS.

Stubdom

- This is just a stub.
  - The implementation is half baked.
    - More system calls returns just -1 (error)
    - No filesystems

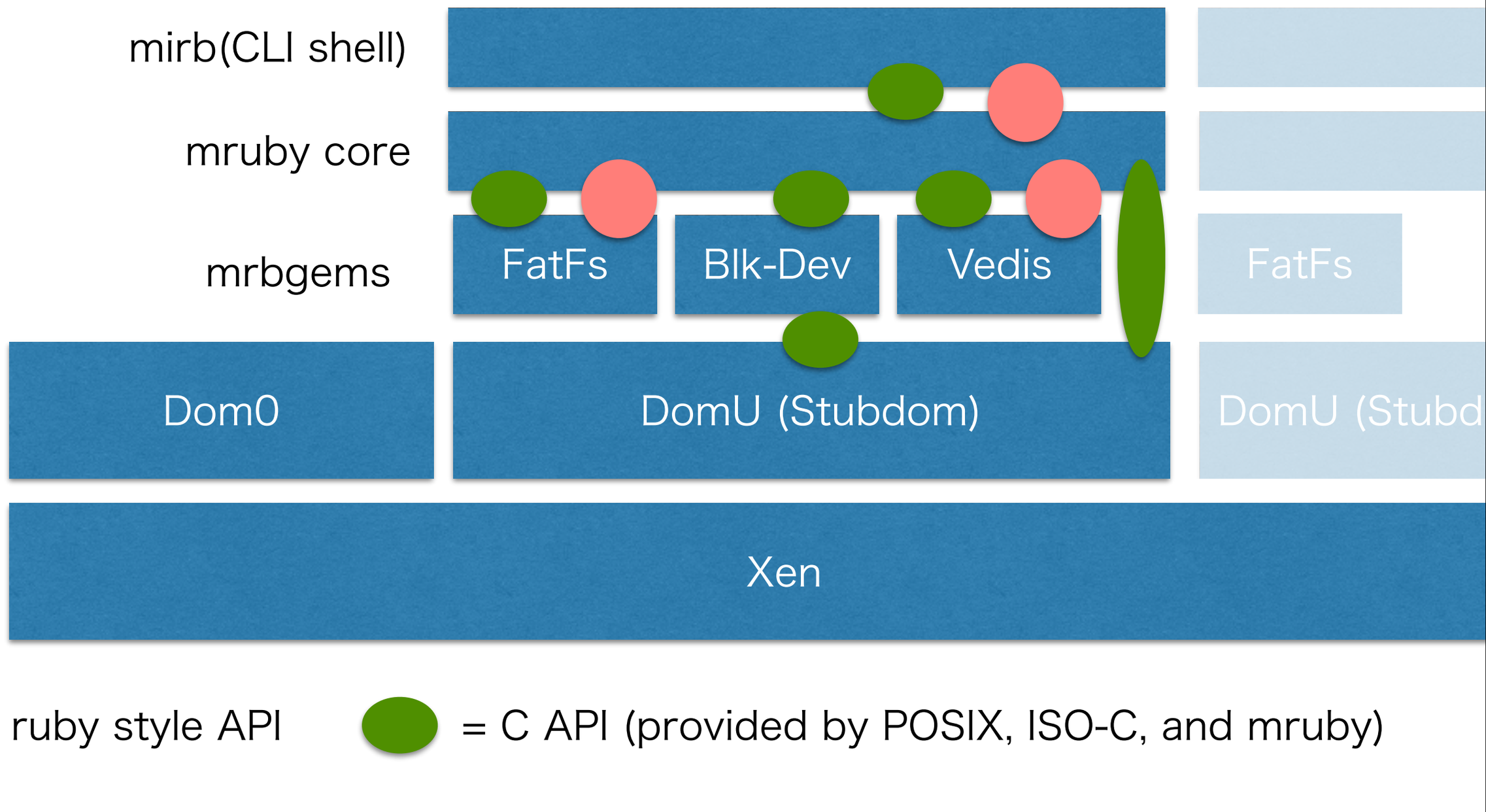
My Additional Choice

- FatFs : Free-beer FAT Filesystem
  - http://elm-chan.org/fsw/ff/00index_e.html
- Very permissive license.
- So many example uses including commercial products.

My Hacks

- Writing several glue code as mrbgems.
  - Xen's block device - FatFs - Stubdom
- Hacking mrbgems to fit poor Stubdom API set.
- Porting mirb (mruby interactive REPL) and implementing multi-threaded telnet server.
- Implementing { ISO | POSIX } functions for Stubdom.

stack structure



More feature

- Small footprint Key-Value-Store
  - vedis - http://vedis.symisc.net/
- Henry Spencer's Regular Expression
- And user can add more feature using mrbgems.

Wish (again)

- Feather-weight cloud OS.
- Runs on virtualization framework.
- Works with VM based Light-weight Language like Ruby..

What's Mocloudos

- Feather-weight cloud OS.
  - Floppy disk size kernel.
- Runs on virtualization framework.
  - Runs on Xen para-virtualization layer.
- Works with VM based Light-weight Language.
  - mruby REPL based command line shell.

What's Mocloudos

- multi mruby VM support.
  - Each mruby VM state is bound to 1 xen thread.
- Extensivity by mrbgems.
  - KVS (NoSQL) support, and more in the future

I could my Cloud OS within 14 man-days.

- Feb 1 : Project started.
- Feb 2 : telnet service with mruby
- Feb 28 : Vedis KVS integration
- Mar 3 : FAT FS integration started (but it break FAT)
- Mar 11 : DHCP and Socket class for mruby finished
- Mar 12 : FAT FS integration finished
  - Moving to alpha version. ＼Today!／

Similar Product and Differences

- Qubes OS
  - Based on Xen

    My OS doesn't have strict security. Feather-weight is all.
- mruby on OSv
  - Uses mruby
  - My OS doesn't have Linux level compat. They are all removed.

Future Plan

- Source code release.
- Porting to another environment.
  - Real devices / Full virtualization (like Bhyve)
- Finding applications that it requires.

Conclusion

- The feather-weight OS for { cloud | virtualization } was born.
- It was developed within 14 man-days.
    - Many people also can create similar one easily.

Conclusion

- Bhyve will be an attractive host for such OSes.