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)
- 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

  - 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](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.