Moby and LinuxKit on ARM64 Server

Dennis Chen
Staff Software Engineer

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Agenda

- Overview
- Design Principle
- Challenges on ARM64
- ARM64 Support Status
- Patch Contribution on ARM64
- Next Steps
- LinuxKit Demo on ARM64
Overview

- A **toolkit** to build a **secure**, **portable** and **lean** Linux Distribution on Demand.
- All system services will exist in form of containers, which can be replaced and removed.

Source: Alvaro Miranda
Design Principle

- Customizable
- Lightweight
- No redundant service
- Resource isolation
- Secure
- Fast boot
- Quick deployment

Traditional Linux Distribution vs Containerized Distribution by LinuxKit
Challenges on ARM64

- Hardcode for AMD64 at the beginning of the LinuxKit project
- One code base to support both ARM64 and AMD64
- Multi-Arch Docker image support (consolidate ARCHs into one)
- Some ARM64 specific packages are missing from Alpine distribution (ovmf…)
- Some existing packages can’t work on ARM64, e.g. gummiboot tool, etc
ARM64 Support Status

- April 2017
  - Docker has plan to support LinuxKit on ARM64, with Arm’s involvement afterwards
- July 6th 2017
  - The forked LinuxKit code base can run on ARM64 successfully, posted by @arm64b
  - https://github.com/arm64b/linuxkit-arm64/tree/aarch64
- August 4th 2017
  - Work closely with LinuxKit community to merge above code into upstream, LinuxKit mainline can support both ARM64 and AMD64

LinuxKit arm64 booting. Build on @packethost arm64 machine from same YAML as x86 using signed multi-arch images. All code merged.
Patch contribution on ARM64

- 13 patches merged by upstream
  - Refactor the original AMD64-only hardcode to support multi-arch
  - Refactor the Dockerfiles to support multi-arch
  - Boot up the ARM64 kernels (4.4, 4.9, 4.12) for LinuxKit
  - Some ARM64 specific bug fixes:
    - 2498 – qemu: Fix the networking issue in 'tap' mode on arm64
    - 2203 – ARM64: specify external firmware binary for containerized qemu
    - ...

- 1 patch under upstream review (one month ago)
  - 2454/2524 – mkimage: Support iso-efi generation for both arm64 and amd64

(latest update on Sep 25th, after a sleepless night suffering the jet lag, the PR has been merged. Thanks Avi D, Justin C, RN... AND thanks to packet.net providing the arm64 server to make it happens 😊)
Next Steps

- Security
  - Content trust build, secure grub2...
- Performance optimization
  - Both footprint and speed
- Alpine Linux contribution
  - For those missing or malfunctional packages on ARM64
- Networking issues
  - Networking configuration persistent -- DHCP
LinuxKit Demo on ARM64 on Friday Demo Day

• We will demo:
  • How to customize and build a LinuxKit distribution image
  • How to make resource isolation with namespace
  • How to generate a tiny LinuxKit distribution with Nginx as microservice

• See you on Friday!
Thank You!
Danke!
Merci!
谢谢！
ありがとう！
Gracias!
Kiitos!