

rust-vmm

- shared virtualization crates-

Firecracker

This is me!



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rust-vmm

A simple analogy

- Build a motorcycle -

1. Define what we want



2. What do we need?

- Wheels
- Engine
- Frame
- Transmission

**Can we use something that
already exists?**

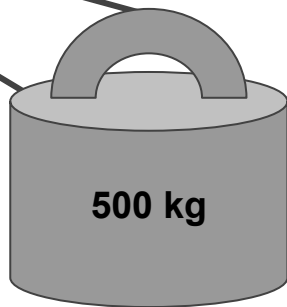
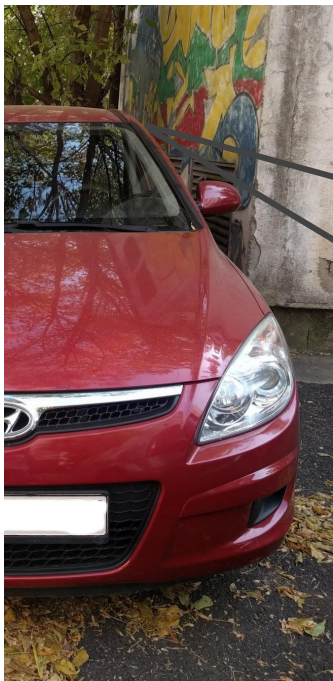


We can start from
the car!

It already works and
everybody is using
it.



We remove what we do
not need.



And we patch it a
bit!

What we planned:



What we did:



**Is there a better way to build
this?**

Build it from scratch!



CrosVM

- Lightweight Rust VMM
- Provides application isolation in ChromiumOS
- Runs on top of KVM

CrosVM



April 2017

Firecracker

- Lightweight Rust VMM
- Short-lived workloads
- Multi-tenant environments
- Runs on top of KVM

Crosvm

Firecracker

April 2017

October 2017

Different Customer Usecases

CrosVM

- GPU
- PCI
- qcow
- ...

Firecracker

- Rate Limiting
- MMDS
- Metrics
- ...



Common Virtualization Components

- KVM API wrappers
- Virt/IO specification implementation
- Kernel loader
- . . .



Welcome to rust-vmm



What is rust-vmm?

- Open-source project
- A place for sharing virtualization components



Why rust-vmm?

- Share common virtualization code between CrosVM & Firecracker



Why would you care about that?

Why rust-vmm?

- Share common virtualization code between CrosVM & Firecracker
- Create custom VMMs
- Modularity & testing



Who has contributed to it so far?

Alibaba Cloud

Kata Containers

Chromium OS

Qemu

Firecracker

Red Hat

Intel



How can you help?

- Become a [member of rust-vmm](#) on GitHub
- Subscribe to the [rust-vmm](#) email list
- Want feedback on your work? Submit a [review request](#)!



What's next?

Ongoing discussions:

- vhost-user
- porting Qemu components

Come decide with us!



Example of a minimal VMM

What do we need?

- KVM wrapper
- Kernel loader
- Block Device
- User interface



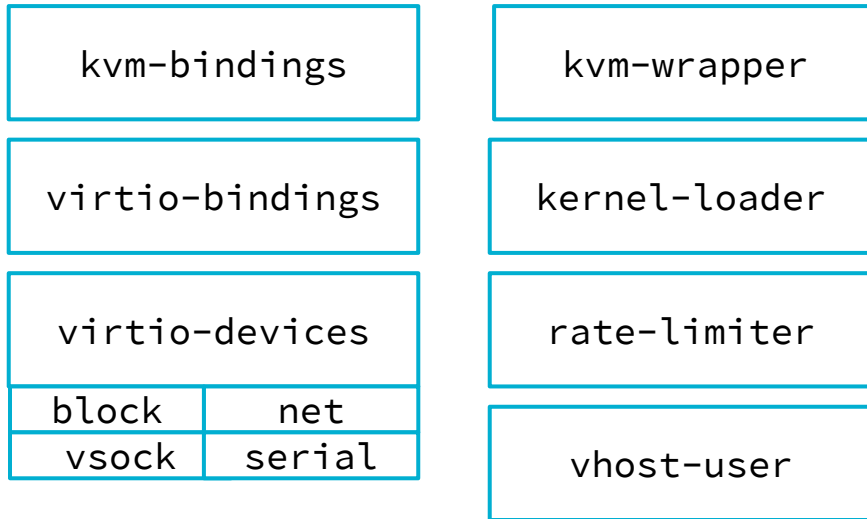
my-minimal-vmm

VMM User
Interface

my-minimal-vmm

VMM User
Interface

future rust-vmm components



my-minimal-vmm

VMM User
Interface

future rust-vmm components

kvm-bindings

virtio-bindings

virtio-devices

block

vsock

net

serial

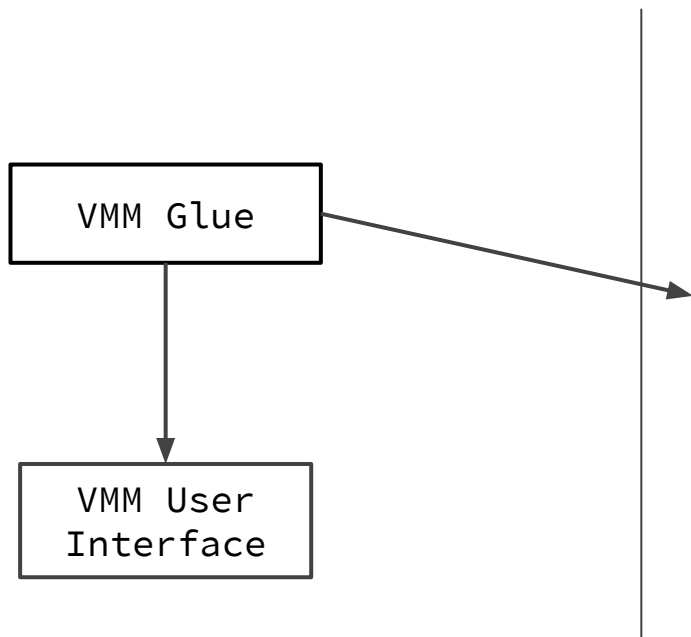
kvm-wrapper

kernel-loader

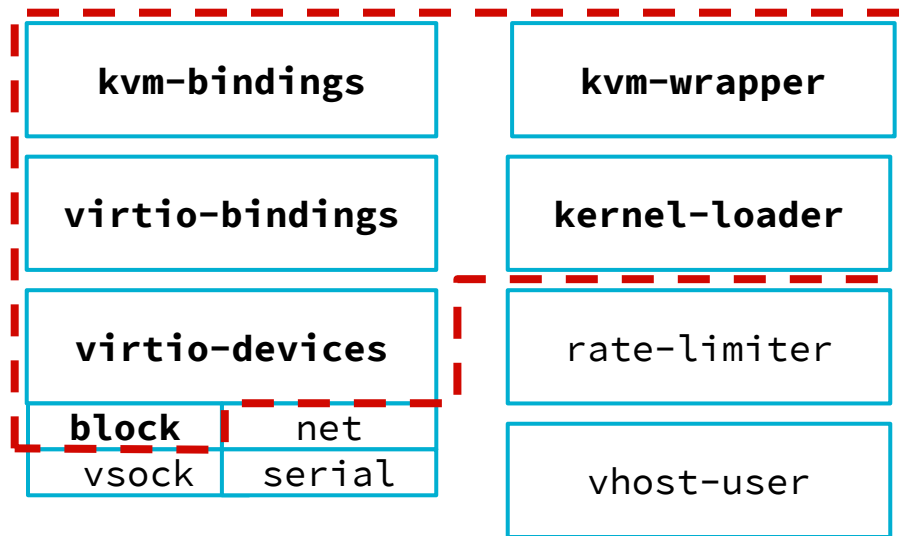
rate-limiter

vhost-user

my-minimal-vmm

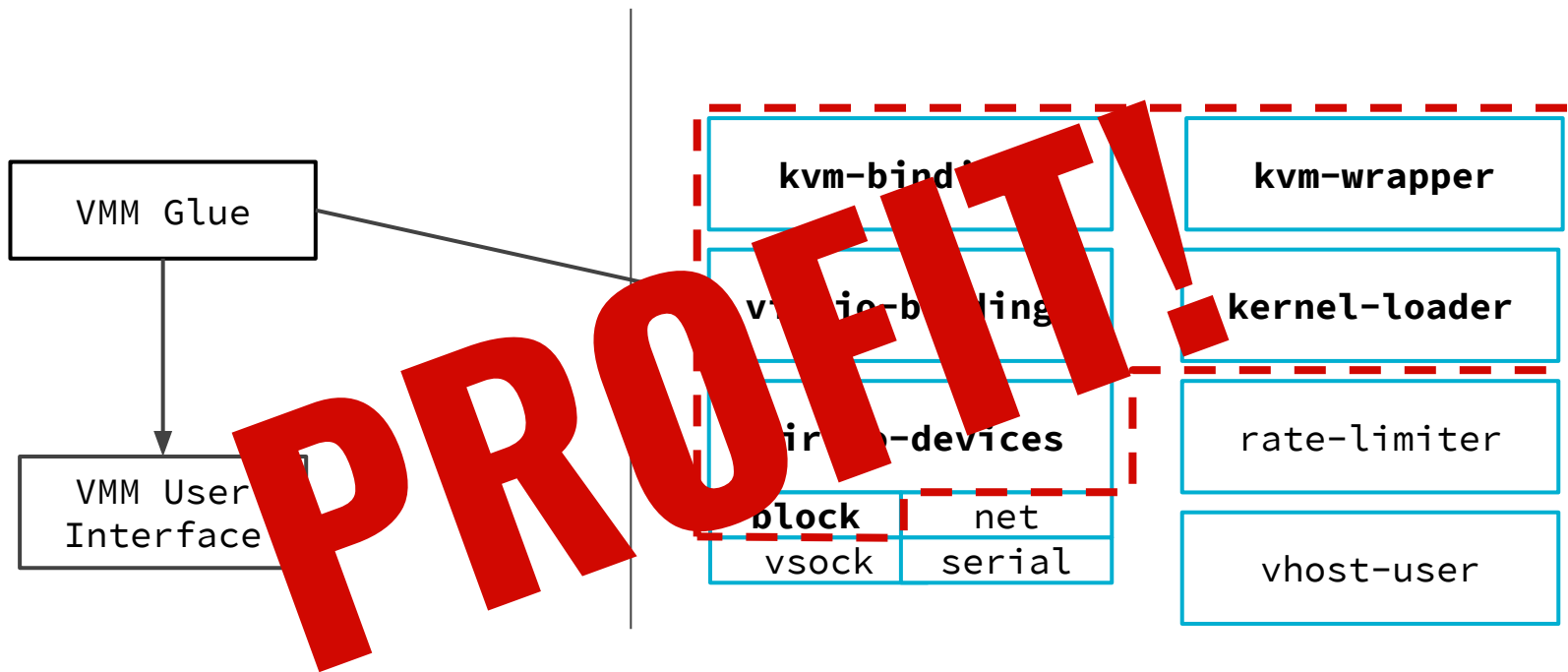


future rust-vmm components



my-minimal-vmm

future rust-vmm components



- <https://github.com/rust-vmm>
- rust-vmm@lists.opendev.org
- fandree@amazon.com

Questions?



rust-vmm: Current Status

TODO	In Progress	Done
KVM ioctls	virtio-bindings	kvm-bindings
VirtIO Devices	kernel-loader	
Others?	vhost-user	

Why rust?

Memory safety - ownership

- One value => one owner
- Values is dropped when owner is out of scope

Performance