Keynote / KVM Status Report 2020

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State of KVM (the Linux kernel part)

- 1 core maintainers: Paolo Bonzini
- Some changes in architecture support
  - ARM32 host support is gone
  - MIPS was unmaintained and got new maintainers
    - James Hogan
    - Huacai Chen
    - Aleksandar Markovic
  - ARM64, PPC, x86, s390
    - Stable maintainers
  - Increasing numbers of reviewers listed in MAINTAINERS file
- RISC-V on the horizon
  - Code looks pretty good, fully reviewed, waiting for architecture stabilization
  - Very strict rules by the RISC-V kernel maintainers
Trends in KVM

• KVM is ubiquitous in the cloud
  • Amazon, Google, IBM, Alibaba, Huawei, Tencent Cloud, ByteDance, Yandex, Oracle, …
  • Software stack range from standard QEMU to highly customized
• KVM is also used in the container and kubernetes world
  • Kata containers for container
  • KubeVirt
• Trusted computing is coming
  • AMD SEV
  • IBM Power Protected Execution
  • IBM Z Secure Execution
  • ARM protected KVM efforts (see also Will Deacon’s talk)
  • Intel TDX (see Sean Christopherson’s talk)
• I/O: Hardware passthrough is still a hot topic but co-exists with virtio
• Test coverage improves
KVM Commits in each release (long term)

KVM change rate is still growing
Commits 5.4-rc1..5.9-rc1

- Last years numbers in ()
- 1549(1116) non-merge commits
- 159(117) merge commits for kvm files
- 579(319) commits have “Reviewed-by:”
- 101(87) commits have “Acked-by:”
- 243(222) commits have “Fixes:”
- 126(113) commits have “Cc: stable”

Top authors
- 419 Sean Christopherson
- 142 Paolo Bonzini
- 79 Marc Zyngier
- 58 Vitaly Kuznetsov
- 43 Miaohe Lin

Top reviewers
- 157 Vitaly Kuznetsov
- 66 Cornelia Huck
- 57 Jim Mattson
- 34 David Hildenbrand
- 27 Peter Shier

Top repairmen
- 73 Sean Christopherson
- 28 Paolo Bonzini
- 19 Marc Zyngier
- 13 Vitaly Kuznetsov
- 13 Marios Pomonis
Employers

- Commits from >20 companies
  - Redhat: Overall maintainer
  - Intel
  - IBM: Power, IBM Z
  - Google
  - Huawei
  - Marc Zyngier: Amazon/Google
  - ARM
  - Oracle
  - AMD
  - Tencent Cloud
  - Lemote, SUSE, Microsoft, Amazon, Alibaba, Canonical, Linutronix, ….
Highlights testing

• kvm-unit-tests used for testing non-KVM hypervisors
• Rehosting of kvm-unit-tests on gitlab
  • CI
• More and more selftests
• More and more kvm unit tests
Highlights overall

- Trusted Computing everywhere
- kvm_stat logging and CSV
- Unify shadow MMU cache data structures across architectures
- Fixes, cleanups etc.
Highlights x86

- async page fault rework
- Dirty bitmap optimization
- Refactoring and optimization (MMU, CPUID, pointer chasing, PMU, IOAPIC, TLB, event injection)
- more spectre-like work and optimization (retpoline, Spectre-v1/L1TF, TSX_CTRL)
- Nesting (5 level page tables, AMD improvements, PMU)
- SEV improvements (ASID allocation and flushing)
- Support for mapping DAX areas with large nested page table entries
- Fast path for IPI delivery and tsc deadline timer
Highlights ARM

- Removal of 32 bit host support
- Interrupt controller improvements
- Split VHE and nVHE hypervisor code
- Pointer authentication for guests on nVHE
- Steal time support
- Data abort report and injection
- Level-based TLB invalidation support
Highlights MIPS

- Loongson support
Highlights Power

- PPC secure guest support
- Preliminary POWER10 support
- Up to 4094 guests for HV KVM
- Interrupt improvements
- Single-step capability indication
Highlights IBM Z (s390x)

- Secure execution
- Selftests
- Yield improvements
- Nesting fixes
- Diagnose 318 handling
Forward looking (beyond 5.9)

- X86 new MMU for two-dimensional paging
- More trusted computing
  - AMD SEV enhancements (secure state and secure nested paging)
  - ARM Protected KVM?
  - Intel TDX
  - Power, s390x enhancements
- RISC-V
Have a great KVM Forum

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