September 2021 – September 2022

- September 2021: Linux 5.15-rc1
- September 2022: Linux 6.0 well under way
- (Almost) 6 releases
- ~2500 commits; 202 to stable releases
  - Up from 2200 and 180 between 5.9-rc1 and 5.15-rc1
  - Ratio roughly unchanged, a little less than 1:12
- Welcome RISC-V to upstream KVM! (5.16)
Commits in each group of 5 releases
Commits by employer since 5.15-rc1
Commits by architecture since 5.15-rc1

- x86: 1162 commits
- ARM: 396 commits
- POWER: 174 commits
- s390x: 94 commits
- RISC-V: 89 commits
- MIPS: 23 commits
- Selftests: 491 commits
- Generic: 209 commits
Use Linux library code more

- Memslot lookup (interval tree)
- vCPU lookup (xarray)
- x86 page table destruction (workqueue)
x86 highlights

- API for continuous TSC over migration
- Many APICv/AVIC cleanups
- Many more MMU cleanups and fixes
- In-kernel Xen event channel delivery
- Eager splitting of page tables
x86 hardware features - AMD

- Nested LBR
- Nested TSC scaling
- “Nested nested” acceleration: vGIF, vVMLOAD/VMSAVE
- AVIC with physical APIC ID > 255 (aka “x2AVIC”)
x86 hardware features - Intel

• AMX and dynamic XSAVE states, thanks Thomas Gleixner!
• Intel IPI virtualization
• Intel PEBS (Precise Event-Based Sampling) virtualization
Arm highlights

- Support for timed event wait instructions WFxT
- Support for asymmetric PMU setup
- Apple M1 support
- PSCI-based suspend
- Hypercall selection from userspace
- New VMID allocator using fewer IPIs
- Hypervisor stack guard pages and stack traces
Arm: Protected KVM

- EL2 filtering of system registers
- Limitation of some hypercalls after initialization
- Selective sharing of pages from EL1 to EL2
s390

- Secure guests
  - Lazy destroy of secure VMs
  - Ultravisor communication device driver
  - Adapter interrupt virtualization
- Storage key improvements/fixes
Maintenance changes

- POWER changes go through architecture tree
- New x86 maintainers sending pull requests to me
  - Sean Christopherson
  - Vitaly Kuznetsov
What’s next? x86

• Improved CI
• x86 confidential computing
  • Intel TDX
  • AMD SEV-SNP
What’s next? Feature parity

- Paravirtualization features
  - Asynchronous page faults
  - Steal time
  - Proposals worked on in the RISC-V hypervisor SIG
- Hypervisor features
  - Dirty page ring
  - Scalable MMU
Thank you

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