



# **KVM update**

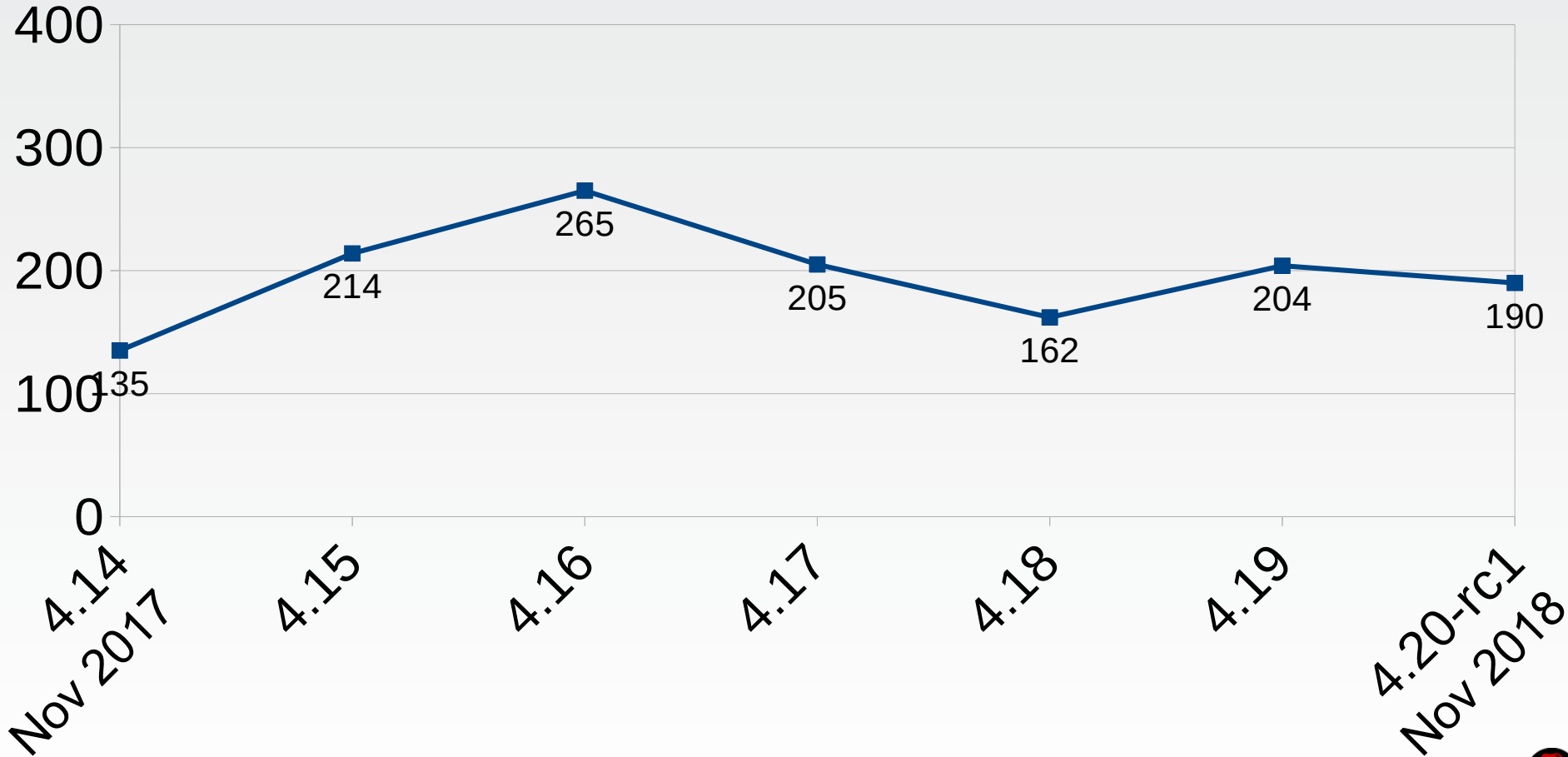
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Red Hat, Inc.  
KVM Forum 2018

# A year of KVM

- November 2017: Linux 4.14
- November 2018: Linux 4.19
- 5 releases
- 1240 commits
- 165 authors
- At least 15 employers



# Commits in each release (non-merge)

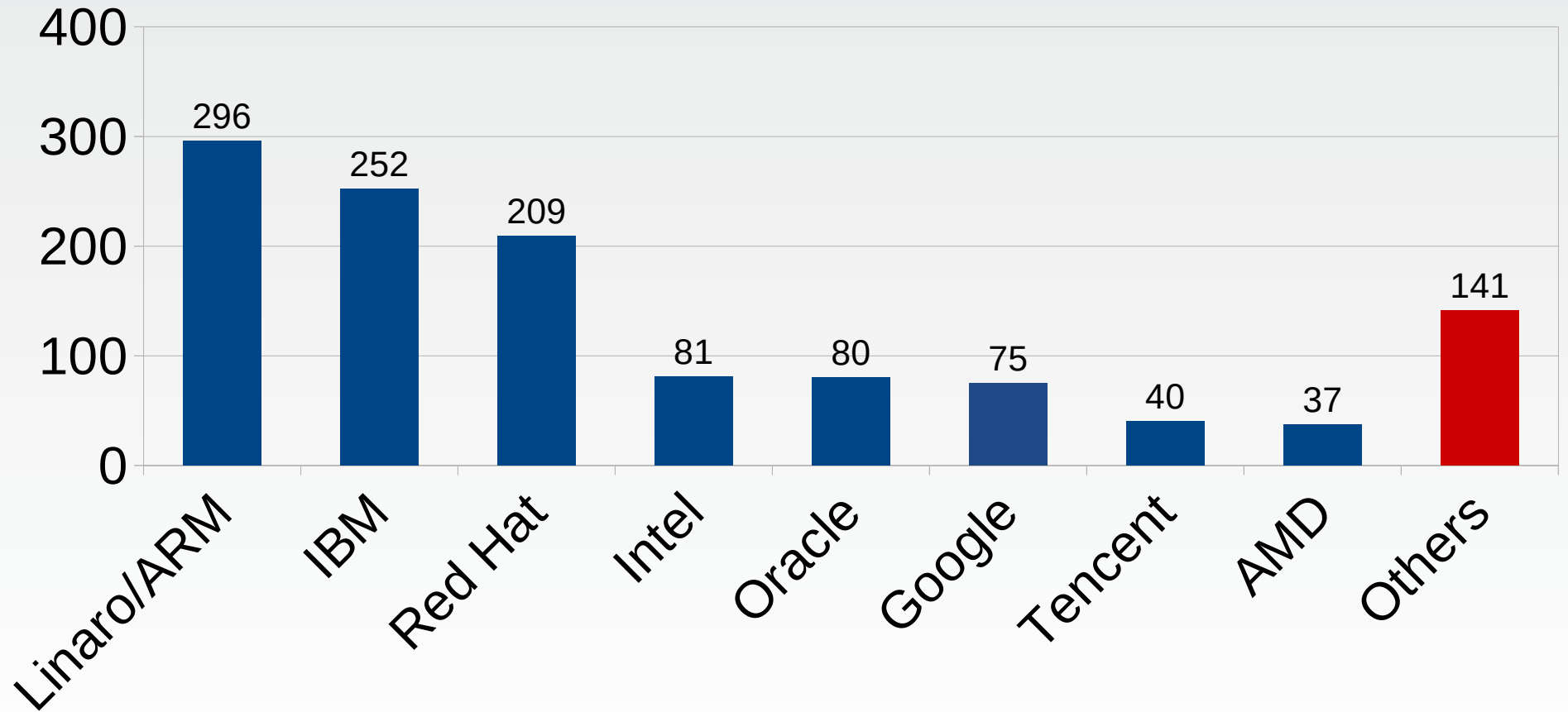


## Who contributes to KVM?

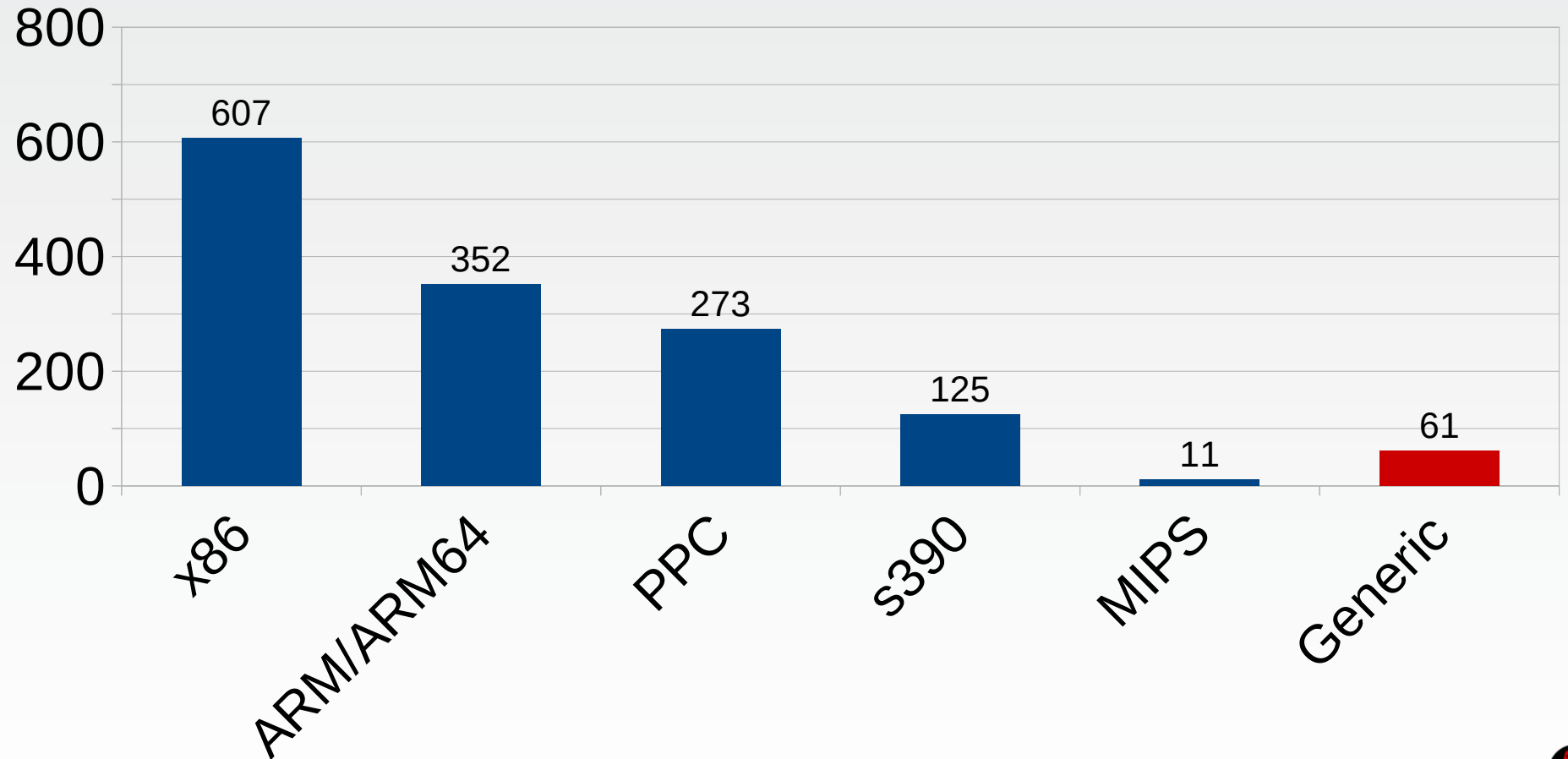
- Hardware vendors: AMD, ARM, IBM, Intel, Samsung
- Hypervisor vendors: Huawei, Oracle, Red Hat, Virtuozzo
- Cloud vendors: Amazon, Google, Microsoft, Tencent, ZTE
- And more



# Commits by employer since 4.14



# Commits by architecture since 4.14



# Highlights: x86

- Nested virtualization (Intel)
  - Lots of cleanup and bugfixes
  - Live migration
  - Nested VMCS shadowing
- AMD Secure Encrypted Virtualization
- Paravirtualization: TLB shutdown, IPI
- Hyper-V enlightenments
- Spectre v2 + L1TF
  - MSR-based features



## Highlights: ARM

- Many optimizations
- GIC v4
- RAS error reporting and handling





# Highlights: POWER

- POWER9
- Nested virtualization
- Spectre, Meltdown



## Highlights: s390

- Adapter Interruption Virtualization (exitless interrupts)
- Improvements to vSIE (nested virtualization)
- Crypto acceleration (vfio-ap)
- Initial support for host large page
- Spectre v2



# x86 nested virtualization

- Nested vmexit performance improvements
  - Remove unnecessary operations (KVM Forum '17)
  - Shadow paging vmexit scalability
- Many event injection fixes
  - Everybody understands event injection better! 😊
- Live migration support for the L1 guest
  - Reporting host VMX capabilities
  - Nested virtualization state save/restore
- For now, all improvements are for Intel only



# Testing

- kvm-unit-tests
  - 181 commits in the last year
  - Lots of x86 nested virtualization tests!
- API self-tests
  - New in 4.17, already have x86 and ARM support
  - Guests run outside of QEMU
  - Allows testing API corner cases, race conditions,...
  - Contributed by Google and Red Hat
- TODO: convert old API tests in kvm-unit-tests



Enjoy the rest of KVM Forum!

