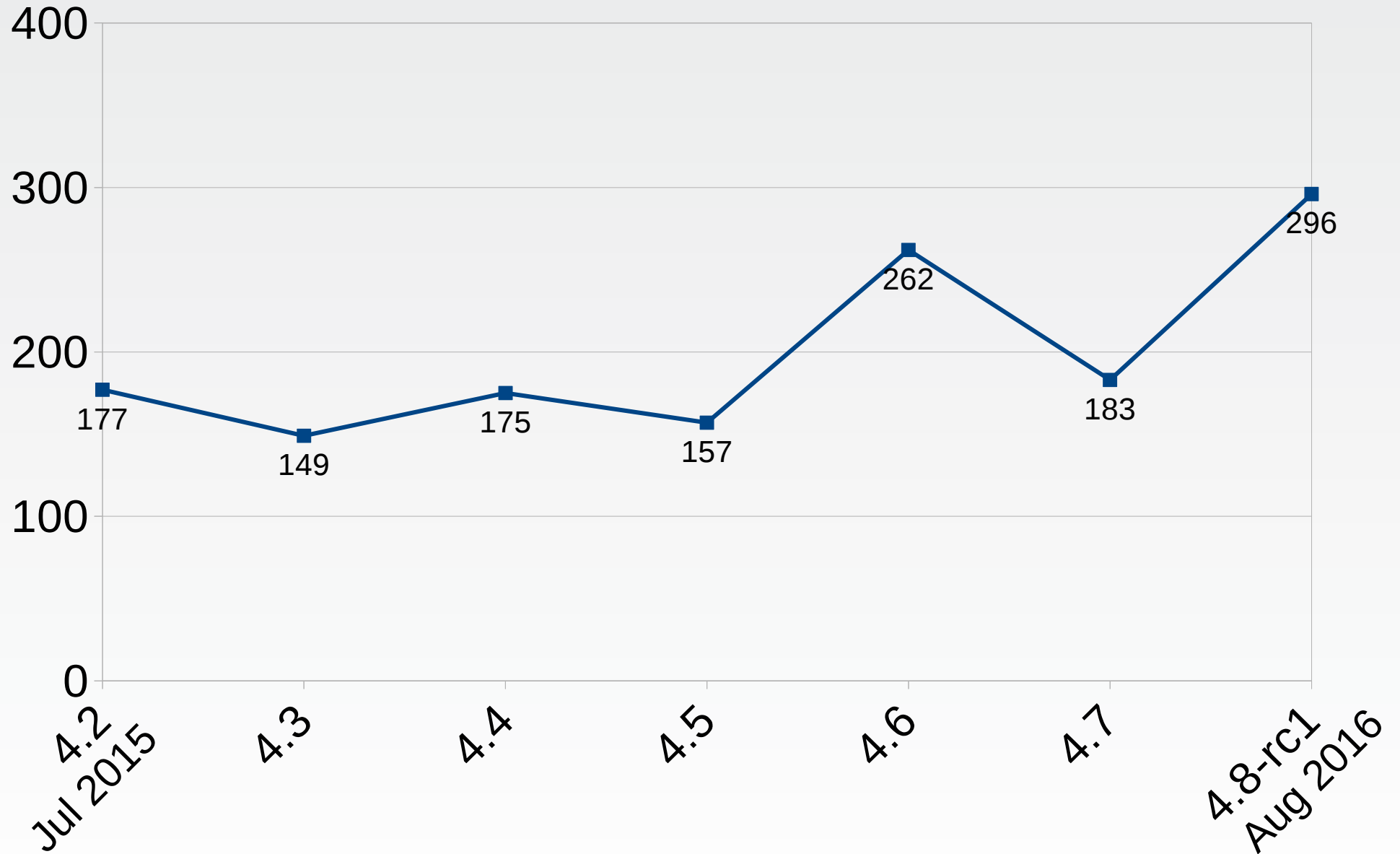# KVM Forum 2016 - Keynote

Paolo Bonzini
Red Hat, Inc.
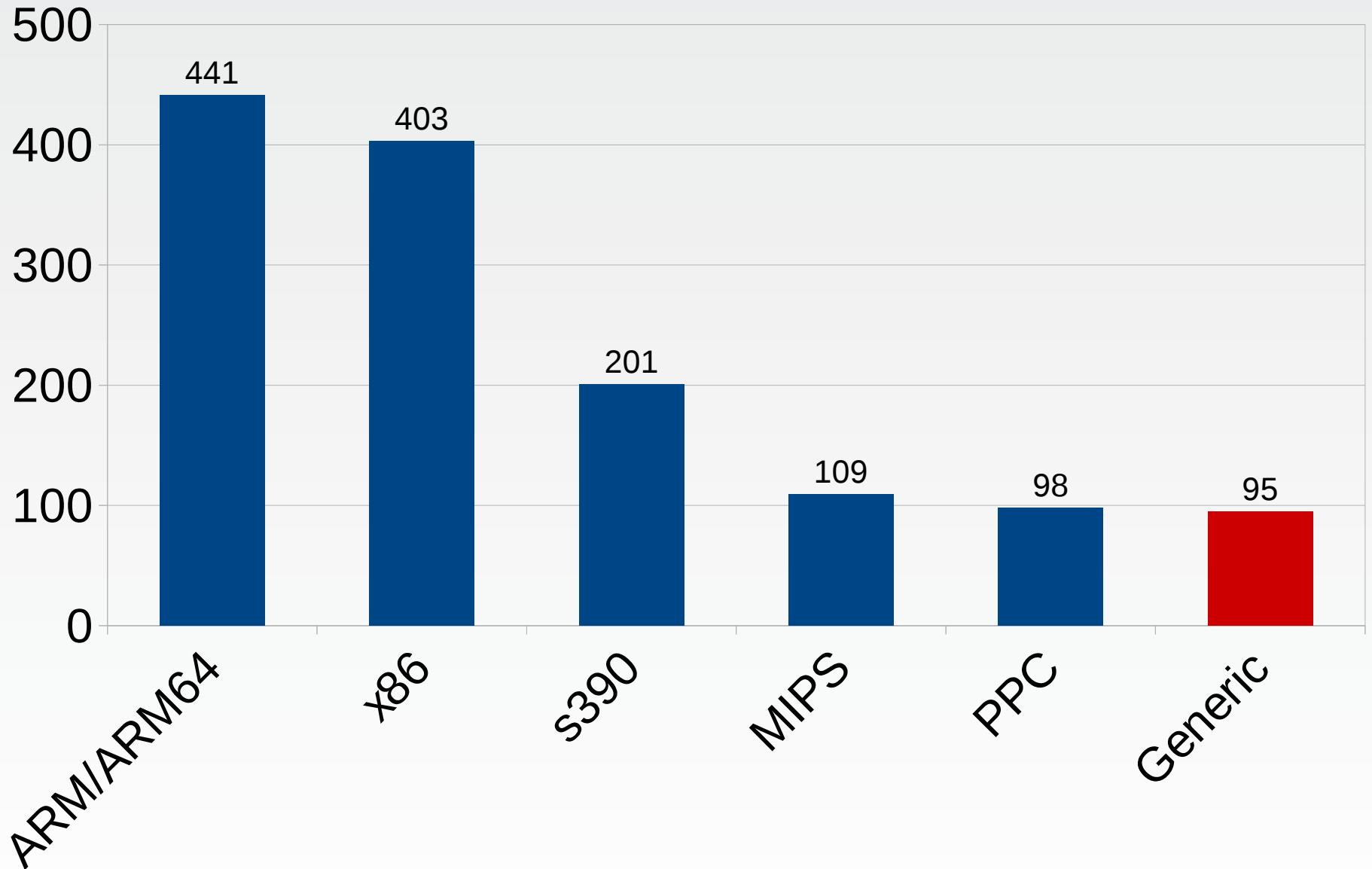KVM Forum 2016

State of KVM

- 6 architectures

  - All in-tree, all actively maintained

  - ARM, ARM64, MIPS, PPC, x86, s390

- 2 main userspace implementations

  - All architectures supported in QEMU

  - All except s390 in kvmtool

- Since 4.2: 6 releases, 1222 commits, ~15 companies

- New co-maintainer: Radim Krčmář!

Commits in each release (non-merge)

Data points:
- 4.2 Jul 2015: 177
- 4.3: 149
- 4.4: 175
- 4.5: 157
- 4.6: 262
- 4.7: 183
- 4.8-rc1 Aug 2016: 296

Commits by architecture since July 2015

Bar chart showing commits by architecture: ARM/ARM64 = 441, x86 = 403, s390 = 201, MIPS = 109, PPC = 98, Generic = 95.
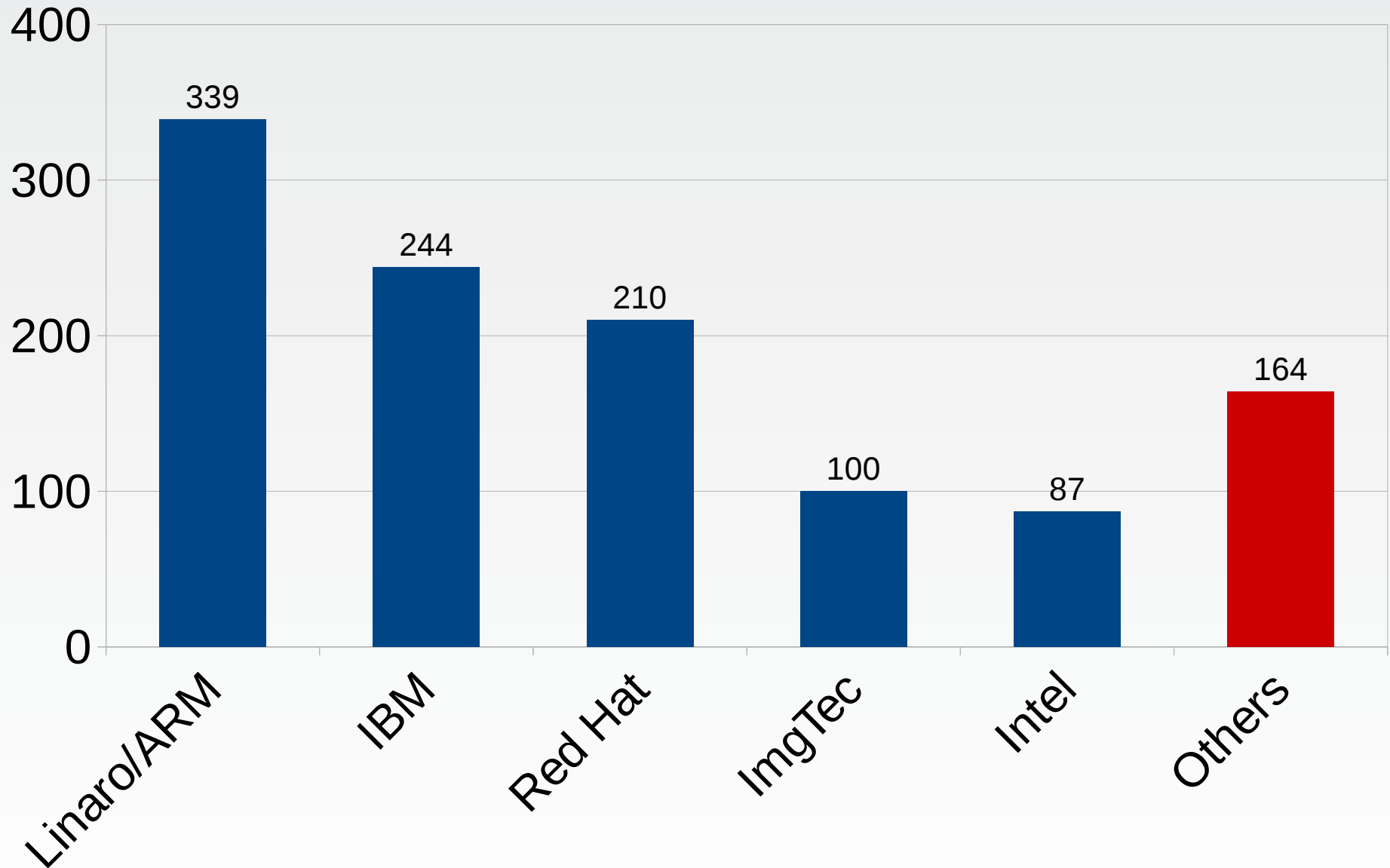
Main contributors

- Red Hat: maintenance, x86

- Linaro+ARM: ARM/ARM64

- IBM: PPC, s390

- Imagination Technologies: MIPS

- Intel, AMD: x86 hardware enablement

- Google, Kingsoft Cloud, Samsung, Virtuozzo,...

Commits by employer (non-merge, since Jul '15)

Bar chart showing commits by employer: Linaro/ARM 339, IBM 244, Red Hat 210, ImgTec 100, Intel 87, Others 164.

Highlights: x86

- VT-d posted interrupts

- AVIC (AMD APIC virtualization)

- Nested virtualization: nested VPID, security

- More Hyper-V

- Split irqchip

- >255 vCPUs

Highlights: ARM

- Debug support

- Virtualization Host Extensions (kernel at EL2)

- Virtual PMU

- 16K pages

- VGIC rewrite

- MSI support

Highlights: POWER

- POWER8 micro-threading
- IOMMU hypercalls
- Dynamic DMA windows

Highlights: s390

- Guest runtime instrumentation

- PCI passthrough (KVM-VFIO)

- Nested virtualization (vSIE)

- Preparing for CPU model support

Highlights: MIPS

- Many cleanups

- 64-bit host support

- Preparing for hardware virtualization extensions

Performance

- "Improving vmexit latency one patch at a time—since 2006"

- Context tracking optimizations

- Adaptive low-latency halt

- Optimized TSC deadline timer

Security

- Virtualization provides the best isolation

- Secure boot

- Kernel hardening and KVM

- AMD Secure Encrypted Virtualization (SEV)

kvm-unit-tests

- 220 commits in the last year

- "Standalone test" infrastructure

- PPC64 port and initial RTAS test

- http://www.linux-kvm.org/page/KVM-unit-tests

It's not just KVM!

- VFIO

  - No-IOMMU mode (for DPDK)

  - Intel Integrated Graphics Device assignment

  - In the pipeline: mediated device framework (vGPU, s390 virtual channel I/O)

- virtio/vhost

  - Polling support

  - Xen support

- Real-time

Thanks!