CPU Hot-Plug
Status And Challenges

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Outline

Overview Of This Presentation

• Motivation
• History and status
• Challenges
• Discussion
Motivation For CPU Hot-Plug

Why Invest In CPU Hot-Plug?

• Scalability
• Testing
CPU “Hot-Plug” In qemu-kvm

CPU Scaling By Ballooning

• vCPUs pre-allocated

• cpu-set HMP command
  - Sets them online/offline
  - Conceptually similar to virtio-balloon for memory

• Not working in last qemu-kvm versions

• Never available in qemu
Status
CPU Hot-Plug
First Real CPU Hot-Add

- vCPUs dynamically added
- cpu-add QMP/HMP command
  - Creates a new X86CPUState and vCPU dynamically
  - Allows to add maxcpus minus initial number of vCPUs
- Windows Server 2012R2+: CPU online right away
- Linux: Need to explicitly set CPU online via /sys

Credits:
- Andreas Färber – CPUState preparations
- Igor Mammedov, Eduardo Habkost – x86/ACPI/QMP parts
Challenges
CPU Hot-Unplug
Reverting The Effects Of CPU Hot-Plug

• vCPUs dynamically removed
• Add cpu-del QMP/HMP commands?
  - How does argument relate to CPU indices? (sparse?)
• Or reuse device-del infrastructure?

• Credits:
  - Fujitsu et al.
From Custom QMP to QOM Device?

- Originally for cpu-set CPU was on Object
- Now CPU is a Device → device-add?
  - Not every machine a PC
    - Allow to add different CPUs
    - Where do we add them to? (topology)
  - Reuse existing infrastructure
  - Which granularity? (ABI stability…)

- Credits:
  - Andreas Färber – RFC QOM'ifying underneath cpu-add
  - Bharata Rao – CPU index rework
CPU Hot-Plug For Power Architecture

- pseries machine is a virtual machine (sPAPR)
- Conclusion: Hot-add on CPU core level
  - SMT a fixed property of core

- Credits:
  - Bharata Rao
CPU Hot-Plug For System z

- There are only virtual machines (PR/SM, LPAR)
- Hot-add on CPU core or on thread level?
- Dispatching required
- NUMA?

• Credits:
  - Jason J. Herne et al.
More?
qemu-project.org

Thank you.
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We adapt. You succeed.