KVM on Embedded POWER
An Update

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Agenda

- Embedded Systems & KVM
- Status
- To Do
Embedded Systems

• How is embedded different?
  – Fixed function devices– not general purpose
  – Huge variety of hardware platforms
    ▪ No standard platforms (no BIOS, ACPI, UEFI)
  – Real time constraints
  – Large variety of operating systems
    ▪ VDC Research (2011 report)
      • About 50% of devices shipped by survey respondents had no formal OS or an
        in-house developed OS

• Virtualization capabilities that are less important:
  – Dozens or hundreds of VMs
  – Live migration
# QorIQ Processing Platforms

<table>
<thead>
<tr>
<th>QorIQ P5</th>
<th>64-bit High End</th>
<th>Service Provider Network Admission Controls</th>
<th>Storage Networks</th>
<th>Switching</th>
</tr>
</thead>
<tbody>
<tr>
<td>P5020, P5010</td>
<td>Up to 2.2 GHz</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>QorIQ P4</th>
<th>4 – 8 Cores</th>
<th>Metro Carrier Edge Router</th>
<th>IMS Controller</th>
<th>Radio Network Control</th>
<th>Serving Node Router</th>
</tr>
</thead>
<tbody>
<tr>
<td>P4080, P4040</td>
<td>Up to 1.5 GHz</td>
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</tbody>
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<table>
<thead>
<tr>
<th>QorIQ P3</th>
<th>2 – 4 Cores</th>
<th>Converged Media Gateway</th>
<th>SSL, IPSec, Firewall</th>
<th>Access Gateway</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3041</td>
<td>Up to 1.5 GHz</td>
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</table>

<table>
<thead>
<tr>
<th>QorIQ P2</th>
<th>1 – 2 Cores</th>
<th>Unified Threat Mgmt</th>
<th>VoIP Carrier-Class Media Gateway</th>
<th>Wireless Media Gateway</th>
<th>Base Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2040, P2020, P2010</td>
<td>Up to 1.2 GHz</td>
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<table>
<thead>
<tr>
<th>QorIQ P1</th>
<th>1 – 2 Cores</th>
<th>Integrated Services Router</th>
<th>Network Attached Storage</th>
<th>Home Media Hub</th>
<th>Enterprise WAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1010, P1011, P1012, P1013, P1014, P1015, P1016, P1017, P1020, P1021, P1022, P1023, P1024, P1025</td>
<td>400 MHz to 1 GHz</td>
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</tbody>
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Status

- e500mc (32-bit) support upstream
  - A few vcpu features still pending
- 64-bit support (e5500) implemented and nearly through review cycle
- SMP support
- Hugetlbfs support
- Generic e500 machine implemented in QEMU
  - QEMU e500 platform now in upstream Linux kernel
  - Device tree is now dynamically generated
- Cleanup / bug fixes
- Freescale IOMMU (PAMU) driver development in process
To Do

- Performance analysis
- e6500 core support
  - LRAT: Logical-to-Real Address Translation
- QEMU gdb stub
- Device assignment / VFIO
  - Datapath Acceleration Architecture (DPAA)
- In-kernel interrupt controller (MPIC)
- Real Time
- Libvirt
- Direct interrupts to VM for pass-through devices