ACRN Open Source Roadmap in 2020

<table>
<thead>
<tr>
<th>Feature and dates</th>
<th>Q4’19</th>
<th>Q1’20</th>
<th>Q2’20</th>
<th>Q3’20</th>
<th>Q4’20</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ACRN Next Evolution**

- CPU Sharing
- GVT-d for Windows guest
- Offline configuration tool
- DM in HV (PCI bridge and CFG space)
- Power management for Sharing and Hybrid Mode
- Basic Libvirt support
- SR-IOV (Ethernet)
- Multiple RTVM
- Inter-RTVM communication
# ACRN Open Source Roadmap in 2020

*Feature and dates for reference only and subject to change without notices*

<table>
<thead>
<tr>
<th></th>
<th>Q4’19</th>
<th>Q1’20</th>
<th>Q2’20</th>
<th>Q3’20</th>
<th>Q4’20</th>
</tr>
</thead>
</table>
| **Hypervisor** | • Zephyr as Safety OS  
• CPU sharing  
• Kata Containers managed from within the Service VM (via Docker)  
• Kata Containers managed from within the Service VM (via Kubernetes) | • Service VM: Yocto or Ubuntu  
• Offline configuration tool  
• S5/reset for sharing mode with RTVM | • CPU sharing - C/P state support  
• CPU sharing - priority/credit-based scheduler  
• Service VM boot from virtual boot loader  
• S5 for hybrid mode  
• CPU ISA - AIA, CLWB, CLDEMOTE  
• SHA-256/AES-256  
• TCC feature - ART, PTM, split lock, pseudo-locking  
• Security - TME (Total Memory Encryption), ROP CET | • Multiple RTVMs  
• Inter-RTVM communication | • 5-Level Paging  
• CPU ISA - VNNI, VP0PCNT, VPMADD52  
• TCC feature - MBA, MBM, CMT, device post interrupt  
• Security - UMIP |

| **I/O virtualization** | • GVT-d for Windows guest  
• SR-IOV for Ethernet  
• Libvirt basic support  
• Device Model in HV - PCI bridge & CFG space | • PCIe 4.0  
• ACPI customization in HV | | | • PCIe 5.0 |

For more details on these features, see the next slide.
2020 ACRN Roadmap Feature Description

Zephyr as Safety OS: Zephyr will be used as a safety OS which will perform the system functional safety-related tasks.

CPU sharing: Enable a scheduler in the hypervisor to allow Service and User VMs to share physical CPUs

Kata Containers managed from within the Service VM (via Docker): Make Kata/ACRN work with Docker.
Kata Containers managed from within the Service VM (via Kubernetes): Make Kata/ACRN work with Kubernetes.

Service VM: Yocto or Ubuntu: Enable Yocto Project or Ubuntu as the Service VM Operating System (OS).

Offline configuration tool: offline configuration tool for ACRN hypervisor that covers configuration items such as guest VM memory, CPU cores, HW allocation, etc.

S5/reset for sharing mode with RTVM: Support Power transition of shutdown/reset for system or per-VM level under the sharing mode with RTVM scenario.

GVT-d for Windows Guest: GPU passthrough (GVT-d) can be used to assign GPU to dedicated Windows Guest. The local display will be assigned to Windows Guest accordingly.


Libvirt basic support: ACRN and Device Model support for basic libvirt operations for VM management such as VM start/stop.

Device Model in HV - PCI bridge & CFG space for PTdev: Support PCI bridge and config space emulation for Pass-thru devices in the hypervisor.

CPU sharing - C/P state in HV: Support the CPU C/P state in hypervisors after CPU sharing is enabled.

CPU sharing - priority/credit-based scheduler: Support/improve the CPU sharing scheduler based on priority/credit.

Service VM boot from virtual boot loader: Support Service VM boot from a virtual boot loader (e.g. OVMF).

S5 for hybrid mode: Support power transition of shutdown for system or per-VM level under the hybrid mode scenario (e.g. pre-launched Safety VM + Service VM + HMI + RTVM).

CPU ISA - AIA, CLWB, CLDEMOTE: CPU Instruction Set Architecture (ISA), including AIA, CLWB, CLDEMOTE.


TCC features: ART, PTM, split lock, pseudo-locking.

Security Feature: TME (Total Memory Encryption) and ROP CET(Control-flow Enforcement Technology that blocks Return Oriented Programming attacks).

PCIe 4.0: Peripheral Component Interconnect Express 4.0 Standard.

ACPI customization in HV: Support a customized ACPI table for pre-launched and service VMs.

Multiple RTVM: Support more than one RTVM in a system.

Inter-RTVM communication: Provide a high-bandwidth, low-latency inter-VM communication between RTVMs.

5-Level Paging: To support up to 4PB of physical memory.

CPU ISA - VNNI, VPPOPCNT, VPMMADD52: CPU Instruction Set Architecture (ISA), including VNNI, VPOP, VPMMADD52.

TCC features: MBA (Memory Bandwidth Allocation), MBM (Memory Bandwidth Monitoring), CMT (Cache Monitoring Technology), device post interrupt.


PCIe 5.0: Peripheral Component Interconnect Express 5.0 Standard.