HV Debugging Feature

VMF part

HV Debugging Feature

☐ **Hypervisor Log**

☐ **Monitoring**

- – Event Statistics
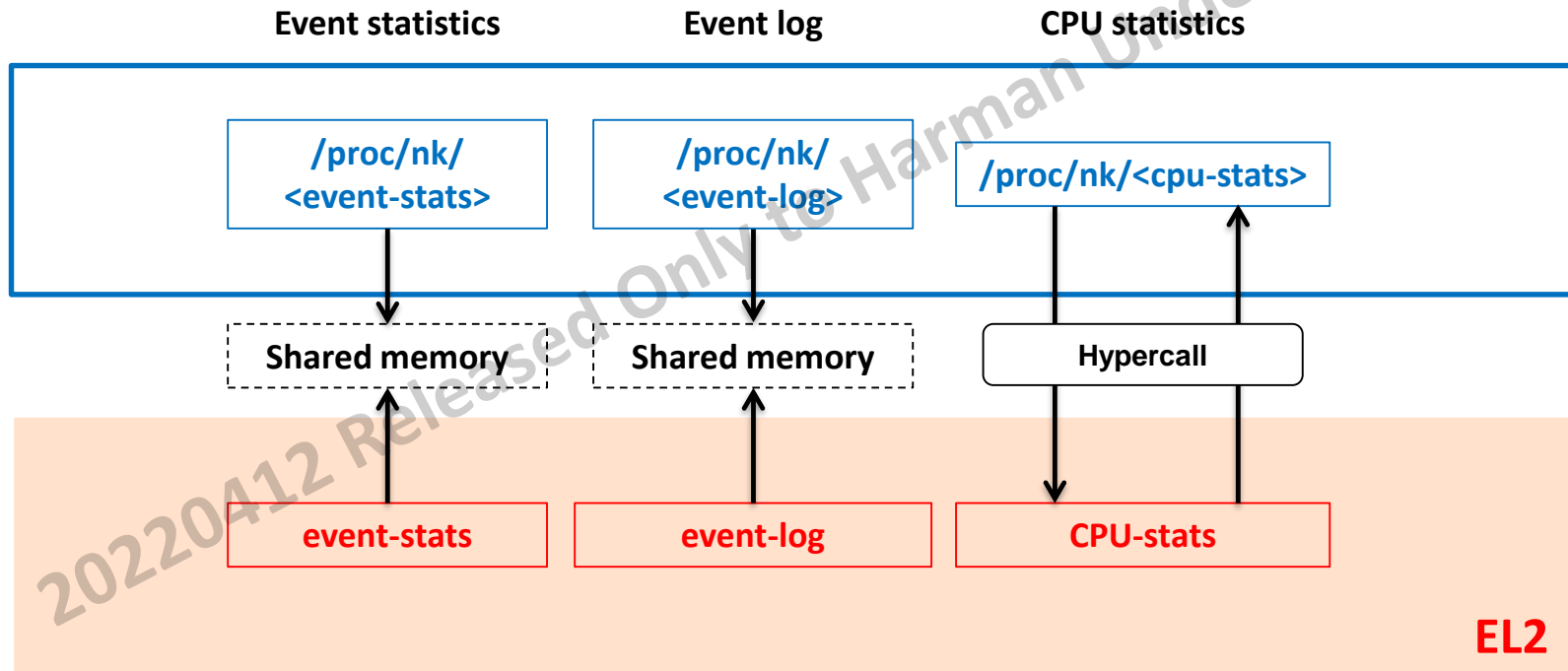- – Event Log
- – CPU Statistics
- – vCPU Registers

Hypervisor Log

– Log stored by/in hypervisor

– /proc/nk/history

```
root@euto-v9-sadk:/proc/nk# cat history
0 HYP:[+0000045354 ticks] _hbi_dtb_probe_and_move: move DTB: [0xba00c580..0xba02313c] -> [0x80022220..0x80038ddc)
0 HYP:[+0000045568 ticks] _hbi_dtb_process_vplatform: VM2 vplatform DTB [0x80022220..0x80038ddc)
0 HYP:[+0000045945 ticks] _hbi_dtb_probe_and_move: move DTB: [0xba023148..0xba03a8b5] -> [0x80038de0..0x8005054d)
0 HYP:[+0000046045 ticks] _hbi_dtb_process_vplatform: VM3 vplatform DTB [0x80038de0..0x8005054d)
0 HYP:[+0000046139 ticks] _bsp_dtb_iter_run: Parse BSP (bootloader) DT
0 HYP:[+0000046373 ticks] _pd_tz_new_node: PD TZ node: addr=0x19e70204 phandle=6 name=pd-aud@10461980
0 HYP:[+0000046531 ticks] _pd_tz_new_node: PD TZ node: addr=0x1d710204 phandle=2 name=pd-dnc@10461D00
0 HYP:[+0000046688 ticks] _pd_tz_new_node: PD TZ node: addr=0x1dc10204 phandle=3 name=pd-npu00@10461D80
0 HYP:[+0000046840 ticks] _pd_tz_new_node: PD TZ node: addr=0x1de10204 phandle=4 name=pd-npu10@10461E80
0 HYP:[+0000046997 ticks] _pd_tz_new_node: PD TZ node: addr=0x1dd10204 phandle=5 name=pd-npu01@10461E00
```

Monitoring

□ **Overview**

□ Event Statistics

– /proc/nk/monitoring/vl,evt-stats-0/*

– Statistics for Physical CPU
  - Hardware interrupt
  - CPU operation

– Statistics for Virtual CPU
  - Virtual interrupt
  - Hypervisor call
  - Virtual interrupt
  - Trap
  - Virtual interrupt
  - Emulated device access
  - VCPU operation

Event Statistics (Virtual Interrupt)

– /proc/nk/monitoring/vl,evt-stats-0/virq-3cntrs

	VCPU0	VCPU1	VCPU2	VCPU3	TOTAL
VIRQ- 0	611	1565	1352	1360	4888
VIRQ- 1	197	453	548	567	1765
VIRQ- 27	21435	891	910	1260	24496
VIRQ-267	312	0	0	0	312
VIRQ-287	1	0	0	0	1
VIRQ-377	59	0	0	0	59
VIRQ-381	0	2	0	0	2
VIRQ-512	36	0	0	0	36
VIRQ-513	1	0	0	0	1
VIRQ-514	1	0	0	0	1
VIRQ-517	412	0	0	0	412
VIRQ-523	1	0	0	0	1
VIRQ-528	48	0	0	0	48
VIRQ-535	1531	0	0	0	1531
VIRQ-536	20	0	0	0	20
TOTAL	24665	2911	2810	3187	33573

Event Log

– /proc/nk/monitoring/vl,evt-log-0/*

– Per PCPU

– Types of event

CPU_START	0	VDEV_LOAD	21
CPU_STOP	1	VDEV_STORE	22
INTR_ENTER	2	VIRQ_ASSERT	23
INTR_LEAVE	3	VCPU_SWITCH_OUT	24
INTR_EL2_ENTER	4	VCPU_SWITCH_IN	25
INTR_EL2_LEAVE	5	VCPU_IDLE_ENTER	26
IRQ_SELECT	6	VCPU_IDLE_LEAVE	27
IRQ_POST	7	VM_STOP	28
CPU_TO_EL3	8	VM_START	29
CPU_FROM_EL3	9	VM_SUSPEND_REQUEST	30
CPU_IDLE_ENTER	10	VM_RESUME_REQUEST	31
CPU_IDLE_LEAVE	11	VM_LOADING	32
TRAP_ENTER	12	VM_LOADED	33
TRAP_LEAVE	13	VM_FATAL	34
HYP_CALL	14	IRQ_SPURIOUS	35
VCPU_TO_EL3	15	VM_S2R_ENTER	36
VCPU_FROM_EL3	16	VM_S2R_LEAVE	37
VCPU_START	17	S2R_ENTER	38
VCPU_STOP	18	S2R_LEAVE	39
VCPU_SUSPEND_REQUEST	19		
VCPU_RESUME_REQUEST	20		

☐ **Event Log**

– /proc/nk/monitoring/vl,evt-log-0/cpu-0


```
[10959794] 3629915852: CPU0 VM2 VCPU0 - trap_enter
    pc:     0xffffff800809c62c
    spsr:           0x60c001c5
    esr:            0x07e00000
[10959795] 3629915855: CPU0 VM2 VCPU0 - vcpu_idle_enter
[10959796] 3629915880: CPU0 VM2 VCPU0 - cpu_idle_enter
[10959797] 3629918554: CPU0 VM2 VCPU0 - cpu_idle_leave
[10959798] 3629918557: CPU0 VM2 VCPU0 - intr_el2_enter
    pc:     0x00000000800d1bcc
    spsr:           0x60400349
[10959799] 3629918560: CPU0 VM2 VCPU0 - irq_select
    irq: 280
```

□ CPU Statistics

— Running time of HYP (VM1), VMs, and idle

— Per PCPU

— /proc/nk/pcpustats

```
Counting frequency: 26000000 Hz
CPU        Idle           VM1            VM2            VM3
 0     77020149     45758922965       13488091              0
 1     64700107     45757777724       26953437              0
 2     31594769     45761570584              0       56265951
 3     50595212     45759217909              0       39618219
 4     55448323     45758501277       35481773              0
 5     57967828     45758419904       33043680              0
 6            0               0              0              0
 7     43725683     45759154573              0       46551228
In msecs:
 0         2962         1759958            518              0
 1         2488         1759914           1036              0
 2         1215         1760060              0           2164
 3         1945         1759969              0           1523
 4         2132         1759942           1364              0
 5         2229         1759939           1270              0
 6            0               0              0              0
 7         1681         1759967              0           1790
```