

成都海光集成电路设计有限公司

系统软件部

PCIe 错误注入工具操作手册

| 文件编号: | | | |
|--------|---------|-----|-------|
| 文档状态: | 文档编号: | | |
| ■ 草稿 | 密级: | ■普通 | |
| □ 正式发布 | | | |
| □正在修改 | 编写: | | |
| | 审核: | | |
| | 审批: | | |
| | 文档保存状态: | □受控 | □作废保留 |

系统软件部 SV 项目组



修订历史

| 修订前版本 | 修订内容 | 完成日期 | 修订人 | 修订后版本 |
|-------|----------------|------------|-----|-------|
| | 创建文档 | 2020/01/21 | 林佳森 | V1.0 |
| | 删除使用限制中 ASPM 部 | 2020/04/23 | 林佳森 | V1.1 |
| | 分 | | | |
| | 增加 PCIe RAS 部分 | 2020/04/27 | 林佳森 | V1.2 |
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注: "草稿"状态的文档版本为 0.Y.Z, Y≥0, Z>0, Y、Z 的数值不断累加;

[&]quot;正式发布"状态的文档版本为 X.Y, $X \ge 1$, $Y \ge 0$, 且 $X \times Y$ 值不断累加;

[&]quot;正在修改"状态的文档指对"正式发布"后的文档进行修改,文档版本为X.Y.Z,其中X.Y同修改之前的文档版本号, Z>0, Z的数值不断累加。



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1. 术语

| 缩略词 | 定义 |
|-------|--|
| ACS | Access Control Services. |
| AER | Advanced Error Reporting. A component of the |
| | PCIe specification. |
| DF | Data Fabric. On-chip coherent interconnect. |
| DPC | Downstream Port Containment. A component |
| | of the PCIe specification. |
| ECRC | Transaction Layer end-to-end 32-bit CRC. |
| eDPC | Enhanced Downstream Port Containment. A |
| | component of the PCIe specification. |
| EP | EndPoint |
| HP | HotPlug |
| IOHUB | Input Output Hub. |
| LCRC | Data Link Layer 32-bit CRC |
| NBIF | New PCIe Bus Interface. |
| NBIO | Northbridge Input Output |
| PCIe | PCI Express. |
| RAS | Reliability, availability and serviceability |
| RP | Root Port |

2. OS 支持

Linux: Debian and RHEL

3. 支持特性

| PCIe LCRC | LCRC_RX | 需要 BIOS 和 OS 支持 AER |
|-----------|---------------|---------------------|
| | | 功能 |
| | LCRC_TX | 需要 BIOS 和 OS 支持 AER |
| | | 功能 |
| PCIe ECRC | ECRC_RX | 需要 RP 到 EP 的整个 PCIe |
| | | 链路支持 ecrc 功能,并且 |
| | | BIOS/OS 使能 ECRC |
| | ECRC_TX | 需要 RP 到 EP 的整个 PCIe |
| | | 链路支持 ecrc 功能,并且 |
| | | BIOS/OS 使能 ECRC |
| ACS | ACS Fatal | 需要 BIOS 和 OS 支持 ACS |
| | | 功能 |
| | ACS Non_Fatal | 需要 BIOS 和 OS 支持 ACS |
| | | 功能 |

注意: 注入错误时需要 RP 和 EP 之间的 PCIe 链路是 linkup 的,且 EP 没有从 PCIe 系统中 remove 掉(DPC、AER 进行修复、HP 进行热插拔或者手动 remove,都会把 EP 从 PCIe 系 第4页 共19页



统中 remove 掉)。

EP 推荐使用下面两种:

Intel Corporation I210 Gigabit Network Connection

Intel Corporation I350 Gigabit Network Connection

4. 命令帮助

4.1. 版本号查询

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject
set default log level to 3.



HYGON PCIE TEST Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64.

Version:v00.26 Build Apr 27 2020 - 14:04:40

命令: ./pcieinject

4.2. Usage 帮助

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject -help set default log level to 3.



HYGON PCIE TEST Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64. Version:v00.26 Build Apr 27 2020 - 14:04:40

Usage: ./pcieinject options ./pcieinject support 6 functions, need to select [One] function by first parameter.

./pcieinject support & functions, need to select [one] function by first parameter.

function 1 argument: alldev, funname: show all dev, usage: ./pcieinject alldev.

function 1 argument: hygondev, funname: show hygon all dev, usage: ./pcieinject property of the property

命令: ./pcieinject -help

4.3. 显示系统中所有的设备

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject alldev set default log level to 3.



HYGON PCIE TEST Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64. Version:v00.26 Build Apr 27 2020 - 14:04:40

sokect support 2 die====
irq name
0 Device 1d94:1450
28 Device 1d94:1451
0 Device 1d94:1451
32 Device 1d94:1453
33 Device 1d94:1453
0 Device 1d94:1452
0 Device 1d94:1454
0 Device 1d94:1454
0 Device 1d94:1454
0 Device 1d94:1454
0 Device 1d94:1459 bus 00 00 00 00 00 00 00 00 00 00 00



| 94 | 60 | 04 | 0 | 1d94 | 1452 | 0 | Device 1d94:1452 |
|-----|----|----|---|------|------|-----|------------------|
| 95 | 60 | 07 | 0 | 1d94 | 1452 | 0 | Device 1d94:1452 |
| 96 | 60 | 07 | 1 | 1d94 | 1454 | 45 | Device 1d94:1454 |
| 97 | 60 | 08 | 0 | 1d94 | 1452 | 0 | Device 1d94:1452 |
| 98 | 60 | 08 | 1 | 1d94 | 1454 | 47 | Device 1d94:1454 |
| 99 | 61 | 00 | 0 | 8086 | 1521 | 192 | Device 8086:1521 |
| 100 | 61 | 00 | 1 | 8086 | 1521 | 202 | Device 8086:1521 |
| 101 | 62 | 00 | 0 | 1d94 | 145a | 0 | Device 1d94:145a |
| 102 | 62 | 00 | 2 | 1d94 | 1456 | 11 | Device 1d94:1456 |
| 103 | 62 | 00 | 3 | 1d94 | 145f | 75 | Device 1d94:145f |
| 104 | 63 | 00 | 0 | 1d94 | 1455 | 0 | Device 1d94:1455 |
| 105 | 63 | 00 | 2 | 1d94 | 7901 | 136 | Device 1d94:7901 |
| | | | | | | | |

命令: ./pcieinject alldev

4.4. 显示系统中所有的 HYGON 设备

 ${\tt root@ubuntu:/home/higon/pcieinjectnew\#\ ./pcieinject\ hygondev\ set\ default\ log\ level\ to\ 3.}$



HYGON PCIE Test Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64.

Version:v00.26 Build Apr 27 2020 - 14:04:40

| | | | ==System | have 2 | socket, | per : | sokect | support 2 die========== |
|-----|-----|-----|-------------|--------|---------|-------|--------|-------------------------|
| Idx | bus | dev | Ťunc | Vid | Did | | irq | name |
| 0 | 00 | 00 | 0 | 1d94 | 1450 | | 0 ' | Device 1d94:1450 |
| 1 | 00 | 00 | 2 | 1d94 | 1451 | | 28 | Device 1d94:1451 |
| 2 | 00 | 01 | 0 | 1d94 | 1452 | | 0 | Device 1d94:1452 |
| 3 | 00 | 01 | 2 | 1d94 | 1453 | | 32 | Device 1d94:1453 |
| 4 | 00 | 01 | 4 | 1d94 | 1453 | | 33 | Device 1d94:1453 |
| 5 | 00 | 02 | 0 | 1d94 | 1452 | | 0 | Device 1d94:1452 |
| 6 | 00 | 03 | 0 | 1d94 | 1452 | | 0 | Device 1d94:1452 |
| 7 | 00 | 04 | 0 | 1d94 | 1452 | | 0 | Device 1d94:1452 |
| 8 | 00 | 07 | 0 | 1d94 | 1452 | | 0 | Device 1d94:1452 |
| 87 | 60 | 03 | 1 | 1d94 | 1453 | | 44 | Device 1d94:1453 |
| 88 | 60 | 04 | ō | 1d94 | 1452 | | 0 | Device 1d94:1452 |
| 89 | 60 | 07 | Ö | 1d94 | 1452 | | Ō | Device 1d94:1452 |
| 90 | 60 | 07 | 1 | 1d94 | 1454 | | 45 | Device 1d94:1454 |
| 91 | 60 | 08 | 0 | 1d94 | 1452 | | 0 | Device 1d94:1452 |
| 92 | 60 | 08 | 1 | 1d94 | 1454 | | 47 | Device 1d94:1454 |
| 93 | 62 | 00 | | 1d94 | 145a | | 0 | Device 1d94:145a |
| 94 | 62 | 00 | 2 | 1d94 | 1456 | | 11 | Device 1d94:1456 |
| 95 | 62 | 00 | 0 2 3 | 1d94 | 145f | | 75 | Device 1d94:145f |
| 96 | 63 | 00 | 0 | 1d94 | 1455 | | Ō | Device 1d94:1455 |
| 97 | 63 | 00 | 2 | 1d94 | 7901 | 1 | 136 | Device 1d94:7901 |

命令: ./pcieinject hygondev

4.5. 显示系统中所有的 GPP 桥及 GPP 桥下接设备



| | | System have 2 | socket, pe | r soked | t suppor | t 2 die | | | | | | | |
|---|--|---|--|--|---|---|---------------------|--|-------------------------------|--|---|---|---|
| Idx 0 1 2 3 | addr 0x240b5d0 0x240b5f0 0x240b610 0x240b630 | n info start addr socketid 0 0 1 1 | 0x240b5d0 dieid 0 1 0 1 | logical 0 1 2 3 | ement by I_dieid | 0x20 by iohc_b 0x00 0x20 0x40 0x60 | tes 1 ti | RC (00:00.0 (20:00.0 (40:00.0 (60:00.0 | 0) (0 | 0 0:18.0) 0:19.0) 0:1c.0) 0:1d.0) | DF1 (00:18.1) (00:19.1) (00:1c.1) (00:1d.1) |). | |
| Idx 0 1 2 3 | GPP bridge (00:01.2) (00:01.4) (40:01.2) (60:03.1) | [Vid:Did] [1d94:1453] [1d94:1453] [1d94:1453] [1d94:1453] | DLACTIVE + + + + | 1rq 32 33 40 44 | socket 0 0 1 1 | die 0 0 0 | core 0 0 0 | phyport 6 4 1 8 | logicport 1 3 1 8 | RC (00:00. (00:00. (40:00. (60:00. | 0) 0) 0) | DF0 (00:18.0) (00:18.0) (00:1c.0) (00:1d.0) | OF1 (00:18.1) (00:18.1) (00:1c.1) (00:1d.1) |
| Idx 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0 | (01:00.0) (02:00.0) (03:00.0) (03:00.1) (41:00.0) (41:00.1) | [vid:oid] ++++GPP (00:01.2) [1a03:1150] [1a03:2000] +++GPP (00:01.4) [8086:1521] [8086:1521] +++GPP (40:01.2) [8086:1521] +++GPP (60:03.1) | 162 162 subdev+++ 152 48 subdev+++ 172 182 subdev+++ | Device Device Device Device Device | 2 1a03:11 2 1a03:20 2 8086:15 2 8086:15 2 8086:15 | 50 000 521 521 521 521 | + | | | | | | |
| 0 | (61:00.0) | [8086:1521] | 192 | Device | 8086:15 | 521 | | | | | | | |

命令: ./pcieinject gpp



4.6. 注入 lcrc_tx

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t lcrc_tx -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



HYGON PCIE Test Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64. Version:v00.26 Build Apr 27 2020 - 14:04:40

| Idx 0 1 2 3 | —————————————————————————————————————— | =System have 2 : info start addr socketid 0 0 1 1 | 0x19d75d0, | sokect s increment ogical_di 0 1 2 3 | nt'by 0 ieid | 2 die= x20 byt iohc_bu 0x00 0x20 0x40 0x60 | es 1 tim | e====== RC (00:00.0 (20:00.0 (40:00.0 (60:00.0 |) | = DF0 (00:18.0) (00:19.0) (00:1c.0) (00:1d.0) | DF1 (00:18.1 (00:19.1 (00:1c.1 | 1). 1). | |
|--|---|--|--|---|--|--|--|--|--|---|---|---|---|
| Idx 0 1 2 3 | GPP bridge (00:01.2) (00:01.4) (40:01.2) (60:03.1) | [Vid:Did] [1d94:1453] [1d94:1453] [1d94:1453] [1d94:1453] | DLActive + + + + | irq so 32 33 40 44 | ocket 0 0 1 1 | die 0 0 0 1 | core 0 0 0 1 | phyport 6 4 1 8 | logicpor 1 3 1 8 | t RC (00:00 (00:00 (40:00 (60:00 | .0) | DF0 (00:18.0) (00:18.0) (00:1c.0) (00:1d.0) | DF1 (00:18.1) (00:18.1) (00:1c.1) (00:1d.1) |
| 0 1 + | (01:00.0) (02:00.0) (03:00.0) (03:00.0) (41:00.0) (41:00.1) (61:00.0) (61:00.1) | [8086:1521] [8086:1521] ++GPP (40:01.2) [8086:1521] [8086:1521] ++GPP (60:03.1) [8086:1521] [8086:1521] | 162 162 subdev++++ 152 48 subdev++++ 172 182 subdev++++ 192 202 | Device 1a Device 1a Device 8a | a03:115 a03:200 ++++++ 086:152 086:152 ++++++ 086:152 086:152 086:152 | 0 0 +++++++ 1 1 +++++++ 1 1 +++++++ 1 | | | | | | | |
| [pciein]e [pciein]e [pciein]e [pciein]e [pciein]e [pciein]e [pciein]e [pciein]e [pciein]e [pciein]e | ct [INFO] pcietest ct [INFO] pcietest ct [INFO] pcietest ct [INFO] pcietest ct INFO] pcietest ct INFO] pcietest ct INFO] pcietest ct [INFO] pcietest ct [INFO] pcietest ct [INFO] pcietest ct [INFO] pcietest ct [INFO] pcietest | disable_dpc, lir set_err_report_c _set_err_report_c _clear_error_stat _clear_error_stat _loop_clear_aer_s _set_severity_rec _write_errctrl_ir _trigger_some_tratrigger_some_tratrigger_some_tratriger_some_tratr | ne:203]: Suc ppp_bridge, ppp_bridge, us, line:40; us, line:50; tatus, line; jecterr, lin jecterr, lin iffic, line: uffic, line: | cess to di line:3618] line:3659] 7]: Clear of clear di: Clear di: Clear di: Idx 0 s ne:2616]: e:2626]: gpp Error: se | sable d : Idx 0 : Aer or device : lane er aer sta ry cnt (everity The val Write 0: bridge bridge | pc, write, expect assk reg (status reg (status for (st | e 0x0 to 0 err 0x40; x2040 recept for decept for 03:00 03:00.0. Et err starrect, do F smn addr mn addr 0; ub dev 3:0 ub dev 3:0 i, type=0; | pc ctrl r, write 0x; write 0x; voil 0x; | eg for developed to AF | / 0:1.4. R CAP reg offse to mask lcrc_tx ect err status - severity reg. / 0:1.4, inject L.4 (socket 0, d deviceid 0x1521 deviceid 0x1521 | reg 0x0, c | ort for dev dev (lear aer status (orresponding bits | reg for dev 03:00.0 success. |
| [pcieinje | ct [INFO] aer_prin ct [INFO]aer_pr ct [INFO] pcietest | t_error, line:213 int_error, line:1 |]: device [.80]: [6 | 8086:1521]] BadTLP | 03:00. | error : | status/mas | sk=0000004 | 0/00002040 |) | | | |

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔

命令: ./pcieinject pcie_err -t lcrc_tx -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3

4.7. 注入 lcrc_rx

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t lcrc_rx -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



| | | | | | | | | | | - | | | | |
|--------------|--|---|--------------|----------|------------|-----------------|---------|------------------|---------------------------------------|-----------------|------------|----------------|------------------------|------------------------|
| | | =System have 2 : | socket, pe | r soked | t suppor | t 2 die= | | | | | | | | |
| | System | | | | | | | | | | | | | |
| Idx 0 | addr 0x212b5d0 | socketid 0 | dieid O | 10g1ca1 | _dieid | iohc_bu 0x00 | 15 | RC (00:00.0 | | DF0 (00:18.0 | | DF1 (00:18. | 13 | |
| 1 | 0x212b5d0 0x212b5f0 | 0 | 1 | 1 | | 0x00 | | (20:00.0 | | (00:18.0 | | (00:18. | | |
| 2 | 0x212b510 | 1 | 6 | 2 | | 0x20 0x40 | | (40:00.0 | | (00:19.0 | | (00:19. | | |
| 3 | 0x212b610 | 1 | 1 | á | | 0x40 | | (60:00.0 | | (00:1d.0 | | (00:1d. | | |
| | | | | | | | | | · · · · · · · · · · · · · · · · · · · | _ | , | (001241 | -/- | |
| | | | | | | | | | | - | | | | |
| Idx | GPP bridge | [Vid:Did] | DLActive | | socket | die | core | phyport | logicpor | t | RC | • • | DF0 | DF1 |
| 0 1 | (00:01.2) (00:01.4) | [1d94:1453] [1d94:1453] | + | 32 33 | 0 | 0 | 0 | 6 | 1 3 | | (00:00.0 | | (00:18.0) (00:18.0) | (00:18.1) (00:18.1) |
| 2 | (40:01.2) | 1d94:14531 | | 40 | 1 | Ö | ő | 4 | 1 | | (40:00.0 | | (00:18.0) (00:1c.0) | (00:18.1) (00:1c.1) |
| 3 | (60:03.1) | 1d94:1453 | I | 44 | 1 | 1 | 1 | 8 | 8 | | (60:00.0 | | (00:1d.0) | (00:1d.1) |
| | (00.03.1) | [1034.1433] | | | · | | | | | _ | (00.00. | 0) | (00.10.0) | (00.10.1) |
| Idx | GPP subdev | [Vid:Did] | irq | name | | | | | | | | | | |
| | ++++++++++++++ | | | | | | | | | | | | | |
| 0 | (01:00.0) | [1a03:1150] | 162 | | 1a03:11 | | | | | | | | | |
| 1 | (02:00.0) | [1a03:2000] ++GPP (00:01.4) | 162 | Device | 1a03:20 | 100 | | | | | | | | |
| 0 | (03:00.0) | F8086:15211 | 152 | | 8086:15 | | | | | | | | | |
| 1 | (03:00.1) | 8086:1521 | 48 | | 8086:15 | | | | | | | | | |
| | | ++GPP (40:01.2) | | | | | | | | | | | | |
| 0 | (41:00.0) | [8086:1521] | 172 | | 8086:15 | | | | | | | | | |
| í | (41:00.1) | [8086:1521] | 182 | Device | 8086:15 | 21 | | | | | | | | |
| +++++++ | | | subdev+++ | ++++++ | +++++++ | +++++++ | | | | | | | | |
| 0 | (61:00.0) | [8086:1521] | 192 | | 8086:15 | | | | | | | | | |
| .1 | (61:00.1) | [8086:1521] | 202 | Device | 8086:15 | 21 | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| [pcieinject | t [INFO] pcietešt_d | lisable_aspm, line:: | 238]: Link o | trl reg | of dev 0:1 | L.4 is 0x4 | 0, indi | icate that ASP | ч has been | disabled. | | | | |
| [pciein]ect | t [INFO] pcietest_d | lisable_dpc, line:1 et_err_report_gpp_ | 91]: DPC ctr | l reg of | dev 0:1.4 | is 0x0, | indicat | te that DPC tr | igger has l | been disal | bled. | | 4 | |
| [pcieinject | t [INFO] pcietest_s t [INFO] pcietest s | et_err_report_gpp_ et_err_report_gpp_ | oridge, line | 36501: | tox I, exp | ect err u | reach | evnect succe | AER CAP F | eg offset | OXI4 TOF | aev 00:01 | 4 to mask icr | c_rx error report. |
| pcieinject | t [INFO] prietest c | lear error status. | line:4871: | clear de | vice statu | ıs rea for | dev 00 | 0:01.4. | JJ CO MUJA | 10.00 | ciror repo | , c 101 de | | |
| [pciein]ect | t [INFO] pcietest_c | lear_error_status, | line:495]: | clear ro | ot error s | statuš reg | for de | ev 00:01.4. | | | | | | |
| [pcieinject | t [INFO] pcietest_c | lear_error_status, | line:500]: | Clear la | ne err sta | tus for 0 | 0:01.4. | | | | | | | |
| pcieiniec | t [INFO] pcietest] | oop clear aer stati | us. line:464 | 1: Retry | cnt 0. co | orrect err | status | s rea 0x0, unc | orrect err | status re | ea 0x0. c1 | lear aer s | tatus red for | dev 00:01.4 success. |
| [pciein]ect | t [INFO] pcietest_s | et_severity_reg, 1 rite_errctrl_injec | ine:3259]: 1 | dx 1 sev | erity 2 is | correct, | do not | need modify | aer severi | ty reg. | | | | |
| [pcieinject | t [INFO] pcietest_w | rite_errctrl_injec rite_errctrl_injec | terr, line:2 | 616]: Th | e val 0x0 | of smn ad | dr 0x11 | L1441a8 for de | v 0:1.4, ii | nject lcre | c_rx, corr | esponding | bitmask is 0x | 20. |
| [pcieinject | t [INFO] prietest_w | rigger_some_traffi | c. line:2578 | 1020]: W | ridae 0:1. | 4 sub dev | 3:0.0 | vendorid 0x80 | 86 devicei | d 0x1521. | re o core | o, priypor | t 4) to inject | TCFC_FX. |
| pcieinject | t [INFO] pcietest_t | rigger_some_traffi | c, line:2578 | : Gpp b | ridge 0:1. | 4 sub dev | 3:0.1 | vendorid 0x80 | 86 devicei | d 0x1521. | | | | |
| pcieiniec | e [THEO] can enion | error, line:208]: | OCTA Due Fee | | nite Conn | and no | | Link Lavon (| | 2) | | | | |
| pcieiniec | t [INFO] aer_print_ t [INFO] aer_print_ | error, ine:208]: error, line:2131: | device [1d94 | ur. seve | 0:01.4 err | or status | /mask=(| 00000040/00006 | neceiver II | , | | | | |
| pcieinject | t [INFO]aer_prin | t_error, line:180] | [6] Ba | | | | , | | | | | | | |
| 063.6303.66 | t ITNEOL perotect : | proct tl ore ere | 120017/7011 | Attor 3 | rotry cos | coss to : | naect | erc ry to de- | 0.1.4 | | | | | |
| rbeigilileci | t [INFO] pcietest_i | infecial cialeuraph) | i ine.2/20]: | wicel I | recry, suc | cess to I | nject | ici c_i x to dev | 0.1.4. | | | | | |



- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔

命令: ./pcieinject pcie err -t lcrc rx -s 0:1.4 -e mask err report -d 1 -c 3 -i 3

4.8. 注入 ecrc rx

oot@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t ecrc_rx -s 0:1.4 -e mask_err_report -d 1 -c 3 -i iset default log level to 3.



HYGON PCIE Test Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64.

Version:v00.26 Build Apr 27 2020 - 14:04:40

| | | | | | | | | | | - | | | | |
|--------------------------|--|--|--------------------|----------------------|----------------------|---------------------|-------------|----------------|------------|--------------|-----------|------------|------------------------------------|-----------------|
| | | System have 2 s | ocket, pe | r_sokect | support | 2 die= | | | | | | | | |
| Idx | ======System i | info start addr socketid | 0x73d5d0, dieid | increme _logical_ | ent by 0: | κ20 byt∈ iohc_bu | s 1 time | | | DF0 | | DF1 | | |
| 0 | 0x73d5d0 | O O | 0 | 10g1ca1_ | _arera | 0x00 | is | RC (00:00.0 | | (00:18.0) | | (00:18.1 | \ | |
| 1 | 0x73d5f0 | 0 | 1 | 1 | | 0x20 | | (20:00.0 | | (00:19.0) | | (00:19.1 | | |
| 2 | 0x73d610 | ĭ | ō | 2 | | 0x40 | | (40:00.0 | | (00:1c.0) | | (00:1c.1 | | |
| 3 | 0x73d630 | 1 | 1 | 3 | | 0x60 | | (60:00.0) | Ó | (00:1d.0) | | (00:1d.1 | 5. | |
| | | | | | | | | | | = | | | | |
| Idx | GPP bridge | [vid:Did] | DLACTIVE | ira | socket | die | core | phyport | logicpor | t R | - | | DF0 | DF1 |
| 0 | (00:01.2) | [1d94:1453] | + | 32 | 0 | 0 | 0 | 6 | 1 | (| 0.00:00 | | (00:18.0) | (00:18.1) |
| 1 | (00:01.4) | [1d94:1453] | + | 33 | 0 | 0 | 0 | 4 | 3 | | 0.00:00 | | (00:18.0) | (00:18.1) |
| 2 | (40:01.2) | [1d94:1453] | + | 40 | 1 | 0 | 0 | 1 | 1 | | 10:00.0 | | (00:1c.0) | (00:1c.1) |
| 3 | (60:03.1) | [1d94:1453] | + | 44 | 1 | 1 | 1 | 8 | 8 | C | 50:00.0 |) | (00:1d.0) | (00:1d.1) |
| Idx | GPP subdev | [Vid:Did] | irq | name | | | | | | = | | | | |
| +++++++ | | +GPP (00:01.2) | | | ++++++ | | | | | | | | | |
| 0 | (01:00.0) | [1a03:1150] | 162 | | 1a03:11 | | | | | | | | | |
| 1 | (02:00.0) | [1a03:2000] ++GPP (00:01.4) | 162 | | 1a03:200 | | | | | | | | | |
| 0 | (03:00.0) | [8086:1521] | 152 | | 8086:15 | | | | | | | | | |
| 1 | (03:00.1) | [8086:1521] | 48 | | 8086:15 | | | | | | | | | |
| | ++++++++++++++ | | | | | | | | | | | | | |
| 0 | (41:00.0) | [8086:1521] | 172 | Device | 8086:152 | 21 | | | | | | | | |
| 1 | (41:00.1) | [8086:1521] | 182 | Device | 8086:15 | 21 | | | | | | | | |
| +++++++ | +++++++++++++++ | +GPP (60:03.1) | subdev+++ | +++++++ | ++++++ | ++++++ | | | | | | | | |
| 0 | (61:00.0) (61:00.1) | [8086:1521] [8086:1521] | 192 202 | Device | 8086:153 8086:153 | 21 | | | | | | | | |
| 1 | (61:00.1) | [8080:1321] | 202 | Device | 8080:13 | 21 | | | | | | | | |
| pcieinject | [INFO] pcietest_disa | able_aspm, line:238 |]: Link ctr | reg of o | dev 0:1.4 | is 0x40, | indicate 1 | hat ASPM ha | s been di | sabled. | | | | |
| pcieinject | [INFO] pcietest_disa [INFO] pcietest_set_ | able_dpc, line:191] | : DPC ctrl | reg of dev | v 0:1.4 is | 0x0, in | dicate that | DPC trigge | r has bee | n disabled. | - A E | | 4 4 4 | |
| Incieiniect | [INFO] prietest set | err report app bri | dae. line:3 | 559]: Aer | mask red | 0x4580000 |) reach ext | pect. succes | s to mask | ecre rx er | cor repor | rt for dev | dev 00:01.4. | x error report. |
| pcieinject | [INFO] prietest clea | ar error status. li | ne:4871: cl | ear device | e status r | en for d | ev 00:01 4 | | | | | | | |
| | [INFO] prietest_clear [INFO] prietest_clear | ar_error_status, li ar_error_status, li | ne:495]: Cl | ear root e | error stat | us reg for | or dev 00:0 | 01.4. | | | | | | |
| pcieiniect | [INFO] prietest clea | ar error status. li | ne:5041: cl | ear aer st | tatus for | 00:01.4. | | | | | | | | |
| | [INFO] prietest look | o clear aer status. | line:464l: | Retry ont | t O. corre | oct err si | tatus reg (| 0x0, uncorre | ct err st | atus reg 0x |), clear | aer statu | s reg for dev 00:0 | 1.4 success. |
| pcieinject pcieinject | [INFO] prietest_set_ [INFO] prietest writ | _severity_reg, line te_errctrl_injecter | ::3280]: IGX | 3 (ecrc_r | rx) severi | ty 15 1, | Ov111441a | change sev | erity reg | trom 0x4e2 | COPPRISE | x4e2030(se | t bitmask 0x80000) mask is 0x80 | • |
| pcieiniect | [INFO] pcietest_writ | te_errctrl_iniecter | r. line:262 | 5]: Write | 0x180 to | smn addr | 0x111441a8 | 3 of dev 0:1 | 4 (socke | t 0. die 0 | core 0, p | phyport 4) | to inject ecrc_rx | |
| pcieinject | [INFO] pcietest_tri | gger_some_traffic, | line:2578]: | Gpp bride | ge 0:1.4 s | ub dev 3 | 0.0 vendor | id 0x8086 d | leviceid 0 | x1521. | | | - | |
| | [INFO] pcietest_tric | | | | | | | | | | 1 | | | |
| pcieinject | [INFO] aer_print_err | or, line:208]: PCI | e Bus Error | severity | y=Uncorrec | ted (Fat | al), type=1 | ransaction | Layer, (R | teceiver ID) | | | | |
| pcieinject | [INFO] aer_print_err | or, iine:213]: de\ error. line:1801: | /1CE [1094:1 | +53] 00:01 | L.4 error | status/m | 45K=0008000 | 00/04580000 | | | | | | |
| | | | | | | | | | | | | | | |
| beieiblect | [INFO] pcietest_inje | ecc_ci_err_gpp, iir | ie:2/20]: AT | ter i reti | ry, succes | s to inj | ect ecrc_r | c to dev 0:1 | 4. | | | | | |

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔

命令: ./pcieinject pcie err -t ecrc rx -s 0:1.4 -e mask err report -d 1 -c 3 -i 3

备注: ecrc 错误是整个 pcie 链路上端到端的 crc 校验, 注入错误前请检查 RP-Switch-EP 是否支持 ecrc。



4.9. 注入 ecrc_tx

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t ecrc_tx -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



HYGON PCIE Test Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64. Version:v00.26 Build Apr 27 2020 - 14:04:40

| Table | | | | | | | | | | | - | | | |
|--|-------------|--|--|------------------------------|------------------------|--------------------------|-----------|----------------------|--------------------------------|------------|-----------------|------------|--|-----------------------|
| Idx | | | | | | | | | | | | | | |
| 0 0x160b5d0 0 0 0 0 0 0x00 (00:00.0) (00:18.1) (00:18.1) 1 0x160b5l0 1 1 1 2 0x20 (2:00.0) (00:19.0) (00:19.1) (00:19.1) 2 0x160b5l0 1 1 0 0x40 (40:00.0) (00:10.0) (00:11.1) Idx GPP bridge [Vid:Did] DLACTIVE irg socket die core phyport logicport RC (00:00.0) (00:10.1) Idx GPP bridge [Vid:Did] DLACTIVE irg socket die core phyport logicport RC (00:00.0) (00:18.1) 2 (40:01.2) [1694:1453] + 32 0 0 0 0 6 1 1 (00:00.0) (00:18.0) (00:18.1) 3 (60:03.1) [1694:1453] + 40 1 0 0 1 1 (00:00.0) (00:18.0) (00:18.1) 3 (60:03.1) [1694:1453] + 44 1 1 1 8 8 8 (60:00.0) (00:18.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (10:00.0) (00:18.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (10:00.0) (00:18.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (10:00.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (10:00.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (10:00.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (10:00.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (00:18.1) Idx GPP subdev [Vid:Did] irg name (10:00.0) (10:00. | Tdx | addr | | dieid | logical | dieid | | | | | DF0 | DF1 | | |
| 2 | | 0x160b5d0 | 0 | 0 | 0 | | 0x00 | | (00:00.0 | | (00:18.0) | (00: | | |
| 3 | 1 | | 0 | 1 | 1 | | | | | | | | | |
| Idx | 2 | | 1 | 0 | 2 | | | | | | (00:1c.0) | (00: | lc.1). | |
| 0 (00:01.2) [1d94:1453] + 32 0 0 0 6 8 3 (00:00.0) (00:18.0) (00:18.1) 1 (00:01.4) [1d94:1453] + 33 0 0 0 0 4 3 (00:00.0) (00:10.0) (00:18.1) 2 (40:01.2) [1d94:1453] + 40 1 0 0 1 1 1 (40:00.0) (00:10.0) (00:10.0) (00:10.0) Id94:1453] + 40 1 1 1 8 8 8 (60:00.0) (00:10.0) (00:10.0) (00:10.1) Idx GPP subdev [Vid:01id] irq name ***The control of the | 3 | 0X100D030 | T | 1 | 3 | | 0X60 | | (60:00.0 | J) | (00:1a.0) | (00: | Id.1). | |
| 0 (00:01.2) [1d94:1453] + 32 0 0 0 6 8 3 (00:00.0) (00:18.0) (00:18.1) 1 (00:01.4) [1d94:1453] + 33 0 0 0 0 4 3 (00:00.0) (00:10.0) (00:18.1) 2 (40:01.2) [1d94:1453] + 40 1 0 0 1 1 1 (40:00.0) (00:10.0) (00:10.0) (00:10.0) Id94:1453] + 40 1 1 1 8 8 8 (60:00.0) (00:10.0) (00:10.0) (00:10.1) Idx GPP subdev [Vid:01id] irq name ***The control of the | | | | | | | | | | | - | | | |
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| 1 | 3 | (60:03.1) | [1d94:1453] | + | 44 | 1 | 1 | 1 | 8 | 8 | (60: | 00.0) | (00:1d.0) | (00:1d.1) |
| 1 | Tdy | GPP Subdey | [vid:pid] | ira | name | | | | | | = | | | |
| 1 (02:00.0) [1a03:2000] 162 Device 1a03:2000 | | +++++++++++++++ | ++GPP (00:01.2) | subdev+++ | | ++++++ | ++++++ | + | | | | | | |
| 1 | | | | | | | | | | | | | | |
| 0 (03:00.0) [8086:1521] 152 Device 8086:1521 1 (03:00.1) [8086:1521] 48 Device 8086:1521 1 (03:00.1) [8086:1521] 172 Device 8086:1521 1 (41:00.0) [8086:1521] 172 Device 8086:1521 1 (41:00.1) [8086:1521] 172 Device 8086:1521 1 (41:00.1) [8086:1521] 172 Device 8086:1521 1 (41:00.1) [8086:1521] 172 Device 8086:1521 1 (61:00.0) [8086:1521] 202 Device 8086:1521 1 (61:00.0) [8086:1521] 202 Device 8086:1521 1 (61:00.0) [8086:1521] 202 Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:191]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:289]: Device 8086:1521 prieminent New prietest_disable_doc, Ine:2899: Device 8086:1521 prieminent | 1 | | | | | | | | | | | | | |
| 1 (03:00.1) [8086:1521] 48 Device 8086:1521 172 Device 8086:1521 172 Device 8086:1521 173 Device 8086:1521 174 Device 8086:1521 175 Device 8086:1521 | 0 | | | | | | | | | | | | | |
| 0 (41:00.0) [8086:1521] 172 Device 8086:1521 1 (41:00.1) [8086:1521] 182 Device 8086:1521 1 (61:00.0) [8086:1521] 192 Device 8086:1521 1 (61:00.0) [8086:1521] 192 Device 8086:1521 1 (61:00.1) [8086:1521] 192 Device 8086:1521 The prieter of the | 1 | (03:00.1) | [8086:1521] | 48 | Device | 8086:15 | 21 | | | | | | | |
| 1 (41:00.1) [8086:1521] 182 Device 8086:1521 0 (61:00.0) [8086:1521] 192 Device 8086:1521 1 (61:00.1) [8086:1521] 192 Device 8086:1521 1 (61:00.1) [8086:1521] 202 Device 8086:1521 [Display the property of | | | | | | | | + | | | | | | |
| O (6:00.0) [8086:1521] 192 Device 8086:1521 Cicinfect [NPO] priested disable_dos. Three_states Three_state | | | | 182 | | | | | | | | | | |
| pcieinject [NFO] pcietest_disable_aspm, line:238]: Link ctrl reg of dev 0:1.4 is 0x40, indicate that ASPM has been disabled, pcieinject [NFO] pcietest_disable_abc, line:238]: Link ctrl reg of dev 0:1.4 is 0x40, indicate that DC trigger has been disabled. Dcienject [NFO] pcietest_disable_abc, line:191]: DC ctrl reg of dev 0:1.4 is 0x0, indicate that DC trigger has been disabled. NEO pcietest_disable_abc, line:259]: DC ctrl reg of dev 0:1.4 is 0x0, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.4 is 0x0, indicate that DC trigger has been disabled. NEO pcietest_disable_abc, line:259]: DC ctrl reg of dev 0:1.4 is 0x0, indicate that DC trigger has been disabled. NEO pcietest_disable_abc, line:259]: DC ctrl reg of dev 0:1.4 is 0x0, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger has been disabled. DC ctrl reg of dev 0:1.00, indicate that DC trigger some trigger some trigger. DC ctrl reg of dev 0:1.00, indicate that DC trigger some trigger some trigger. DC ctrl reg of dc trigger some trigger some trigger some trigger some trigger. DC ctrl reg of dc trigger some trigger some trigger some trigger | | ++++++++++++++++ | ++GPP (60:03.1) | subdev+++ | ++++++ | +++++++ | ++++++ | + | | | | | | |
| [Dceinject [INFO] prietest_disable_aspm, line:238] Link ctrl reg of dev 0:1.4 is 0x40, indicate that ASPM has been disabled. prienject [INFO] prietest_disable_dpc, line:291]: DPC ctrl reg of dev 0:1.4 is 0x40, indicate that DPC trigger has been disabled. prienject [INFO] prietest_set_err_report_gpp_bridge, line:3613]: Tax 2, expect err 0x80000, write 0x80000 to AER CAP reg offset 0x8 for dev 03:00.0 to mask err_ctx error report. Prienject [INFO] prietest_set_err_report_gpp_bridge, line:3613]: Tax 2, expect err 0x80000, write 0x80000 to AER CAP reg offset 0x8 for dev 03:00.0 to mask err_ctx error report. Prienject [INFO] prietest_clear_error_status, line:362]: Clear error_status_color_or_ | | | | | | | | | | | | | | |
| picienter (nwo) picietest_disable_dpc, line:191]; DPC ctrl reg of dev 0:1.4 is 0x0, indicate that DPC trigger has been disabled. Note in the picient | 1 | (61:00.1) | [8086:1521] | 202 | Dev1ce | 8086:15 | 21 | | | | | | | |
| picienter (nwo) picietest_disable_dpc, line:191]; DPC ctrl reg of dev 0:1.4 is 0x0, indicate that DPC trigger has been disabled. No picietest_two picients_two p | | | | | | | | | | | | | | |
| picienter (nwo) picietest_disable_dpc, line:191]; DPC ctrl reg of dev 0:1.4 is 0x0, indicate that DPC trigger has been disabled. Note in the picient | [pcieiniect | t [INFO] prietest d | isable aspm. line: | 2381: Link | trl rea | of dev 0:1 | .4 is 0x4 | O. indic | cate that ASP | M has been | disabled. | | | |
| picteriet [NPO] pictest_clear_error_status, line:500]: Clear lane err status for 03:00.0 concerning the picteriet [NPO] pictest_clear_error_status, line:500]: Clear are restatus for 03:00.0 success. pictering the pictering the pictering transport of the pictering | [pcieinlect | t [INEO] prietest d | isable doc line 19 | all: DEC CT | -l rea of | dev 0:1 4 | is 0x0 | indicate | e that DPC tr | igger has | been disabled | | | |
| picteriet [NPO] pictest_clear_error_status, line:500]: Clear lane err status for 03:00.0 concerning the picteriet [NPO] pictest_clear_error_status, line:500]: Clear are restatus for 03:00.0 success. pictering the pictering the pictering transport of the pictering | pcieiniec | t [INFO] pcietest_s | et_err_report_gpp_: et err report gpp b | oriage, line oridae. line | 2:3618]: 2:3659]: | idx 2, exp Aer mask r | ect err u | 0 reach | expect. Succ | ess to mas | AP reg offset (| r report f | or dev dev 03:00.0 | ecrc_tx error report. |
| prieffiet [NPO] prietest_clar_error_status, line;504]; clear_aer_status_rog_000.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0. | [pcieiniect | t [INFO] pcietest_c | lear_error_status, | line:487]: | Clear de | vice statu | s reg for | dev 03: | :00.0. | | | | | |
| picienject [NPO] picietest_loop_clear_aer_status, line;464]: Retry cnt 0, correct err status reg 0X0, uncorrect err status reg 0X0, clear aer status reg for dev 03:00.0 success. picienject [NPO] picietest_elseverty_reg_ line;2802]: 1x2, [cerc_tx] severity is 1; success to reg from 0x4e2031 to 0x4e20312 | [pcieinject | t [INFO] pcietest_c t [INFO] pcietest c | lear_error_status, lear_error_status. | line:500]: | Clear ae | ne err sta r status f | or 03:00. | 0. | | | | | | |
| poteinject [NRO] prietest_mrite_errcri_injecterr. Ine:2616] The val Ox100 of sem addo Ox111414188 for dev 0:1.4. inject errc_tx, corresponding bitmask is Ox40. Disciplined to the prietest_trigger_some_traffic, line:2578] op bridge 0:1.4 sub dev 3:0.0 vendor10 ox15:1. Oxfor ox100 ox15:1. Oxfor ox100 ox15:1. Oxfor ox100 ox15:1. Oxfor ox100 ox | [pcieiniect | t [INFO] prietest l | oop clear aer stati | us. line:464 | 1]: Retry | cnt 0, co | rrect err | status | reg 0x0, unc | orrect_err | status reg 0x | D, clear a | er status reg for | dev 03:00.0 success. |
| [pciefiject [INFO] pictest_mrite_errctr].injecterr; line:2526]: write 0x40 to smm addr 0x11144188 of dev 0:1.4 (socket 0, die 0 core 0, phyport 4) to inject ecrc_tx. picterinett [INFO] pictest_trigger_some_traffic, line:2578]: Gpb bridge 0:1.4 sub dev 3:0.0 vendorford 0x0800 dx1521. pciefiject [INFO] are_print_error, line:258]: PCTE 0x150 print_group bridge 0:1.4 sub dev 3:0.1 vendorford 0x0800 deviced 0x1521. pciefiject [INFO] are_print_error, line:231]: device [8086:1321] 03:00.0 error status/mask=00080000/00080000 ayer, (Receiver ID) pciefiject [INFO] are_print_error, line:231]: device [8086:1321] 03:00.0 error status/mask=00080000/00080000 ayer. | | t [INFO] pcietest_s t [INFO] pcietest w | et_severity_reg, I rite errotrl inject | ine:3280]: terr. line: | Edx 2 (ec 2616]: Th | rc_tx) sev e val 0x10 | erity is | addr 0x1 | ess to change 111441a8 for | dev 0:1.4. | reg from 0x4e2 | 031 to 0x4 | e2031(set bitmask i onding bitmask is | 0x80000). 0x40 |
| pcieinject [INFO] aer_print_error, line:208]: PCIe BUS Error: severity-uncorrected (Fatal), type-Transaction Layer, (Receiver ID) pcieinject [INFO] aer_print_error, line:213]: device [8086:1921] 03:00.0 error status/mask=00080000/00080000 pcieinject [INFO] _aer_print_error, line:180]: [1] icRC | [pcieiniect | t [INFO] pcietest_w | rite_errctrl_iniect | terr. line: | 2626]: wr | ite 0x40 t | o smn add | r 0x1114 | 441a8 of dev | 0:1.4 (soc | ket 0. die 0 c | ore 0, phy | port 4) to inject | ecrc_tx. |
| pcieinject [INFO] aer_print_error, line:208]: PCIe BUS Error: severity-uncorrected (Fatal), type-Transaction Layer, (Receiver ID) pcieinject [INFO] aer_print_error, line:213]: device [8086:1921] 03:00.0 error status/mask=00080000/00080000 pcieinject [INFO] _aer_print_error, line:180]: [1] icRC | pcieinject | t [INFO] pcietest_ti | rigger_some_traffic | c, line:257 | 3]: Gpp b | ridge 0:1. | 4 sub dev | 3:0.0 | vendorid Oxff | ff devicei | d 0x1521. | | | |
| | | | | | | | | | = | | | ٦ . | | |
| pcieinject [INFO]aer_print_error, line:180]: [19] ECRC | pcieiniec | t [INFO] aer_print_o | error, ne:208]: F error: line:213]: 6 | PCIE BUS Err | or: seve | rity=Uncor 3:00.0 err | rected (F | ata(), 1 /mask=00 | type=Transact 0080000/00080 | on Layer, | (Receiver ID) | | | |
| | | | | | | | | , | | | | | | |
| [pcieinject [INFO] pcietest_inject_tl_err_gpp, line:2720]: After 1 retry, success to inject ecrc_tx to dev 0:1.4. | pcieinject | t [INFO] pcietest_i | nject_tl_err_gpp, | line:2720]: | After 1 | retry, suc | cess to i | nject e | = crc_tx to dev | 0:1.4. | | _ | | |

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。

命令: ./pcieinject pcie_err -t ecrc_tx -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3

备注: ecrc 错误是整个 pcie 链路上端到端的 crc 校验, 注入错误前请检查 RP-Switch-EP 是否支持 ecrc。

4.10. 注入 acs_fatal

 $noot@ubuntu:/home/higon/pcieinjectnew\# ./pcieinject pcie_err -t acs_fatal -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.$



| Idx | System | =System have 2 info start addr socketid | 0x1cd65d0 | sokect increm | ent by (| t 2 die== 0x20 byte iohc_bu | es 1 ti | me===== | | F0 | DF1 | | |
|---------|------------------------|---|------------------|------------------|----------|-----------------------------------|---------|----------|-----------|--------------------|----------|------------------------|------------------------|
| 0 | 0x1cd65d0 | 0 | 0 | 0 | arera | 0x00 | • | (00:00.0 | | 00:18.0) | (00:18.1 | D. | |
| i | 0x1cd65f0 | Ö | ī | ĭ | | 0x20 | | (20:00.0 |) (i | 00:19.0) | (00:19.1 | 1). | |
| 2 | 0x1cd6610 | 1 | 0 | 2 | | 0x40 | | (40:00.0 | | 00:1c.0) | (00:1c.1 | | |
| 3 | 0x1cd6630 | 1 | 1 | 3 | | 0x60 | | (60:00.0 |)) (| 00:1d.0) | (00:1d.1 | 1). | |
| | | | | | | | | | | | | | |
| Idx | GPP bridge | [Vid:Did] | DLACtive | | socket | die | core | phyport | logicport | RC | | DF0 | DF1 |
| 0 | (00:01.2) | [1d94:1453] | + | 32 | 0 | 0 | 0 | 6 | 1 | (00:00. | | (00:18.0) | (00:18.1) |
| 1 | (00:01.4) | [1d94:1453] | + | 33 40 | 0 | 0 | 0 | 4 | 3 | (00:00. | | (00:18.0) | (00:18.1) |
| 2 | (40:01.2) (60:03.1) | [1d94:1453] [1d94:1453] | + | 40 | 1 | 1 | 1 | į. | Ţ | (40:00. (60:00. | | (00:1c.0) (00:1d.0) | (00:1c.1) (00:1d.1) |
| 3 | (00.03.1) | [1094.1435] | - | | | | 1 | | | (00.00. | 0) | (00.10.0) | (00.10.1) |
| Idx | GPP subdev | [Vid:Did] | irq | name | | | | | | | | | |
| +++++++ | | ++GPP (00:01.2) | | | | | | | | | | | |
| 0 | (01:00.0) | [1a03:1150] | 162 | Device | | | | | | | | | |
| 1 | (02:00.0) | [1a03:2000] ++GPP (00:01.4) | 162 subdev+++ | Device | | | | | | | | | |
| 0 | (03:00.0) | [8086:1521] | 152 | Device | | | | | | | | | |
| ĭ | (03:00.1) | 8086:1521 | 48 | Device | 8086:15 | 21 | | | | | | | |
| +++++++ | ++++++++++++++ | ++GPP (40:01.2) | | ++++++ | ++++++ | +++++++ | | | | | | | |
| 0 | (41:00.0) | [8086:1521] | 172 | Device | | | | | | | | | |
| 1 | (41:00.1) | [8086:1521] | 182 | Device | | | | | | | | | |
| +++++++ | ************** | ++GPP (60:03.1) | subdev+++ | | | | | | | | | | |
| 1 | (61:00.0) (61:00.1) | [8086:1521] [8086:1521] | 192 202 | Device Device | | | | | | | | | |
| 1 | (61.00.1) | [8080.1321] | 202 | Device | 0000.13 | 21 | | | | | | | |



| Decimient | Time | Decimient | Time | Decimient | De

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。
 - 命令: ./pcieinject pcie err -t acs fatal -s 0:1.4 -e mask err report -d 1 -c 3 -i 3
- 备注: ACS violation 依赖于下面网卡发送 memory 请求,一次注入有可能网卡没有发包。

4.11. 注入 acs nonfatal

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t acs_nonfatal -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



| | | ≔System have 2 info start addr | | | | | | | | | | | | |
|----------------------------|---|--|--------------------------------|---------------------|--------------------------|----------------------|--------------------------|-------------------------------|------------|-------------------|------------|------------|---------------------|-----------------|
| Idx | addr | socketid | dieid | ogical | dieid | iohc_b | | RC | | DF0 | | DF1 | | |
| 0 | 0x26085d0 | 0 | 0 | 0 | | 0x00 | | (00:00.0 |)) | (00:18.0 |) | (00:18. | 1). | |
| ĭ | 0x26085f0 | ō | i | ĭ | | 0x20 | | (20:00.0 | | (00:19.0 | | (00:19. | | |
| 2 | 0x2608610 | 1 | 0 | 2 | | 0x40 | | (40:00.0 |)) | (00:1c.0 | | (00:1c. | | |
| 3 | 0x2608630 | 1 | 1 | 3 | | 0x60 | | (60:00.0 |)) | (00:1d.0 | Ď | (00:1d. | 1). | |
| | | | | | | | | | | | | | | |
| Idx | GPP bridge | [vid:Did] | DLACTIVE | ira | socket | die | core | phyport | logicpor | rt | RC | | DF0 | DF1 |
| 0 | (00:01.2) | [1d94:1453] | + | 32 | 0 | 0 | 0 | 6 | 1 | | (00:00. | | (00:18.0) | (00:18.1) |
| 1 | (00:01.4) | [1d94:1453] | + | 33 | 0 | 0 | 0 | 4 | 3 | | (00:00. | | (00:18.0) | (00:18.1) |
| 2 | (40:01.2) | [1d94:1453] | + | 40 | 1 | 0 | 0 | 1 | 1 | | (40:00. | | (00:1c.0) | (00:1c.1) |
| 3 | (60:03.1) | [1d94:1453] | + | 44 | 1 | 1 | 1 | 8 | 8 | | (60:00. | 0) | (00:1d.0) | (00:1d.1) |
| Idx | GPP subdev | [vid:Did] | ira | name | | | | | | - | | | | |
| | ++++++++++++++ | | | | ++++++ | ++++++ | + | | | | | | | |
| 0 | (01:00.0) | [1a03:1150] | 162 | Device | 1a03:11 | 50 | | | | | | | | |
| 1 | (02:00.0) | [1a03:2000] | 162 | | 1a03:20 | | | | | | | | | |
| +++++++ | | ++GPP (00:01.4) | subdev+++ | | ++++++ | | + | | | | | | | |
| 0 | (03:00.0) | [8086:1521] | 152 | | 8086:15 | | | | | | | | | |
| 1 | (03:00.1) | [8086:1521] | 48 | | 8086:15 | | | | | | | | | |
| 0 | (41:00.0) | ++GPP (40:01.2) [8086:1521] | 172 | | 8086:15 | | + | | | | | | | |
| 1 | (41:00.0) | [8086:1521] | 182 | | 8086:15 | | | | | | | | | |
| | ++++++++++++++ | | | | | | | | | | | | | |
| 0 | (61:00.0) | [8086:1521] | 192 | Device | 8086:15 | 21 | | | | | | | | |
| ĭ | (61:00.1) | [8086:1521] | 202 | | 8086:15 | | | | | | | | | |
| | , | | | | | | | | | | | | | |
| [pcieinject | [INFO] pcietest_dis | able_aspm, line:238 |]: Link ctrl : | eg of de | v 0:1.4 is | 0x40, in | dicate th | t ASPM has b | een disab] | ed. | | | | |
| Incipiniect | [INFO] pcietest_dis | err report ann bri | dae line:361 | 1 - Tdv 9 | evnect o | rr 0v2000 | 00 Write | 0v4780000 to | ACD CAD P | en offset O | v8 for de | 00:01 4 | to mask are nonfata | l error report |
| pcieinject | [INFO] pcietest_set [INFO] pcietest_cle | _err_report_gpp_bri | dge, line:365 |]: Aer n | ask reg 0x | 4780000 r | each expe | t, success to | mask acs | _nonfatal e | rror repor | nt for dev | dev 00:01.4. | r ciror reporer |
| [pciein]ect | [INFO] pcietest_cle | ear_error_status, li ear_error_status, li | ne:487]: Clea | device | status rec | for dev | 00:01.4. | | | | | | | |
| Incieiniect | [INFO] pcietest_cle | ear_error_status, II ear error status, II | ne:495]: Clea ne:500]: Clea | lane er | ror status r status f | or 00:01 | dev 00:01. 4 | 4. | | | | | | |
| [pcieinject | [INFO] pcietest_cle [INFO] pcietest_cle | ar_error_status, li | ne:504]: Clea | aer sta | tus for 00 | :01.4. | | | | | | | | |
| [pcieinject | [INFO] pcietest_loc | p_clear_aer_status, | line:464]: R | try cnt | 0, correct | err stat | us reg 0x0 |), uncorrect | err status | reg 0x0, c | lear aer : | status reg | for dev 00:01.4 su | ccess. |
| Incieiniect | [INFO] pcietest_loc [INFO] pcietest_set [INFO] pcietest_res | tore johc shadow. 1 | ine:34381: Th | val of | smn addr (| x13b01c18 | is 0x3030 | 0. success to | o restore | dev 0:1.4 b | us resour | ce from Ox | ffff00 to 0x30300. | υ). |
| Ipcieiniect | INFO pcietest_tri | ager_some_traffic. | line:25781: G | op bridae | 0:1.4 sub | dev 3:0. | O vendorio | 1 0x8086 devi | ceid 0x152 | 1. | | | | |
| [pcieinject [pcieinject | : [INFO] pc1etest_tr1 : [INFO] pc1etest_res | gger_some_traffic, ore_confiq_bus_reso | ıme:25/8]: G urce, line:33 | p bridge 4]: The | val of cor | uev 3:0. fig 0x18 | ı vendorid is 0x30300 | , ox8086 devi , success to | restore d | ı. ev 0:1.4 bu | s resource | e from Oxf | fff00 to 0x30300. | |
| | [INFO] aer_print_er | | | | | | | | | | 1 | | | |
| [pcieinject | : [INFO] aer_print_er | ror, line:213]: dev | ice [1d94:145 | 3] 00:01. | 4 error st | atus/mask | =00200000 | 04780000 | cuyer, (k | ccciver 10) | l | | | |
| [pciein]ect | [INFO]aer_print_ | error, line:180]: | [21] ACSVio | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。
 - 命令: ./pcieinject pcie_err -t acs_nonfatal -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3
- 备注: ACS violation 依赖于下面网卡发送 memory 请求,一次注入有可能网卡没有发包。



4.12. 注入 completion timeout

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t completion_timeout -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



HYGON PCIE Test Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64.

Version:v00.26 Build Apr 27 2020 - 14:04:40

| | =======System | =System have 2 s | socket, per | sokect | suppor | t 2 d1e≕ | | | | | | | | |
|----------------------------|--|--|--------------------------------|------------------------|--------------------|----------------------------|---------------------------|------------------------------|-----------------------|--------------------|-------------|--------------|---|----------------|
| Idx | addr | socketid | dieid | logical | dieid | iohc_bu | | RC | | DF0 | | DF1 | | |
| 0 | 0xb1d5d0 | 0 | 0 | 0 | ureru | 0x00 | • | (00:00.0 | 1) | (00:18. | 0) | (00:18. | 1) | |
| ĭ | 0xb1d5f0 | o O | ĭ | ĭ | | 0x20 | | (20:00.0 | | (00:19. | | (00:19. | | |
| 2 | 0xb1d610 | i | ō | 2 | | 0x40 | | (40:00.0 | | (00:1c. | | (00:1c. | | |
| 3 | 0xb1d630 | 1 | 1 | 3 | | 0x60 | | (60:00.0 |)) | (00:1d. | . 0) | (00:1d. | 1). | |
| | | | | | | | | | | - | | | | |
| Idx | GPP bridge | [vid:Did] | DLACTIVE | ira | socket | die | core | phyport | logicpor | - | RC | | DF0 | DF1 |
| 0 | (00:01.2) | [1d94:1453] | + | 32 | 0 | Ö | 0 | 6 | 1 | | (00:00. | 0) | (00:18.0) | (00:18.1) |
| 1 | (00:01.4) | [1d94:1453] | + | 33 | ō | ō | ō | 4 | 3 | | (00:00. | | (00:18.0) | (00:18.1) |
| 2 | (40:01.2) | [1d94:1453] | + | 40 | 1 | 0 | 0 | 1 | 1 | | (40:00. | | (00:1c.0) | (00:1c.1) |
| 3 | (60:03.1) | [1d94:1453] | + | 44 | 1 | 1 | 1 | 8 | 8 | | (60:00. | 0) | (00:1d.0) | (00:1d.1) |
| Idx | GPP subdev | [vid:Did] | ira | name | | | | | | - | | | | |
| +++++++ | +++++++++++++++ | ++GPP (00:01.2) | subdev+++ | ++++++ | ++++++ | +++++++ | | | | | | | | |
| 0 | (01:00.0) | [1a03:1150] | 162 | Device | 1a03:11 | 50 | | | | | | | | |
| 1 | (02:00.0) | [1a03:2000] | 162 | Device | 1a03:20 | 00 | | | | | | | | |
| +++++++ | (03:00.0) | ++GPP (00:01.4) | 152 152 | | 8086:15 | | | | | | | | | |
| 0 1 | (03:00.0) | [8086:1521] [8086:1521] | 48 | | 8086:15 | | | | | | | | | |
| +++++++ | | ++GPP (40:01.2) | | | | | | | | | | | | |
| 0 | (41:00.0) | [8086:1521] | 172 | | 8086:15 | | | | | | | | | |
| 1 | (41:00.1) | [8086:1521] | 182 | Device | 8086:15 | 21 | | | | | | | | |
| ++++++++ | | ++GPP (60:03.1) | 192 | | | | | | | | | | | |
| 0 | (61:00.0) (61:00.1) | [8086:1521] [8086:1521] | 202 | | 8086:15 8086:15 | | | | | | | | | |
| | (01:00.1) | [00000:1551] | 202 | Device. | 0000.13 | | | - | | - | | | · | |
| [pcieinject | [INFO] pcietest_disa | ble_aspm, line:238] ble_dpc, line:191]: | : Link ctrl r | eg_of_dev | 0:1.4 is | 0x40, indic | ate that | ASPM has bee | n disabled | | | | | |
| [pciein]ect | [INFO] pcietest_disa [INFO] pcietest_set_ | ible_dpc, line:191]: err report app brid | DPC ctrl reg ne. line:3618 | of dev 0 1: Tdx 6. | expect er | 0, indicate r 0x4000. W | that DPC | trigger has 84000 to AFR | CAP reg o | bled. ffset 0x8 | for dev 0 | 0:01.4 to m | ask completion timeou | t error repor |
| [pcieinject | [INFO] pcietest_set_ | err_report_gpp_brid | ge, line:3659 |]: Aer ma: | sk reg 0x4 | 784000 read | h expect, | success to | mask compl | etion_tim | eout error | report for | ask completion_timeou dev dev 00:01.4. | ic ciror repor |
| [pcieinject [pcieinject | [INFO] pcietest_clea [INFO] pcietest_clea | r_error_status, lin r_error_status, lin r_error_status, lin r_error_status, lin | e:48/]: Clear e:495]: Clear | root err | tatus regi | tor dev 00: rea for dev | 01.4. | | | | | | | |
| [pciein]ect | [INFO] pcietest_clea | r_error_status, line | e:500]: Clear | lane err | status fo | r 00:01.4. | 00102111 | | | | | | | |
| [pciein]ect | [INFO] pcietest_clea [INFO] pcietest_loop | r_error_status, Ilni clear aer status | e:504]: Clear line:4641: Re | aer stati trv cnt 0 | s for 00: | 01.4. err status | red 0x0. i | incorrect er | r status r | en 0x0. c | lear aer s | atus red fo | or dev 00:01.4 succes | s. |
| [pcieinject | [INFO] pcietest_dbg_ | portA_write, line:2 | 762]: Sucess | to write | 00000008x | to debug p | ort A ind | ex reg (smn | addr 0x700 |). | | .u.u eg | or dev 00:01.4 succes | |
| [pciein]ect [pciein]ect | [INFO] pcietest_dbg_ [INFO] pcietest dbg | portA_write, line:2 | 772]: Sucess | to write (| Oxe to deb | ug port A c | lata low ro | eg (smn addr red (smn add | 0x704). lr 0x708). | | | | | |
| [pciein]ect | [INFO] pcietest_dbg_ | portA_write, line:2 portA_write, line:2 portA_write, line:2 | 762]: Sucess | to write | 0x80001026 | to debug p | ort A ind | ex reg (smn | addr 0x700 |). | | | | |
| [pciein]ect [pciein]ect | [INFO] prietest_dbg_ INFO] prietest_dbg_ | portA_write, line:2: | 772]: Sucess | to write (| Oxf to deb | ug port A c | lata low re | eg (smn addr | 0x704). lr 0x708) | | | | | |
| [pciein]ect | [INFO] prietest_dbg_ | portA_write, line:2 portA_write, line:2 portA_write, line:2 | 762]: Sucess | to write | 0x80001010 | to debug p | ort A ind | ex_reg (smn | addr 0x700 |) | | | | |
| [pcieinject [pcieinject | [INFO] pcietest_dbg_ [INFO] pcietest_dbg_ | portA_write, line:2 | 772]: Sucess | to write (| 0x5ff10001 | to debug p | ort A data lata biob i | a low reg (s red (smn add | mn addr 0x | 704). | | | | |
| [pcieinject | [INFO] prietest_set_ | severity_reg, line: | 3280]: Idx 6 | (completion | on_timeout |) severity | is 1, suc | cess to chan | ge severit | y reg fro | m_0x4e2030 | to 0x4e6030 | O(set bitmask Ox4000) | |
| [pciein]ect | [INFO] prietest_writ | e_inject_transaction | n, line:2952] | : The val | 0x0 of sm | n addr 0x11 smp addr 0x | 144210 for | f dev 0:1.4, | inject co | mpletion_ | timeout, co | orresponding | g`bitmask is 0xc0000í. inject completion_tim | eout |
| [pciein]ect | [INFO] pcietest_tria | der_some_traffic. l | ine:25781: Gp | p bridae (| 0:1.4 sub | dev 3:0.0 \ | endorid 0: | xffff device | id Oxffff. | , | , p, | | jeec compression_com | |
| [pciein]ect | | ger_some_traffic, 1 | | | | | | | | _ | | | | |
| pcieinject | [INFO] aer_print_err [INFO] aer_print_err | or, line:208]: PCIe | Bus Error: s | everity=U | ncorrected | (Fatal), t | ype=Trans | action Layer | , (Request | er ID | | | | |
| pcieinject | | or, | ce [1094:1453 [14] CmpltTO | J 00:01.4 | error sta | cus/mask=00 | 004000/04 | 64000 | | | | | | |
| Inciginiect | [INFO] pcietest_inje | | | | | | ect comple | etion timeou | t to dev 0 | .1 4 | | | | |
| rperennject. | . 5271.057.051.0525-11136 | cc_pc.c_, as_err_gpp | , | Air Cel I I | cc, y, suc | ccss to mi | ccc comp i | e ron_e rilleou | ic co dev o | | | | | |

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。
 - 命令: ./pcieinject pcie_err -t completion_timeout -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 备注: unlock 的 MP 设备或者 ES 的设备才可以注入

4.13. 注入 unexpected completion

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t unexpected_cmplt -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



| Idx 0 1 2 3 | System addr 0x9ec5d0 0x9ec5f0 0x9ec610 0x9ec630 | =System have 2 : info start addr socketid 0 0 1 1 | 0x9ec5d0, | r sokectincremological, 0 1 2 3 | ent by 0: | t 2 die= x20 byte iohc_bi 0x00 0x20 0x40 0x60 | es 1 tim | RC (00:00.0 (20:00.0 (40:00.0 (60:00.0 |)) ()) ()) | 00:18.0) 00:19.0) 00:1c.0) 00:1d.0) | DF1 (00:18.1). (00:19.1). (00:1c.1). (00:1d.1). | | |
|--|--|---|------------------------------|---|--|---|--------------------------|--|-------------------------------|--|---|--|---|
| Idx 0 1 2 3 | GPP bridge (00:01.2) (00:01.4) (40:01.2) (60:03.1) | [vid:Did] [1d94:1453] [1d94:1453] [1d94:1453] [1d94:1453] | DLActive + + + + | irq 32 33 40 44 | socket 0 0 1 1 | die 0 0 0 1 | core 0 0 0 1 | phyport 6 4 1 8 | logicport 1 3 1 8 | RC (00:00. (00:00. (40:00. (60:00. | o) (00 0) (00 | 0:18.0) 0:18.0) 0:16.0) 0:1c.0) | DF1 (00:18.1) (00:18.1) (00:1c.1) (00:1d.1) |
| Idx ************************************ | GPP subdev (01:00.0) (02:00.0) (03:00.0) (03:00.1) (41:00.1) (41:00.1) (61:00.1) | [Vid:Did] ++GPP (00:01.2) [1a03:1150] [1a03:1150] [1a03:2000] ++GPP (00:01.4) [8086:1521] ++GPP (40:01.2) [8086:1521] ++GPP (60:03.1) [8086:1521] [8086:1521] | 162 162 | Device Device Device Device HILLIAN Device Device Device | 1a03:11 1a03:200 +++++++ 8086:15 8086:15 8086:15 8086:15 | 50 00 ++++++ 21 21 ++++++ 21 21 | | | | | | | |



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| Determined Tumop | Determined
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- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。

命令: ./pcieinject pcie_err -t completion_timeout -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 备注: unlock 的 MP 设备或者 ES 的设备才可以注入

4.14. 注入 malformed tlp

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t malformed_tlp -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



| Idx 0 1 2 3 | Syste addr 0x1b765d0 0x1b765f0 0x1b76610 0x1b76630 | ===System have 2 m info start addr socketid 0 0 1 | 0x1b765d0 | r sokec incre logical 0 1 2 3 | ment by | t 2 die= 0x20 byt iohc_bu 0x00 0x20 0x40 0x60 | es 1 t | ime====== RC (00:00.0 (20:00.0 (40:00.0 (60:00.0 | ()) (()) (| F0 (00:18.0) (00:19.0) (00:1c.0) (00:1d.0) | DF1 (00:18.1). (00:19.1). (00:1c.1). (00:1d.1). | | |
|-------------------------|---|---|---|--|--|--|---------------------|---|---|---|---|----------------|---|
| Idx 0 1 2 3 | GPP bridge (00:01.2) (00:01.4) (40:01.2) (60:03.1) | [vid:Did] [1d94:1453] [1d94:1453] [1d94:1453] [1d94:1453] | DLActive + + + + | irq 32 33 40 44 | socket 0 0 1 1 | die 0 0 0 1 | core 0 0 0 | phyport 6 4 1 8 | logicport 1 3 1 8 | RC (00:00. (00:00. (40:00. (60:00. | 0) (00:1 0) (00:1 | L8.0) Lc.0) | DF1 (00:18.1) (00:18.1) (00:1c.1) (00:1d.1) |
| 0 | (01:00.0) (02:00.0) | [vid:pid] ++++GPP (00:01.2) [1a03:1150] [1a03:2000] +++-GPP (00:01.4) [8086:1521] [8086:1521] [8086:1521] [8086:1521] [8086:1521] [8086:1521] [8086:1521] [8086:1521] | 162 162 subdev+++ 152 48 subdev+++ 172 182 | Device Device Device Device Device Device Device Device | 1a03:11 1a03:20 ++++++ 8086:15 8086:15 | 50 000 +++++++ 21 21 +++++++ 21 21 +++++++ | | | | • | | | |
| pcieini | ect INFO pcletest_ | disable_aspm, line:2 disable_dpc, line:191 set_err_report_gpp_br set_err_report_gpp_br .clear_error_status, l | 1ne:48/ : Cle | ar devic | e status r | eg tor dev | 00:01.4 | | been disabl has been di AER CAP re to mask mal | ed. sabled. og offset Ox8 for d formed_tlp error r | ev 00:01.4 to mas eport for dev dev | k malformed_tl | lp error repor |

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picteriest INCO petest_disaple_aspm, iner:391 Line Cff reg of dev 0:1.4 % Oxfo, inertack that Aspm has been disabled bed, proceedings of the company of the
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- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。
 - 命令: ./pcieinject pcie_err -t malformed_tlp -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 备注: unlock 的 MP 设备或者 ES 的设备才可以注入



4.15. 注入 ecrc

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t ecrc -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



HYGON PCIE TEST Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64. Version:v00.26 Build Apr 27 2020 - 14:04:40

| | Custom | ==System have 2 info start addr | socket, pe | r sokect | suppor | t 2 die= | oc 1 ti | | | - | | | | |
|-----------------------------|--|--|--|---|---|--|---|---|---|--|------------------------------------|---|---|---|
| Idx 0 1 2 3 | addr 0x1fb55d0 0x1fb55f0 0x1fb5610 0x1fb5630 | socketid 0 0 1 1 | | logical_ 0 1 2 3 | | iohc_bu 0x00 0x20 0x40 0x60 | | RC (00:00.0 (20:00.0 (40:00.0 (60:00.0 | o) o) | DF0 (00:18.0) (00:19.0) (00:1c.0) (00:1d.0) | | DF1 (00:18.1 (00:19.1 (00:1c.1 (00:1d.1 | ι). ι). | |
| Idx 0 1 2 3 | GPP bridge (00:01.2) (00:01.4) (40:01.2) (60:03.1) | [vid:Did] [1d94:1453] [1d94:1453] [1d94:1453] [1d94:1453] | DLACTIVE + + + + | irq 32 33 40 44 | socket 0 0 1 1 | die 0 0 0 1 | core 0 0 0 | phyport 6 4 1 8 | logicpor 1 3 1 8 | { | C 00:00.0 00:00.0 40:00.0 | o) o) | DF0 (00:18.0) (00:18.0) (00:1c.0) (00:1d.0) | DF1 (00:18.1) (00:18.1) (00:1c.1) (00:1d.1) |
| 0 1 +++++++ 0 1 | (01:00.0) (02:00.0) ++++++++++++++++++++++++++++++++++ | [vid:pid] +++GPP (00:01.2) [1a03:1150] [1a03:2000] +++GPP (00:01.4) [8086:1521] [8086:1521] [8086:1521] [8086:1521] [8086:1521] [8086:1521] [8086:1521] | 162 162 subdev+++ 152 48 subdev+++ 172 182 | Device Device Device Device H++++++ Device Device Device | 1a03:21 1a03:20 ++++++ 8086:15 8086:15 ++++++ 8086:15 8086:15 | 50 000 +++++++ 21 21 21 21 +++++++ | | | | | | | | |
| | Time priests Time Time | Hable aspm. line:29 itsable dpc. line:19 itsable dpc. line:19 itsable dpc. line:19 itsable dpc. line:19 lear_error_spp.b. lear_error_status. lear_error_status. lear_error_status. loop_clear_aer_status. loop | 1]: DPC ctrl ridge, line: ridge, line: ridge, line: ridge, line: line:489]: C line:495]: C line:500]: C line:500]: C e:2762]: Suc e:2772]: Suc e:2782]: Suc e:278 | reg of de | IN 0:1.4 is 9, expect mask recestatus error status error status error status te 0x8 to corr te 0x800 te 0x6 to corr te 0x6 to corr te 0x6 to corr te 0x6 to corr yal 0x0 c e 0xc00 t tge 0:1.4 | is OXO, inc t err OX86 g OX4744000 reg for de tus reg fo o0:01.4. ect err st 00000 to de o debug por o fo debug por o se fo debug por o fo debug por o fo debug por o fo se fo debug por o fo se fo debug por o fo debug por o fo debug por | licate th. (000, write reach e: v 00:01.4. i reach e: v 00:01.4. t A data thug port t A data (bug port t A data (bug port t A data (bug port) t | at DPC trigg ce 0x4744000 pect, succest. .01.4. 0x0, uncorr A index reg low reg (sm high reg (sr A index neg low reg (sm high reg (sr A index neg low reg (sm high reg (sr high reg (sr hi | er has been to AER CAN ss to mask ect err st (smn addr ox7 n addr 0x7 nn addr 0x7 mn addr 0x7 mn addr ox7 mn addr ox7 mn addr ox7 mn addr ox7 mn addr ox ity reg fro 0:1.4, in :1.4 (sock deviceid o | n disabled. p reg offset ecrc error atus reg 0x0 0x700). 04). 708) 0x700). 04). 0x700). 040 0x700). | report f | for dev dev | / 00:01.4. | 0:01.4 succes: |
| [pciein]ec [pciein]ec | t [INFO] aer_print t [INFO]aer_pri | _error, line:208]: P _error, line:213]: d nt_error, line:180]: inject_pcie_ras_err_ | evice [1d94: [19] ECR | 1453] 00:0 C | i.4 error | status/ma | sk=00080 | 000/047d4000 | | eceiver ID) | | | | |

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。
 - 命令: ./pcieinject pcie_err -t ecrc -s 0:1.4 -e mask_err_report -d 1 -c 3 -i 3

备注: unlock 的 MP 设备或者 ES 的设备才可以注入,需要从 RP 到 EP 整个链路上都支持 ECRC。



4.16. 注入 unsupported request

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t unsupported_req -s 60:3.1 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



HYGON PCIE Test Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64.

Version:v00.26 Build Apr 27 2020 - 14:04:40

| | | =System have 2 : | socket, pe | r sokec | t support | : 2 die: | | | | | | | |
|---------|-------------------------|--------------------------------|----------------------|----------|-----------|----------|----------|-----------|-----------|--------------|---------|------------------|------------------|
| | System | info start addr | 0x89d5d0, | increm | ent by 0: | (20 byt) | es 1 tin | | | | | | |
| Idx | addr | socketid | dieid | logical. | _dieid | iohc_bu | ıs | RC | | FO . | DF1 | | |
| 0 | 0x89d5d0 | 0 | 0 | 0 | | 0x00 | | (00:00.0 | | 00:18.0) | (00:18. | 1). | |
| 1 | 0x89d5f0 | 0 | 1 | 1 | | 0x20 | | (20:00.0 | | 00:19.0) | (00:19. | 1). | |
| 2 | 0x89d610 | 1 | Ō | 2 | | 0x40 | | (40:00.0 | | 00:1c.0) | (00:1c. | 1). | |
| 3 | 0x89d630 | 1 | 1 | 3 | | 0x60 | | (60:00.0 |)) ((| 00:1d.0) | (00:1d. | 1). | |
| | | | | | | | | | | | | | |
| m dec | con builder | Ford 2 - 62 - 27 | D. 4 - 4 - 4 - 1 - 1 | | | 42 - | | | 7 | | | PE0 | 0.01 |
| Idx | GPP bridge (00:01.2) | [Vid:Did] [1d94:1453] | DLActive | 32 | socket | die | core | priypor c | logicport | RC (00:00 | 0) | DF0 (00:18.0) | DF1 (00:18.1) |
| 1 | (00:01.4) | [1d94:1453] | | 32 | ŏ | ŏ | ŏ | 4 | 5 | (00:00 | | (00:18.0) | (00:18.1) |
| 2 | (40:01.2) | [1d94:1453] | | 33 40 | 1 | ŏ | ŏ | 1 | 1 | (40:00 | | (00:1c.0) | (00:1c.1) |
| 5 | (60:03.1) | [1d94:1453] | I | 44 | 1 | 1 | 1 | 8 | 8 | (60:00 | | (00:1d.0) | (00:1d.1) |
| | (00.03.1) | [1454.1455] | | | | | | | | (00.00 | | (00.10.0) | (00.14.1) |
| Idx | GPP subdev | [Vid:Did] | irq | name | | | | | | | | | |
| ++++++ | +++++++++++++ | ++GPP (00:01.2) | subdev+++ | ++++++ | +++++++ | ++++++ | F | | | | | | |
| 0 | (01:00.0) | [1a03:1150] | 162 | Device | 1a03:11 | 0 | | | | | | | |
| 1 | (02:00.0) | [1a03:2000] | 162 | | 1a03:200 | | | | | | | | |
| +++++++ | ++++++++++++++ | ++GPP (00:01.4) | subdev+++ | ++++++ | +++++++ | ++++++ | F | | | | | | |
| 0 | (03:00.0) | [8086:1521] | 152 | | 8086:152 | | | | | | | | |
| 1 | (03:00.1) | [8086:1521] | 48 | | 8086:152 | | | | | | | | |
| +++++++ | +++++++++++++++ | | subdev+++ | | | | ٠ | | | | | | |
| 0 | (41:00.0) | [8086:1521] | 172 | | 8086:152 | | | | | | | | |
| 1 | (41:00.1) | [8086:1521] | 182 subdev+++ | | 8086:152 | | | | | | | | |
| +++++++ | (61:00.0) | ++GPP (60:03.1) [8086:1521] | 192 | | 8086:15 | | - | | | | | | |
| 1 | (61:00.1) | 8086:1521 | 202 | | 8086:152 | | | | | | | | |
| | (01.00.1) | [0000.1321] | 202 | perice | 0000.13 | | | • | | | | · - · | |
| | | | | | | | | | | | | | |

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- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。

命令: ./pcieinject pcie_err -t unsupported_req -s 60:3.1 -e mask_err_report -d 1 -c 3 -i 3

备注: unlock 的 MP 设备或者 ES 的设备才可以注入,需要 EP 发送一笔 memory 请求才能产生 UR 的错误,建议在管理网卡对应的 GPP 桥注入。



4.17. 注入 bad tlp

 $root@ubuntu:/home/higon/pciein]ectnew\# ./pcieinject pcie_err -t \ bad_tlp -s \ 0:1.4 -e \ mask_err_report -d \ 1 -c \ 3 -i \ 3 set default log level to 3.$



HYGON PCIE TEST Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64.

Version:v00.26 Build Apr 27 2020 - 14:04:40

| | addr 0xbd45d0 0xbd45f0 0xbd4610 0xbd4630 | =System have 2 sinfo start addr socketid 0 0 1 1 | 0xbd45d0 | sokect su increment ogical_die 0 1 2 3 | by 0x | 2 die= 20 byte: iohc_bu: 0x00 0x20 0x40 0x60 | s 1 time | RC (00:00.0 (20:00.0 (40:00.0 (60:00.0 | } | DF0 (00:18.0) (00:19.0) (00:1c.0) (00:1d.0) | DF1 (00:18.1) (00:19.1) (00:1c.1) (00:1d.1) | | |
|--|---|---|--|--|--|--|--|--|--|---|---|--|---|
| Idx 0 1 2 3 | GPP bridge (00:01.2) (00:01.4) (40:01.2) (60:03.1) | [vid:Did] [1d94:1453] [1d94:1453] [1d94:1453] [1d94:1453] | DLACTIVE + + + + + | irq soo 32 33 40 44 | ket 0 0 1 | die 0 0 0 1 | core 0 0 0 1 | phyport 6 4 1 8 | logicpor 1 3 1 8 | RC (00:00. (00:00. (40:00. (60:00. | 0) (0) (0) (| F0 00:18.0) 00:18.0) 00:1c.0) 00:1d.0) | DF1 (00:18.1) (00:18.1) (00:1c.1) (00:1d.1) |
| 0 1 + | t INFO prietest t NFO prietest t NFO prietest t INFO prietest | [1a03:1150] [1a03:200:0] -cppe (00:0] -cppe | subdev++++ 152 162 162 163 subdev+++ 152 182 subdev+++ 182 182 182 182 202 192 202 193 191 191 191 191 191 191 191 191 191 | Device 1a(Device 1a(Device 1a(Device 80) Citer 80 Citer 80 | 33:115 33:200 +++++ 16:152 16: | 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | 0, indica provided reach for dev (0 provided reach for dev (0 pol.4. err statu debug ug port A | tte that DPC write 0x60 n expect, so 0:01.4. lev 00:01.4. s reg 0x0, n port A inc data low r d data low r d data high port A inc data high port A dat data high port A dat data high port A dat data high tot need moc 11144210 of | L trigger 40 to AER uccess to uncorrect dex reg (smn a reg (smn a reg (smn gex reg (smn a reg (smn a reg (smn a) reg (smn a reg (smn a) | has been disablect CAP reg offset 0x mask bad_tlp erro min addr 0x700, ddr 0x704, addr 0x708), mn addr 0x700, addr 0x704, addr 0x704, addr 0x708, ever by reg ever by reg (150 for 0x704), addr 0x708, ever by reg (150 for 0x704), addr 0x708, ever by reg (150 for 0x708), ever by | 114 for dev (or report for 0x0, clear ac | er status reg 1 | For dev 00:01.4 success. |
| pcieinjec pcieinjec pcieinjec pcieinjec | t [INFO] poietest_ t [INFO] poietest_ t [INFO] aer_print t [INFO]aer_pri t [INFO]ter_pri | _error, line:208] _error, line:213] nt_error, line:180 | PCIe Bus Er device [1d9]: [6] B | ror: sever 94:1453] 00: BadTLP | ty=Cor 01.4 € | rected, error sta | type=Data tus/mask= | == Link Layer -00000040/00 | r, (Receiv 0006040 | er ID) | | | |

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。
 - 命令: ./pcieinject pcie_err -t bad_tlp -s 60:3.1 -e mask_err_report -d 1 -c 3 -i 3
 - 备注: unlock 的 MP 设备或者 ES 的设备才可以注入。

4.18. 注入 bad dllp

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t bad_dllp -s 60:3.1 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



| | | ==System have 2 | socket, pe | r sokect | t suppor | t 2 die: | | | | | | |
|---------|----------------|------------------|------------|----------------------------|----------|----------|--------|-----------|-----------|----------|------------|---------------|
| | Svstem | info start addr | 0x223d5d0 | increr | nent by | 0x20 by | es 1 t | ime====== | | | | |
| Idx | addr | socketid | dieid | logical_ | _dieid´ | iohc_b | ıs | RC | D | F0 | DF1 | |
| 0 | 0x223d5d0 | 0 | 0 | 0 | | 0x00 | | (00:00.0 | 0 | 00:18.0) | (00:18.1). | |
| i | 0x223d5f0 | Ö | 1 | 1 | | 0x20 | | (20:00.0 | | 00:19.0) | (00:19.1). | |
| 5 | 0x223d610 | ĭ | ō | 2 | | 0x40 | | (40:00.0 | | 00:1c.0) | (00:1c.1). | |
| 3 | 0x223d630 | ī | ĭ | รั | | 0x60 | | (60:00.0 | | 00:1d.0) | (00:1d.1). | |
| | OMELSHOSO | | | | | | | (0010010 | , | 0012010) | (0012012)1 | |
| | | | | | | | | | | | | |
| Idx | GPP bridge | [vid:Did] | DLActive | ira | socket | die | core | phyport | logicport | RC | DF0 | DF1 |
| 0 | (00:01.2) | [1d94:1453] | + | 32 | 0 | 0 | 0 | 6 | 1 | (00:00. | 0) (00:1 | (00:18.1) |
| ĭ | (00:01.4) | [1d94:1453] | 4 | 33 | ŏ | ŏ | ŏ | ă | 3 | (00:00. | | (00:18.1) |
| 2 | (40:01.2) | [1d94:1453] | 4 | 33 40 | ĭ | ŏ | ŏ | i | 1 | (40:00. | | (00:1c.1) |
| 3 | (60:03.1) | [1d94:1453] | 1 | 44 | ī | ĭ | ĭ | 8 | 8 | (60:00. | | (00:1d.1) |
| | (00.03.1) | [1054,1455] | | | | | | | | (00.00. | 0) (00.1 | (00.14.1) |
| Idx | GPP subdev | [Vid:Did] | ira | name | | | | | | | | |
| | ++++++++++++++ | ++GPP (00:01.2) | | | | ++++++ | | | | | | |
| 0 | (01:00.0) | [1a03:1150] | 162 | | 1a03:11 | | | | | | | |
| ĭ | (02:00.0) | [1a03:2000] | 162 | | 1a03:20 | | | | | | | |
| +++++++ | | ++GPP (00:01.4) | | | | | _ | | | | | |
| 0 | (03:00.0) | [8086:1521] | 152 | | 8086:15 | | | | | | | |
| ĭ | (03:00.1) | 8086:1521 | 48 | | 8086:15 | | | | | | | |
| ++++++ | +++++++++++++ | +++GPP (40:01.2) | | | | | _ | | | | | |
| 0 | (41:00.0) | [8086:1521] | 172 | | 8086:15 | | | | | | | |
| ĭ | (41:00.1) | 8086:1521 | 182 | | 8086:15 | | | | | | | |
| ++++++ | ++++++++++++++ | ++GPP (60:03 1) | subdev+++ | | | | | | | | | |
| 0 | (61:00.0) | [8086:1521] | 192 | | 8086:15 | | | | | | | |
| 1 | (61:00.1) | 8086:1521 | 202 | | 8086:15 | | | | | | | |
| | (01.00.1) | [0000011351] | | Device. | 0000.13 | | | | | | | |
| | | | | | | | | | | | | |



```
poteinject [IMFO] potetest_disable_aspm, line:238]: Link ctrl reg of dev 60:3.1 is 0x0, indicate that ASPM has been disabled, preinject [IMFO] potetest_disable_aspm, line:238]: Dow ctrl reg of dev 60:3.1 is 0x0, indicate that ASPM has been disabled. For the control of the con
```

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。

命令: ./pcieinject pcie err -t bad dllp -s 60:3.1 -e mask err report -d 1 -c 3 -i 3

备注: unlock 的 MP 设备或者 ES 的设备才可以注入。DLLP 包可能是 ACK、NACK 包, 也可能是 updata flow ctrl 等,DLLP 丢失,导致不可预知的错误

4.19. 注入 advisy non fatal

root@ubuntu:/home/higon/pcieinjectnew# ./pcieinject pcie_err -t advisory_nonfatal -s 60:3.1 -e mask_err_report -d 1 -c 3 -i 3 set default log level to 3.



HYGON PCIE Test Application Linux ubuntu 4.4.0-116+ #15 SMP Sat Jul 27 15:56:29 HKT 2019 x86_64.

Version:v00.26 Build Apr 27 2020 - 14:04:40

| Idx 0 1 2 3 3 | addr 0x25e85d0 0x25e85f0 0x25e8610 0x25e8630 | System have 2 info start addr socketid 0 0 1 | 0x25e85d0, | sokect s incremen ogical_di 0 1 2 3 | t'by 0x eid i 0 0 | 2 die== 20 byte ohc_bus 0x00 0x20 0x40 0x60 | es 1 tin | RC (00:00.0 (20:00.0 (40:00.0 | DI ()) ((| F0 00:18.0) 00:19.0) 00:1c.0) 00:1d.0) | DF1 (00:18. (00:19. (00:1c. (00:1d. | 1). 1). | |
|----------------------------|--|--|--|--|--|---|---------------------|--|-------------------------------|--|---|---|---|
| Idx 0 1 2 3 | GPP bridge (00:01.2) (00:01.4) (40:01.2) (60:03.1) | [vid:Did] [1d94:1453] [1d94:1453] [1d94:1453] [1d94:1453] | DLActive + + + + | irq so 32 33 40 44 | cket 0 0 1 | die 0 0 0 1 | core 0 0 0 | phyport 6 4 1 8 | logicport 1 3 1 8 | RC (00:00. (00:00. (40:00. (60:00. | o) o) | DF0 (00:18.0) (00:18.0) (00:1c.0) (00:1d.0) | DF1 (00:18.1) (00:18.1) (00:1c.1) (00:1d.1) |
| 0 1 ++++++ 0 1 | GPP subdev (01:00.0) (02:00.0) (03:00.0) (03:00.1) (41:00.0) (41:00.1) (61:00.1) | [1a03:1150] [1a03:2000] +++GPP (00:01.4) [8086:1521] [8086:1521] | subdev++++ 162 162 subdev++++ 152 48 subdev++++ 172 182 subdev++++ 192 | Device 1a Device 1a HHHHHHH Device 80 Device 80 HHHHHHHH Device 80 Device 80 Device 80 | 03:1150 03:2000 ++++++ 86:1521 86:1521 ++++++ 86:1521 86:1521 ++++++ | ++++++ | | | | | | | |

```
poteinject IMPO potetest_disable_dop. Inne:238]: Link trl reg of dev 60:11. 15 0x40, indicate that ASPM has been disabled, poteinject IMPO potetest_disable_dop. Inne:238]: Link trl reg of dev 60:21. 15 0x40, indicate that ASPM has been disabled. Property of the control of the
```

- 1、通过命令: ./pcieinject gpp 显示出系统中所有 linkup 的 GPP 桥。
- 2、往对对应 GPP 桥注入对应错误, -s 后面参数就是 GPP bridge 对应的 bus:device.function。-c 注错重试次数, -i 注错重试时间间隔。

命令: //pcieinject pcie_err -t advisory_nonfatal -s 60:3.1 -e mask_err_report -d 1 -c 3 -i 3 备注: unlock 的 MP 设备或者 ES 的设备才可以注入。

5. 使用限制

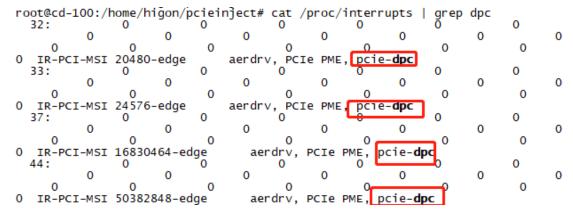
下面几个功能和工具提供的错误注入功能没有直接关系,但是设计的系统配置会影响错



误上报,从而影响错误注入后的观察,需要手动配置。

1、DPC 功能

新版本的 OS 会支持 DPC 的 service, 当不可修复错误触发 DPC 时, DPC service 会把 GPP 下接设备 remove, 从而导致错误只能注入 1 次。如果想多次注入,需要输入-d 1,如果想触发 DPC,则输入-d 0。



7.31.3. DPC Control Register (Offset 06h)

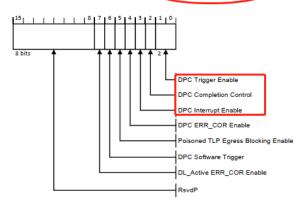


Figure 7-153: DPC Control Register

lspci -s bus:device.function -vvv 对应 GPP 桥的 DPC ctrl 已经被disable。

Capabilities: [380 v1] Downstream Port Containment

DDCCap: INT Msq #0, RPExt+ PoisonedTLP+ SwTrigger+ RP PIO Log 6, DL_ActiveErr+

DDCCtl: Trigger: 0 Cmpl- INT- ErrCor- PoisonedTLP- SwTrigger- DL_ActiveErr
DDCSta: Irigger- Reason: 00 INI- RPBUSY- Iriggerext: 00 RP PIO ErrPtr:IT

Source: 0000

2, Firmware first model

对应某些错误,如果错误上报是走到的 firmware first model 这条路,BIOS 会配置产生对应错误会 syncflood,从而导致系统重启,不方便观察结果。如果想多次注入错误,可以使用 script 目录下的 iohc_ras. sh 关闭对应的GPP 的 firmware first model 功能。



root@cd-100:/home/higon/pcieinject# ./pcieinject gpp set default log level to 3.



HYGON PCIE Test Application Linux cd-100 4.15.13-hygon #93 SMP Tue Mar 27 11:42:55 CST 2018 x86_64.

Version:v00.15 Build Jan 15 2020 - 17:10:13

| | | | | | | 2 44 - | | | | | | |
|--------|------------------------|----------------------------|-------------|-----------|------------|---------|-------------|--------------|-------------|-----------|------------------------|------------------------|
| | | ===System have 2 | socket, per | sokec | t support | 2 die: | | | | | | |
| Idx | GPP bridge | [vid:Did] | DLACTIVE | ina | socket | die | core | phynort | logicport | RC | DF0 | DF1 |
| Tux | (00:01.2) | [1d94:1453] | DEACTIVE | 11 4 | SUCKEL | uie | COLE | priypor c | Tog Tepor t | (00:00.0) | (00:18.0) | (00:18.1) |
| 1 | (00:01.2) | 1d94:1453 | | 33 | 0 | 0 | 0 | 4 | ± - | (00:00.0) | (00:18.0) | (00:18.1) |
| | | | | 33 | 0 | • | 1 | 4 | 2 | (20:00.0) | (00:18.0) | (00:18.1) |
| 2 | (20:03.2) (60:03.1) | [1d94:1453] [1d94:1453] | | 44 | 4 | 1 | + | 9 | 9 | (60:00.0) | (00:19.0) (00:1d.0) | (00:19.1) (00:1d.1) |
| 3 | (60:03.1) | [1094:1455] | + | 44 | 1 | 1 | 1 | ٥ | | (60:00.0) | (00:10.0) | (00:10.1) |
| Idx | GPP subdev | [vid:Did] | ira | name | | | | | | | | |
| | ++++++++++++++ | | | | | +++++ | _ | | | | | |
| 0 | (01:00.0) | [1a03:1150] | | | | | | 50 PCT-to- | -PCI Bridge | | | |
| ĭ | (02:00.0) | [1a03:2000] | 152 | ASPEED | Technolo | ngy Tn | ASPEE | Graphic | Eamily | | | |
| | +++++++++++++ | ++++GPP (00:01.4 | | | | | | o ar aprire. | | | | |
| 0 | (03:00.0) | Γ8086:15211 | | | | | | Network | Connection | | | |
| ĭ | (03:00.1) | [8086:1521] | 48 | Intel | Corporati | on T35 | Ginabi | Network | Connection | | | |
| +++++ | +++++++++++ | | | | | | | | comicceron | | | |
| 0 | (21:00.0) | [8086:1521] | 172 | | | | | Network | Connection | | | |
| ĭ | (21:00.1) | [8086:1521] | 182 | Intel | Corporati | on T35 | Gigabi | t Network | Connection | | | |
| | +++++++++++++ | | | | | | | c neemon k | Connection | | | |
| 0 | (61:00.0) | [8086:1521] | | | | | | t Network | Connection | | | |
| 1 | (61:00.1) | 8086:1521 | 202 | Intel | Corporati | on T35 | Gigabi | t Network | Connection | | | |
| root@c | :d-100:/home/higor | | | 2 | co. por ac | J., 133 | . s.gabi | C MCCWOIK | Connection | | | |
| | d-100:/home/higor | | | rac ch | 0 read | _ | | | | | | |
| . 5000 | a 1001/1.bille/111gor | , peremject/scr | .pe/ Tone_ | , as. 311 | o . eau | _ | | | | | | |

第一个参数是 logical dieid, 算法为: socketid*每个 socket 支持多少 die+socket 内部 dieid

- ./iohc ras.sh 0 read 是对应 die 的 ras action reg。
- ./iohc ras.sh 0 write 是把 ras action reg清零。
- 3、ecrc 支持

ecrc 是整个 pcie 链路上的 crc 校验,注入前请检查整个 pcie 链路上是否 支持 ecrc 错误校验。

```
| rooted-100:/home/higon/pcieinject# |spci = 0.14 - www
| Oo: 0.4 PCT bridge: Chengdu halguang 1 bees into control PCT bridge: Chengdu halguang 1 bees into control PCT bridge: Chengdu halguang 1 bees into control PCT bridge: Chengdu halguang 1 bees into per parter | Devember | PCT | PCT
```

如果不支持, 请检查 OS 配置是否把 ecrc 编入 OS 和 cmdline 是否打开了 ecrc 检查: ecrc=on。

4、测试完毕后环境恢复



错误注入测试可能修改了系统的默认配置,测试完毕请重启系统恢复环境。