

Lab2 report

2019年3月18日 20:33

Part1

Q1: What's the purpose of using hugepage?

A: 减少cache miss的次数, 缩减开销

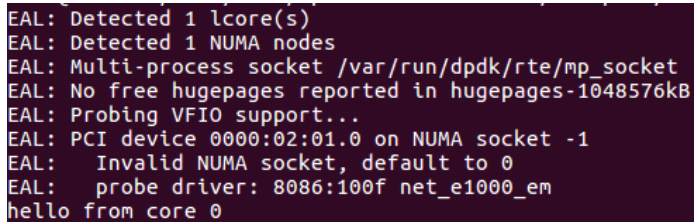
Q2: Take examples/helloworld as an example, describe the execution flow of DPDK programs?

A:

1. 程序开始先调用了rte_eal_init()初始化函数, 主要是pci网卡、内存、cpu核的信息获取与初始化。
2. 为每个核创建执行一个线程

```
/* call lcore_hello() on every slave lcore */
RTE_LCORE_FOREACH_SLAVE(lcore_id) {
    rte_eal_remote_launch(lcore_hello, NULL, lcore_id);
}
```

3. 接着调用rte_eal_mp_wait_lcore()函数等待所有线程结束, 运行结果如下图



```
EAL: Detected 1 lcore(s)
EAL: Detected 1 NUMA nodes
EAL: Multi-process socket /var/run/dpdk/rte/mp_socket
EAL: No free hugepages reported in hugepages-1048576kB
EAL: Probing VFIO support...
EAL: PCI device 0000:02:01.0 on NUMA socket -1
EAL: Invalid NUMA socket, default to 0
EAL: probe driver: 8086:100f net_e1000_em
hello from core 0
```

Q3: Read the codes of examples/skeleton, describe DPDK APIs related to sending and receiving packets.

A:

- Sending api: `rte_eth_tx_burst(port^1, 0, bufs, nb_rx);` 转发数据到相邻端口
- Receiveing api: `rte_eth_rx_burst(port, 0, bufs, BURST_SIZE);` 收一组包, 返回收到的包的个数, 从网卡队列取包放入bufs数组中

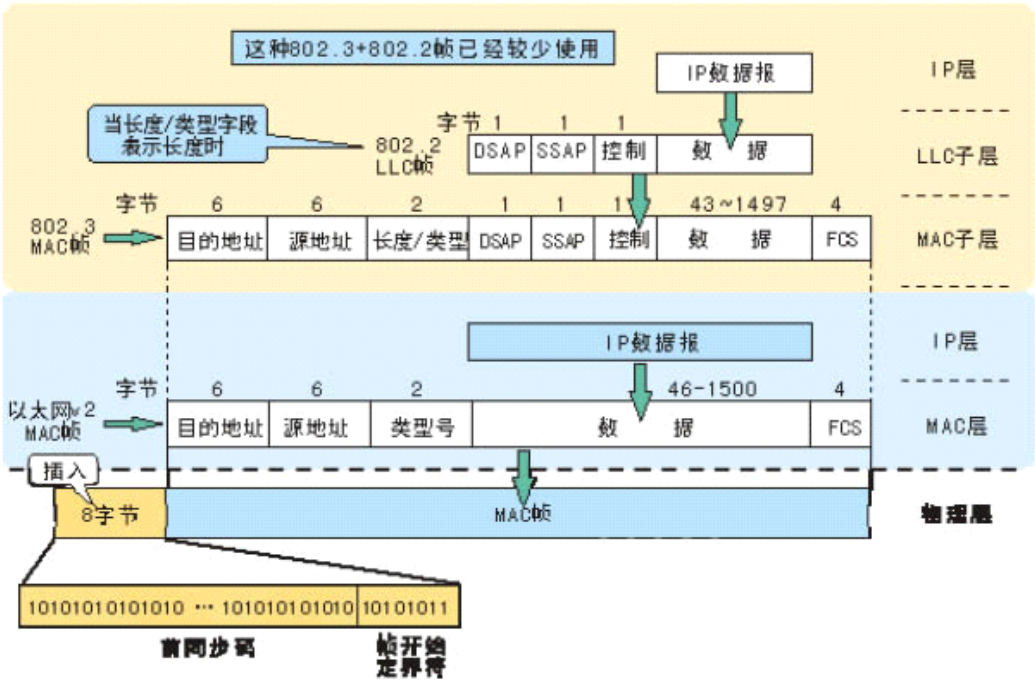
Q4: Describe the data structure of 'rte_mbuf'

A: rte_mbuf结构分为三个部分: headroom、data和tailroom; headroom一般默认128字节, 用来存放用户自己针对mbuf的一些描述信息, 保留给用户使用, 可以通过修改mbuf头文件来实现headroom的大小; data为数据段, 用来存放数据; tailroom用来扩展存放新的数据。

Part2

简要说明

Part2部分代码是直接以examples/skeleton代码为基础, 进行改写得到的。首先去掉skeleton的收包功能, 然后向mbuf内写入ether/ipv4/udp结构的包头, 用rte_eth_tx_burst函数进行发包, 发送端和接收端端口都为9001。包头结构如图所示



udp抓包结果验证截图

No.	Time	Source	Destination	Protocol	Length	Info
2888	37822.044088	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2889	37822.044093	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2890	37822.044098	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2891	37822.044103	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2892	37822.044106	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2893	37822.044111	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2894	37822.044116	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2895	37822.044119	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2896	37822.044124	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2897	37822.044126	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2898	37822.044131	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2899	37822.044136	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2900	37822.044139	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2901	37822.044145	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2902	37822.044148	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2903	37822.044153	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2904	37822.044156	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2905	37822.044161	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2906	37822.044165	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2907	37822.044169	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2908	37822.044173	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2909	37822.044177	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2910	37822.044181	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2911	37822.044185	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2912	37822.044190	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2913	37822.044195	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2914	37822.044198	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2915	37822.044203	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2916	37822.044206	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376
2917	37822.044211	192.168.80.10	192.168.80.6	UDP	114	9001 → 9001 [BAD UDP LENGTH 16384 > IP PAYLOAD LENGTH] Len=16376