DPDK Summit

DPDK on an Intelligent NIC

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Background

- **What is PCI-e EndPoint?**
  - Target mode in PCI-express.
  - Common devices - NIC, Graphic Cards, Security Coprocessors.
  - The PCI-e channel can be used for control or data plane.

- **What is DPDK?**
  - A set of libraries and drivers for fast packet processing.
  - Enables third-party fast path stacks in Linux userspace.
Conventional DPDK Usage

- Runs on standalone data plane processor
- DPDK application is Bus Master and owns the hardware
DPDK on an Intelligent NIC

- DPDK runs on a co-processor
- DPDK application is a PCI-e slave.
Content on the PCI-e bus

- Networks Packet with L2, L3, etc headers
- Custom message - typically as a request/response
OCTEON TX as a PCI-e EP running NIC application
PCI-e EP as NIC

- Host projected as a NIC device
- Fits with the DPDK PMD model
- Register PCI-e EP as a RTE_ETH_DEV

```c
//PM driver for BGX
static struct rte_vdev_driver bgx_pmd_drv = {
    .probe = bgx_probe,
    .remove = bgx_remove,
};
RTE_PMD_REGISTER_VDEV(BGX_PMD, bgx_pmd_drv);
RTE_PMD_REGISTER_PARAM_STRING(BGX_PMD, "nr_port=<int> ");

//PM driver for SDP
static struct rte_vdev_driver sdp_pmd_drv = {
    .probe = sdp_probe,
    .remove = sdp_remove,
};
RTE_PMD_REGISTER_VDEV(SDP_PMD, sdp_pmd_drv);
RTE_PMD_REGISTER_PARAM_STRING(SDP_PMD, "nr_port=<int> ");

//PM driver for SSOW
static struct rte_vdev_driver ssow_pmd_drv = {
    .probe = ssow_probe,
    .remove = ssow_remove,
};
RTE_PMD_REGISTER_VDEV(SSOW_PMD, ssow_pmd_drv);
RTE_PMD_REGISTER_PARAM_STRING(SSOW_PMD, "nr_port=<int> ");
```
Use established DPDK API for:

- Convenient registration of hardware blocks - BGX, SDP, SSOW
- Seamless send/recv of packets
PCI-e EP as a Coprocessor

- For Custom Messages, host is projected as a coprocessor to DPDK.
- Coprocessor can be registered as a ethdev PMD, but it is not intuitive and not a clean fit.
- Coprocessor can better leverage the eventdev PMD.
- DPDK eventdev PMD is a Work In Progress.
Status

• Packet and Message exchanges
  • Work in progress to adopt NIC firmware application to use DPDK’s PMD model to use PCI-e as a Network Packet Interface and as a Coprocessor.

• Roadmap
  • Run performance benchmarks with NIC firmware running over DPDK and compare against non-DPDK NIC firmware implementation.
  • Use eventdev PMD instead of ethdev for custom messages and even for Network packet exchange.
Q & A

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THANK YOU