PCI-e EndPoint support in OpenDataPlane(ODP)

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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 OpenDataPlane?
  • Networking data plane API specification
  • Allows portable data plane applications to leverage vendor specific hardware.
Conventional ODP Usage

- Runs on standalone data plane processor
- ODP application is Bus Master and owns the hardware
- ODP application’s control plane interface is not guided by ODP Specification.
ODP on a target device

- ODP runs on a co-processor
- ODP application is a PCI-e slave.
- ODP application’s control plane interface overlaps with data plane
Two types of data exchange are possible:

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

- Logical fit to ODP
- Register PCI-e EP as a packet-io
- ODP API allow seamless send/recv of packets
PCI-e EP as a Coprocessor

- Host projected as a coprocessor to ODP
- Register PCI-e EP as a packet-io with an event queue.
- ODP API allow coprocessor interface using events

```c
// Application Init-time action
dpi_pktio = odp_pktio_open("dpi0", pool, &param);
odp_pktio_capability(dpi_pktio, &capparam);

odp_pktin_queue_config(dpi_pktio, &inparam);
odp_pktout_queue_config(dpi_pktio, &outparam);
odp_pktio_config(dpi_pktio, &config);

// Application Control plane action
odp_pktio_start(dpi_pktio);

// Application Data plane action
// pkt contains message(request) to be sent to Host
odp_pktout_send(dpi_pktio, pktout_queue, pkt, 1);

// Await message(response) from Host
event = odp_dequeue(dpi_pktio, pktin_queue);
buf = odp_buffer_from_event(event);
// Process buffer
```
OCTEON as a PCI-e EP running NIC application
Status

- Packet and Message exchanges
  - Work in progress to adopt NIC firmware application to use ODP interface use PCI-e as a packet interface as well as a control plane coprocessor.

- Roadmap
  - Run performance benchmarks with NIC firmware running over ODP and compare against non-ODP NIC firmware implementations.
Q & A

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