“Serverless” DPDK

DPDK Summit - San Jose – 2017
Nishant Lodha, Cavium Inc
Linux servers mostly. Running DPDK

Daddy, what are the clouds made of?

@elandivar
Agenda

- SmartNIC Market Share and Projections
- Current and Emerging SmartNIC Use Cases
- Challenges with current generation SmartNICs
- Accelerating Next Gen SmartNICs with DPDK
- Nirvana?
What is a SmartNIC?

**Smart NICs**
- Multi-core / Network Processor based Adapters
- Crypto Accelerator w/ IPSEC / SSL
- OVS Offload, Business Application offload
- Customer Programmable

**Common Features**
- Stateless Offloads
- Tunneling/Overlays: VXLAN, NVGRE, GENEVE
- SR-IOV
- DPDK PMDs

**Standard NIC**
- Speed transitions 10G/25G/40G/50G/100G
- General purpose offloads - RDMA, Storage
- Hardwired or Micro-coded or mix
SmartNIC Market Size: 2016-2021 (Network Acceleration)
Cavium Built Model for 10GbE & Higher Speeds

<table>
<thead>
<tr>
<th>Year</th>
<th>Smart NIC</th>
<th>L2 NIC</th>
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<tbody>
<tr>
<td>2016</td>
<td>$72</td>
<td>$768</td>
</tr>
<tr>
<td>2017</td>
<td>$101</td>
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<td>2018</td>
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<td>2020</td>
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<tr>
<td>2021</td>
<td>$573</td>
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Legend:
- T1 MDC
- T2 Cloud/Telco
- Enterprise/Private
- Storage
SmartNIC is a platform for Innovation

All server compute resources need to have a revenue tie-in
OVS + IPsec Performance Benchmark

Benchmarking Test Setup

Performance

CPU Usage in the host

Throughput in Gbps

Message Size

- 64 Bytes
- 512 Bytes
- 1024 Bytes
- 1400 Bytes

Host based OVS + IPsec
SmartNIC OVS + IPsec

- Available
- Used
Current Approach to OVS Offload on SmartNIC

- **Proprietary**: SimpleExec - Run to completion model, SDK
- **Deployment Model**: Packaged solution or SDK
- **Implications**: Platform specific skills, customer application porting, time to market, ecosystem

**Challenges**

- Need to simplify the SmartNIC
- Require a new Networking Data Plane

SmartNIC accelerates the OVS Data path and restores CPU cores back to the server.
DPDK for the Networking Dataplane

Current Gen SmartNIC

MIPS Based Architecture
SDK
Sample Applications

ARMv8 Cores

Standard Linux

DPDK

Next Gen SmartNIC

Open Architecture
Upstream Linux
Standard DPDK
Why DPDK?

- DPDK is a “Proven” networking dataplane
- Majority of networking applications on x86 are written for DPDK
- Performance; Innovation; Licensing

Why DPDK on SmartNIC?

- SmartNICs growth in Telco / NFV Use Cases
- ARMv8 ecosystem enables DPDK acceleration
- BYOA - Path of least resistance – offloading NFV apps to SmartNICs
Potential Challenges

Taking DPDK to a embedded processor?
- Limited compute and memory resources
- Polling/Hogging
- Fixed Power Envelope

DPDK Version Dependency for NFV Apps

A simplified way of leveraging HW provided offloads

Performance?
Questions?

SmartNIC Panel Discussion at 11:40am!

Thank You :)
That’s it!