OpenDataPlane (ODP)
A Quick Introduction and Overview

Linaro Networking Group (LNG)
Discussion Topics

- Requirements that motivate and drive ODP
- What is ODP?
  - Components
  - Structure
- ODP sponsorship and governance model
OpenDataPlane Requirements

- Support application portability across diverse ISAs and system architectures
  - Core counts, memory organization, integrated HW capabilities, etc.

- Be able to exploit platform-specific acceleration and offload capabilities (HW and SW) without application effort
  - e.g., HW buffer/packet mgmt, integrated I/O, HW parsing and classification, HW scheduling and flow ordering, HW egress traffic shaping and QoS, etc.

- Support scalability to many-core architectures without application redesign
  - Application design unchanged if running on 4, 40, or 400 cores
OpenDataPlane Components and Structure

An Abstract API Specification

Multiple independently maintained implementations of the ODP API

Validation Test Suite
The ODP API Specification

- Open Source, open contribution, BSD-3 licensed
- Vendor and platform neutral
- Application-centric--covers functional needs of data plane applications
- Ensures portability by specifying functional behavior of ODP
- Defined jointly and openly by application writers and platform implementers
- Architected to be implementable on a wide range of platforms efficiently
- Sponsored, Governed, and Maintained by Linaro Networking Group (LNG)
ODP Implementations

- One size does not fit all--widely differing internals among platforms
- Anyone can create an ODP implementation tailored to their platform
- Distribution and maintenance of each implementation as owner wishes
  - Open source or closed source as business needs determine
  - Have independent release cycles and service streams
- Allows HW and SW innovation in how ODP APIs are implemented on each platform
ODP Implementations (Cont’d)

LNG distributes and maintains a number of Reference Implementations of ODP

- Open source, open contribution, BSD-3 licensed
- Provide easy bootstrapping of ODP onto new platforms
- Implementers free to borrow or tailor code as needed for their platform
- Implementers retain full control over their own implementations whether or not they are derived from a reference implementation
ODP Validation Test Suite

- Synchronized with ODP API Specification level
- Maintained and distributed by LNG
- Open source, open contribution, BSD-3 licensed
- Key to ensuring application portability across all ODP implementations
- Tests that implementations of ODP conform to the specified functional behavior of ODP APIs
- Can be run at any time by both users and vendors to validate implementations of ODP
## Available ODP Implementations - 1 of 2

<table>
<thead>
<tr>
<th>Name</th>
<th>Owner/Maintainer</th>
<th>Target Platform</th>
<th>Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>linux-generic</td>
<td>Open contribution, maintained by LNG</td>
<td>Pure SW, runs on any Linux kernel. Functional implementation, not a performance target.</td>
<td>Any</td>
</tr>
<tr>
<td>odp-dpdk</td>
<td>Open contribution, developed by LNG</td>
<td>Intel x86 using DPDK as SW acceleration layer</td>
<td>Intel x86</td>
</tr>
<tr>
<td>odp-netmap</td>
<td>Open contribution, developed by LNG</td>
<td>Linux + NETMAP support (experimental)</td>
<td>x86 + ARM</td>
</tr>
</tbody>
</table>
## Available ODP Implementations - 2 of 2

<table>
<thead>
<tr>
<th>Name</th>
<th>Owner/Maintainer</th>
<th>Target Platform</th>
<th>Architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>odp-keystone2</td>
<td>Texas Instruments</td>
<td>TI Keystone II SoCs</td>
<td>ARM Cortex A15</td>
</tr>
<tr>
<td>linux-qoriq</td>
<td>Freescale</td>
<td>Freescale QorIQ SoCs</td>
<td>Power, ARMv8</td>
</tr>
<tr>
<td>OCTEON</td>
<td>Cavium Networks</td>
<td>Cavium Octeon SoCs</td>
<td>MIPS64</td>
</tr>
<tr>
<td>THUNDER</td>
<td>Cavium Networks</td>
<td>Cavium ThunderX SoC</td>
<td>ARMv8</td>
</tr>
<tr>
<td>odp-mppa</td>
<td>Kalray</td>
<td>Kalray MPPA SoCs</td>
<td>Proprietary</td>
</tr>
</tbody>
</table>

Additional implementations under development by others
ODP Sponsorship and Governance

The Linaro Networking Group and its 13 member companies are sponsors and upstream maintainers of ODP.

LNG membership is open to all.

ODP is fully open source and open contribution, uses BSD 3-clause licensing.

All ODP design work is carried out in public with both open face-to-face meetings and weekly public architecture calls, and on the ODP mailing list.
Thank You

For more information, or to participate in ODP, visit:

Weekly public design calls: Tuesdays at 15:00 UTC
meetings.opendataplane.org