OpenDataPlane (ODP)

A Quick Introduction and Overview

Linaro Networking Group (LNG)

Presented by

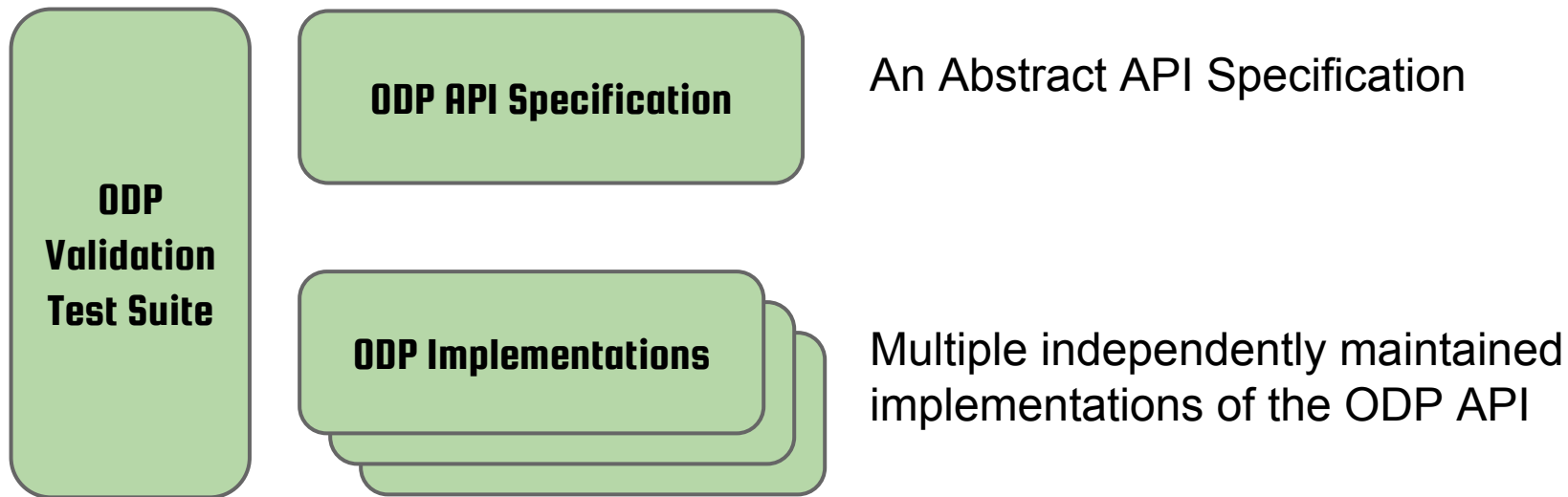Bill Fischofer

Date

October 2015
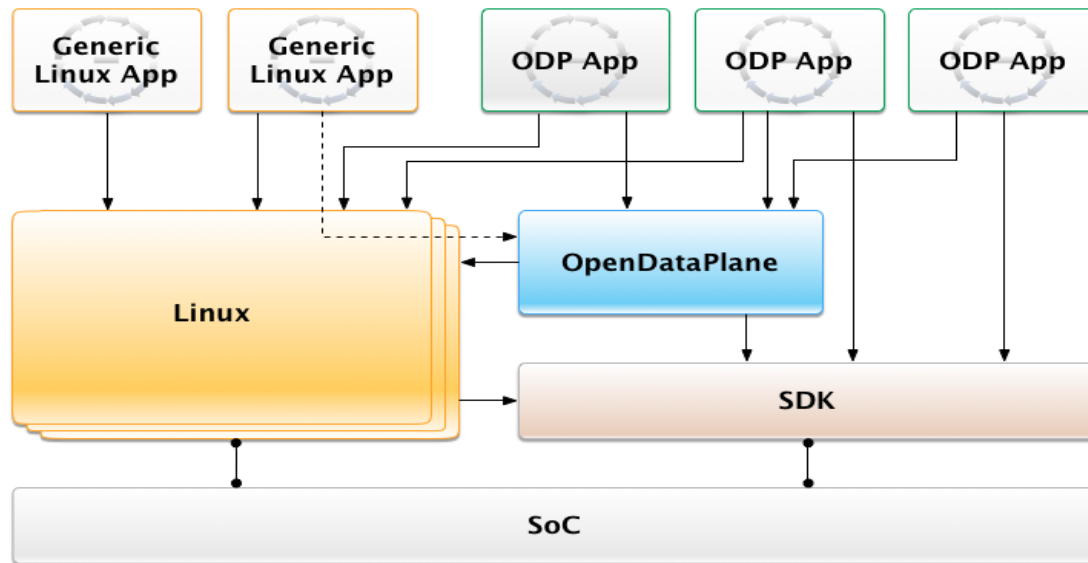
Discussion Topics

- 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

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OpenDataPlane Components and Structure

ODP Validation Test Suite

ODP API Specification

An Abstract API Specification

ODP Implementations

Multiple independently maintained implementations of the ODP API

Validation Test Suite

The ODP API Specification

ODP API Specification

An Abstract 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)

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ODP Implementations

ODP Implementations

Multiple independently maintained implementations of the ODP API

- 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

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ODP Implementations (Cont'd)

ODP Implementations

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

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ODP Validation Test Suite

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

Validation Test Suite

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Available ODP Implementations - 1 of 2

Name	Owner/Maintainer	Target Platform	Architecture
linux-generic	Open contribution, maintained by LNG	Pure SW, runs on any Linux kernel. Functional implementation, not a performance target.	Any
odp-dpdk	Open contribution, developed by LNG	Intel x86 using DPDK as SW acceleration layer	Intel x86
odp-netmap	Open contribution, developed by LNG	Linux + NETMAP support (experimental)	x86 + ARM

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Available ODP Implementations - 2 of 2

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

Additional implementations under development by others

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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
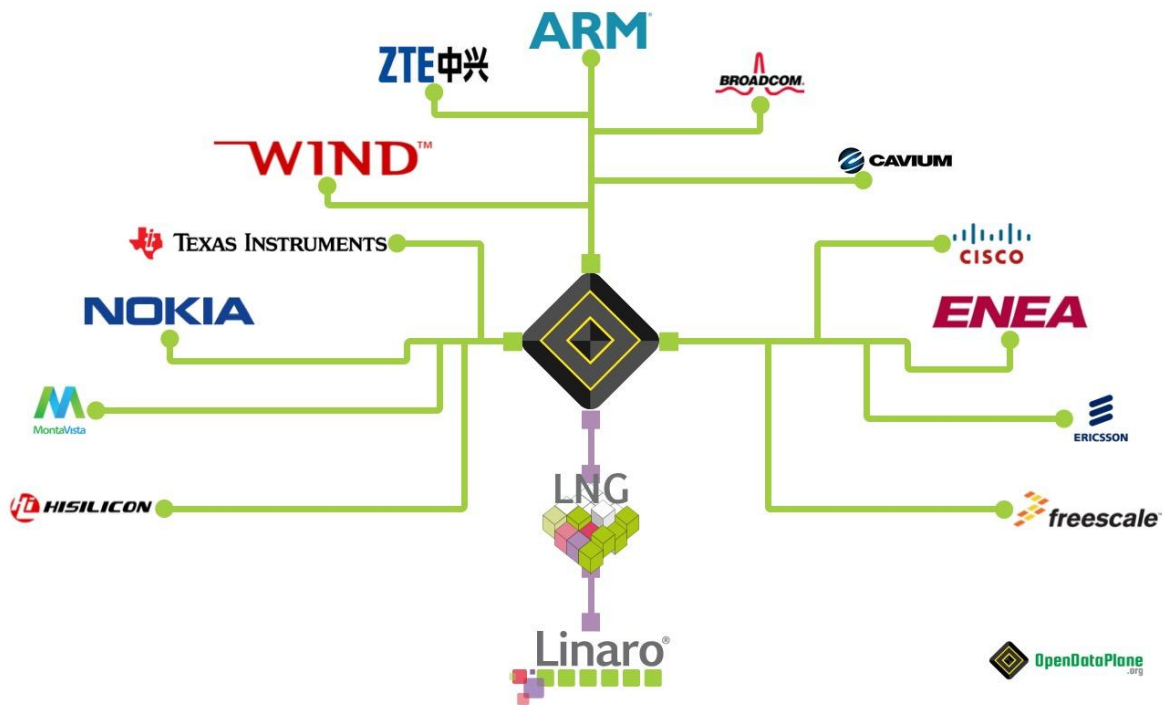
Thank You

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

Weekly public design calls: Tuesdays at 15:00 UTC

meetings.opendataplane.org