DPDK Overview

- Data Plane Development Kit
  - A set of libraries and drivers for fast packet processing
  - Runs mostly in Linux userland
  - The first supported CPU was Intel x86 and it is now extended to IBM POWER and ARM.

- Major members and contributors
  - Several active members on Arm platforms
  - Arm is one of the golden members
DPDK usage modes

- DPDK framework provides components on which Network applications can be built
- Stack below shows application stack and locations where DPDK is used.

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Server Functions/
Applications

Network functions &
Terminations

Host I/F    VM I/F

Packet IO

NIC HW

Nginx, Memcached,
Cloud apps etc

VPP, TCP termination, FW,
Tunnel Termination, Crypto
e tc run in this layer

OVS/ VPP VM switching

DPDK finds home in this
region where we perform
fast handling of incoming or
outgoing packets
```
DPDK on Arm64 Status

- Multiple active members on Arm platforms
- ARM platform porting & optimization
  - Many thanks to Cavium
- Functional verification / enabling
  - DTS (DPDK Test Suite) test in bare-metal & virtualization
  - Several platforms / NICs selected
- DPDK performance on Arm platforms
  - Throughput/Latency perf test on multiple ARM64 platforms and NICs
  - x86 platform for reference & cross check
- Use cases setup
  - DPDK in container, Nginx with DPDK + mTCP, etc.
DTS & Functional Enabling

• DTS test suites verification & investigation
  • All test suites were executed (incl. virtualization suites)
  • 60+ patches sent upstream for DPDK/DTS fixes

• Our goal – Identify a set of DTS test cases suitable for Arm
  • Ensure DPDK is properly supported on Arm
  • But NOT fix all DTS issues
  • Use the selected test suites for CI setup on Arm64

• 206 of 432 test cases passed, 226 failed

• Notes:
  • Test results retrieved by DPDK 17.11, on Platform Y
Arm Internal DPDK CI Setup

Purpose

• Get ready for upcoming public DPDK Lab

• Internal Patch review -- Automatic sanity check for every new patches

• Daily build -- to early detect code/functional broken in master

Status

• 2 Selected platforms with 3 type of NICs

• All DTS Unit test suite cases at beginning

Next plan

• Add more test suites (may need to fix some issues first)

• Copy setup to Linaro lab (with proper HWs)
Performance summary

• RFC-2544 test
  • Single core, bare-metal

• Several factors impacting DPDK performance
  • TxD/RxD number
  • Glibc & GCC version – newer is better

• Some ARM64 platforms shows better performance than x86 on some sub-system unit test
  • Memcpy, OpenSSL AES

• Profiling – CPU cycle hotspots show notable difference between different ARM64 platforms
Our plan

- Use case & Virtualization scenarios investigation
- CI setup with selected platforms, NICs & DTS test suites
- Architectural enhancements

- Define DPDK on Arm roadmap with partners

- Continue with the bare-metal performance investigation & optimization, e.g. PMD, Crypto drivers, etc
- Investigate performance in virtualization & multi-core scenarios

- Co-work with Linaro on DPDK
- Build up connections with DPDK community and Arm partners
Community Collaboration

- CI setup (LEG, need proper platforms)
- Regular sync up inside Linaro (LEG weekly meeting, etc.)
- Contact channel/mailer (e.g. dpdk@linaro.org?)
Thank You
Danke
Merci
谢谢
ありがとう
Gracias
Kiitos
감사합니다
धन्यवाद
תודה