

Use DPDK to accelerate data compression in SPDK

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- Overview of DPDK and its compressdev infrastructure
- Overview of SPDK and how it uses DPDK
- Creating a compression device with SPDK's new reducelib, vbdev and compressdev



DPDK compressdev overview



DPDK libraries

Core and feature libs	Core libraries Core functions such as memory management, software rings, timers, bus/device mgmt, etc.	Packet classification Software libraries for hash/exact match, LPM, ACL etc.	Accelerated SW libraries Common functions such as IP fragmentation, reassembly, reordering etc.	Stats Libraries for collecting and reporting statistics.	QoS Libraries for QoS scheduling and metering /policing	Packet Framework Libraries for creating complex pipelines in software.
Device APIs	ETHDEV	CRYPTODEV	EVENTDEV	SECURITY	COMPRESSDEV	BBDEV
Device PMDs	PMDs for physical and virtual Ethernet devices	PMDs for HW and SW crypto accelerators	Event-driven PMDs	Hardware acceleration APIs for security protocols	PMDs for HW and SW compression accelerators	PMDs for HW and SW wireless accelerators



Asynchronous	Chained	compression	Compression	Checksum	Hash
burst API	mbufs	Algorithms	Levels		Generation
To support HW & SW acceleration	To allow compression of data greater than 64K-1. Can attach external data buffers to mbufs.	 Deflate LZS 	-1: PMD default 1: Fastest 9: Best Ratio	 CRC32 Adler32 Combined Adler32_CR C32 	• SHA1 • SHA256



compressdev components



Stateless compression with SGLs





- A chunk passed in or out of an operation may be comprised of one or more buffers (segments) chained together.
- Segments can be any size < 64k.
- There is no correlation between the number of segments passed in for compression and the number of segments it will decompress to.



compressdev home on dpdk.org

http://doc.dpdk.org/guides/prog_guide/compressdev.html

compressdev poll mode drivers

https://doc.dpdk.org/guides/compressdevs/index.html

 Deflate your data with DPDK – presentation from DPDK Dublin summit

https://www.snia.org/sites/default/files/SDC/2018/presentations/DPCO/Trahe_F __Daly_L_Deflate_Your_Data_with_DPDK.pdf



SPDK overview





Storage Performance Development Kit

Available via spdk.io



Open Source Software

- Optimized for latest generation CPUs and SSDs
- Software building blocks (BSD licensed)
- Designed to extract maximum performance from non-volatile media

Scalable and Efficient Software Ingredients

- User space, lockless, polled-mode components
- Up to millions of IOPS per core
- Minimize average and tail latencies

SPDK Community





SPDK High Level Architecture*

Released In Progress DPDK

*simplified to just the modules relevant to this presentation





Creating a compression device in SPDK

The Compression Vbdev module









Find out more



• SPDK home

https://spdk.io/

• The secret to customizing SPDK: (all about Virtual BDEVs)

https://www.snia.org/sites/default/files/SDC/2018/presentations/SSS_NVM_PM_NVDIMM/Luse_P_Trahe_F_Virtual_BDEVs_The_Sec ret_to_Customizing_SPDK.pdf

• PMDK - persistent memory development kit

https://ci.spdk.io/download/events/2018-summit/day1_10_LusePMDKSPDK.pdf

Get involved in the development

compressdev vbdev (WIP)

https://review.gerrithub.io/c/spdk/spdk/+/429395

libreduce design (WIP)

https://review.gerrithub.io/c/spdk/spdk/+/430385





SPDK ARCHITECTURE

Released In Progress

