DPDK

Team Emertxe

Topics

- DPDK Overview
- Why DPDK
- How to build
- DPDK code walkthrough

DPDK

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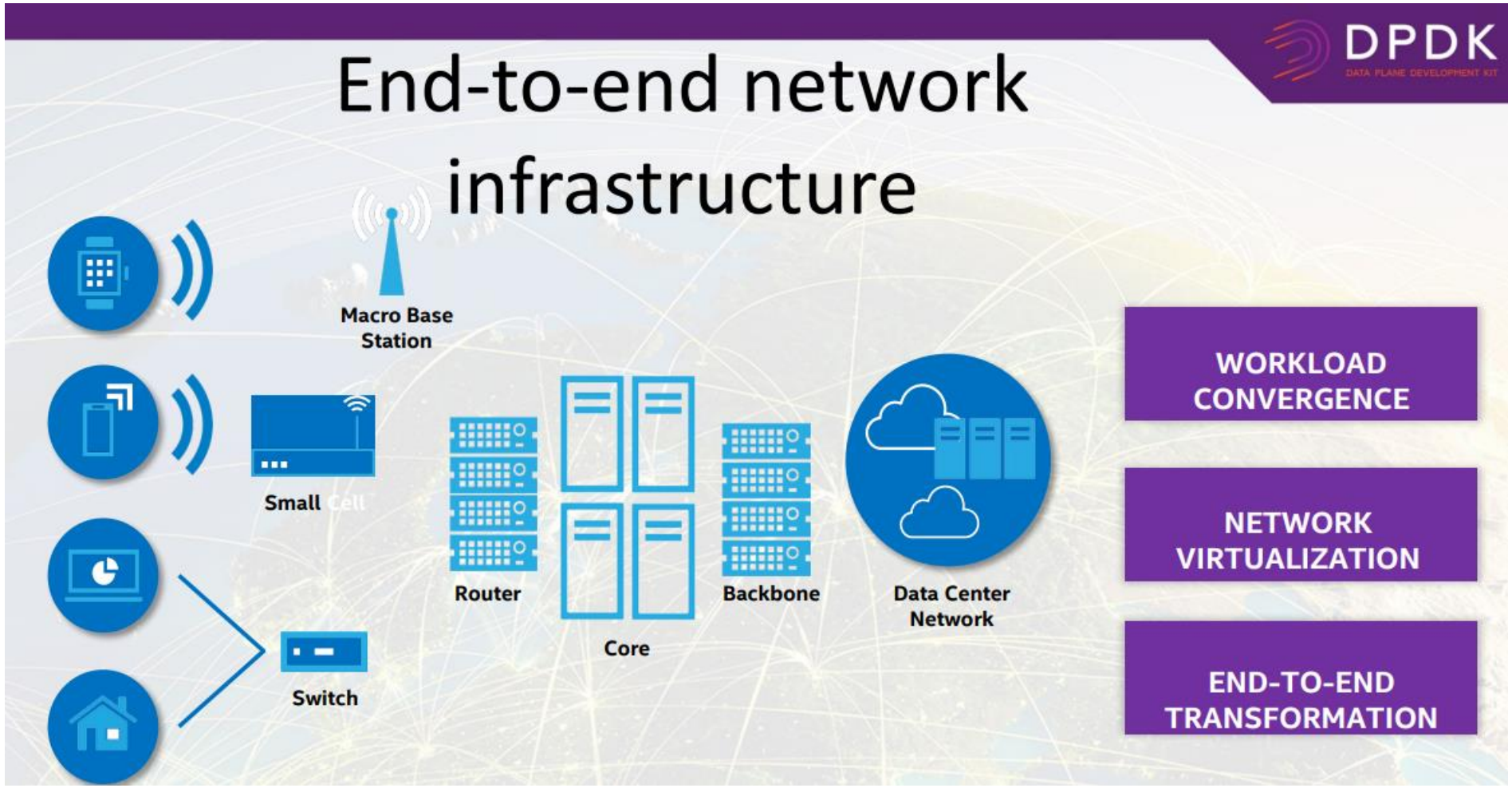
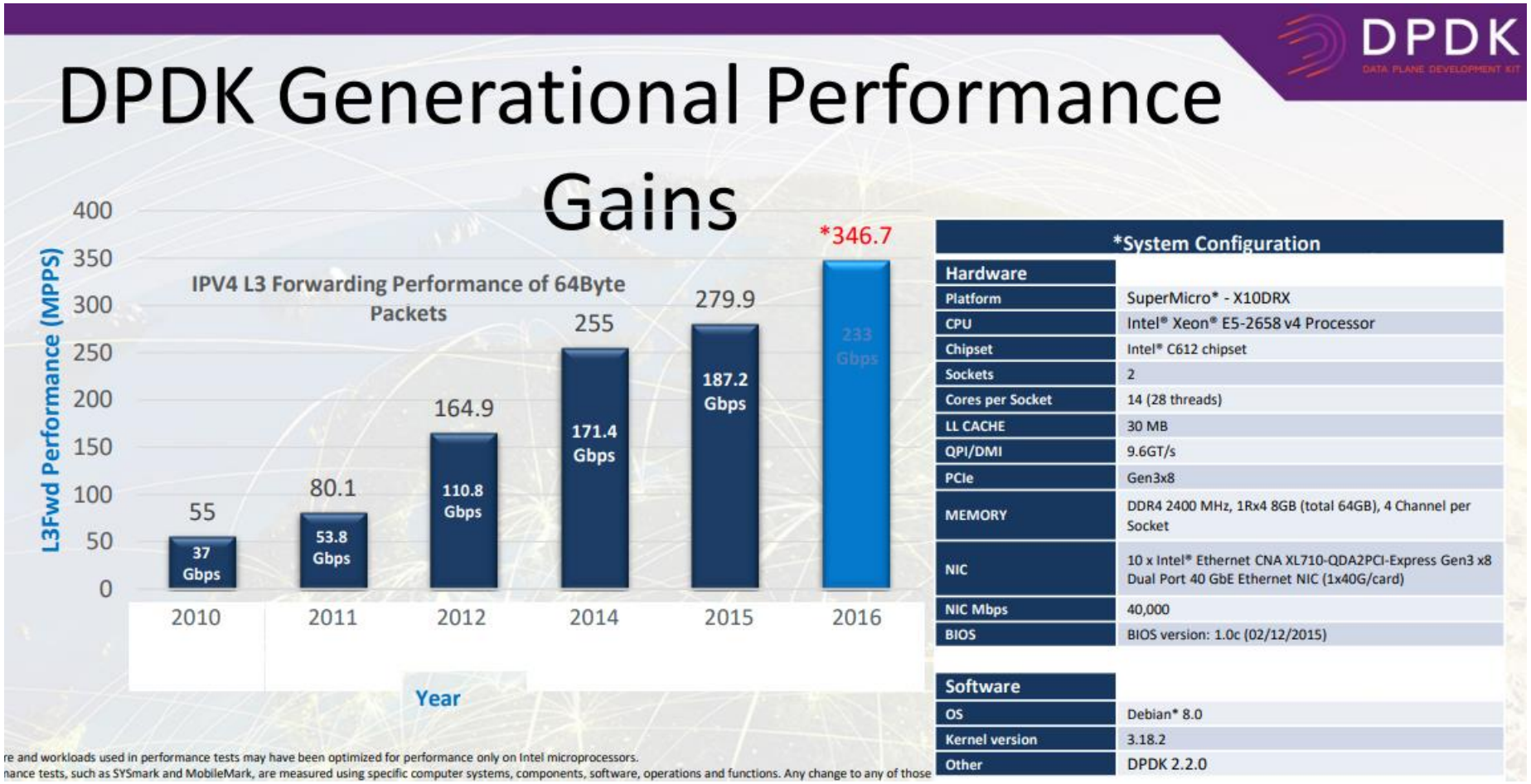
DPDK



DPDK



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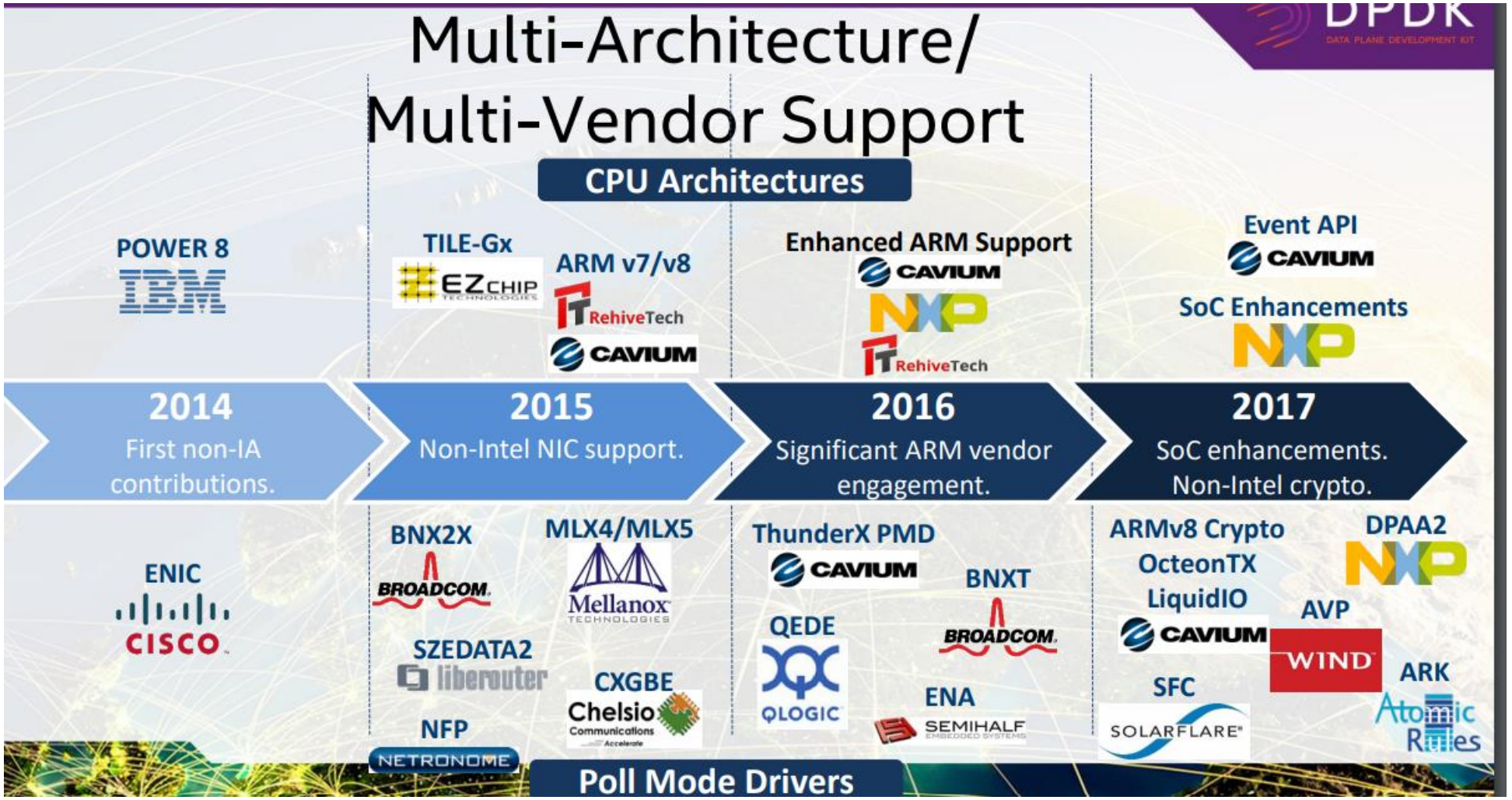
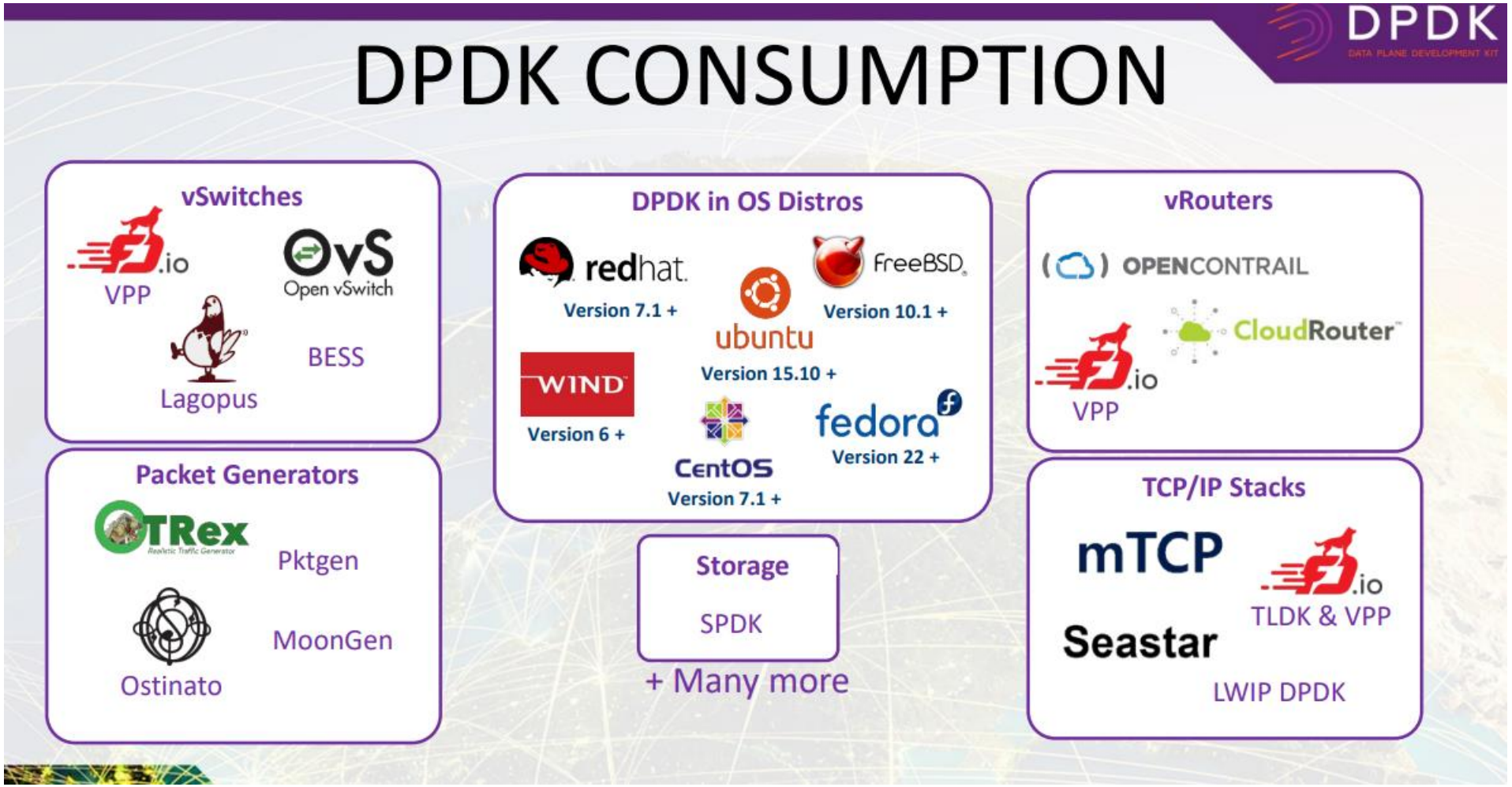
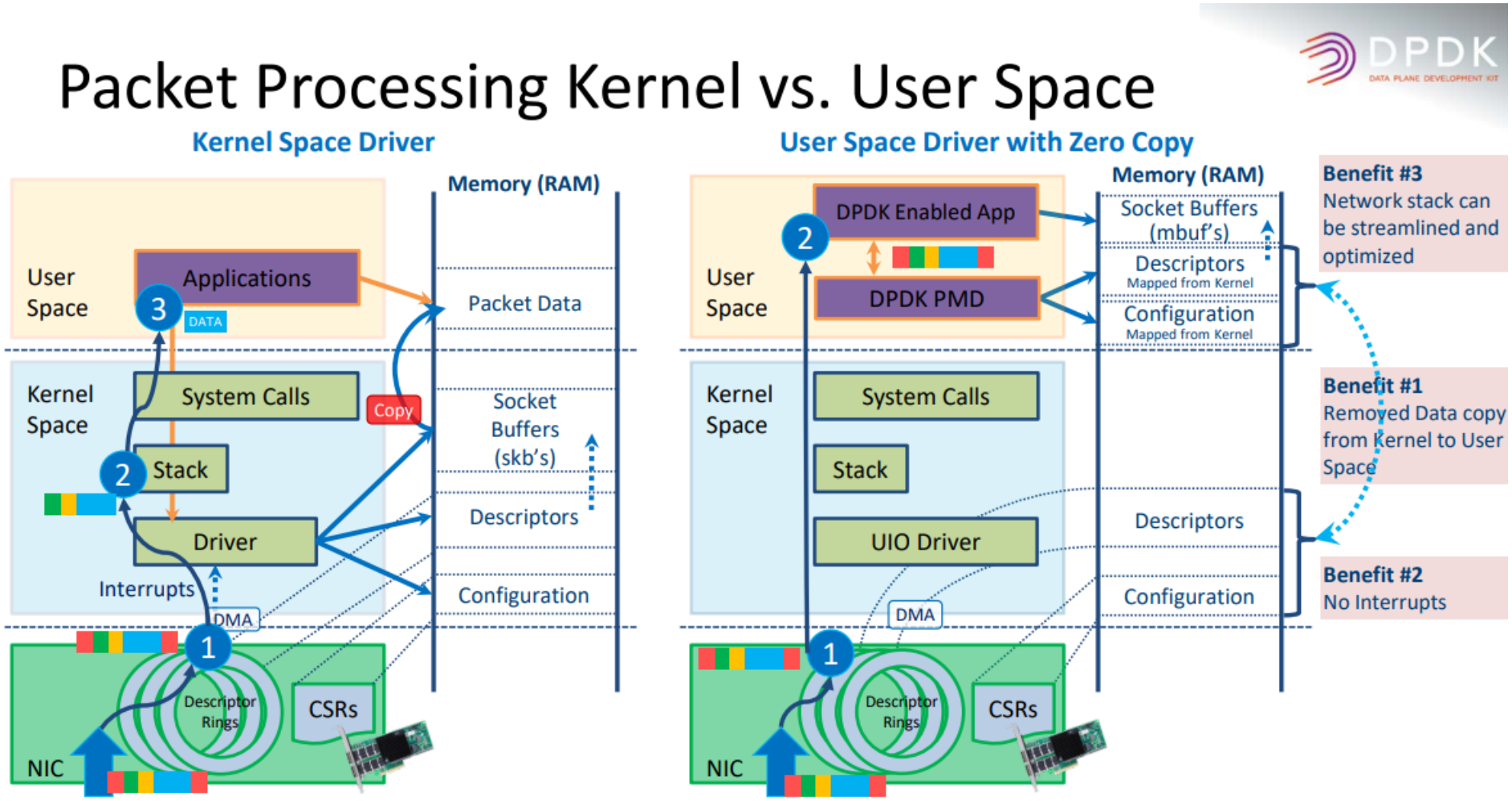
DPDK



DPDK


DPDK CONSUMPTION
DPDK
DATA PLANE DEVELOPMENT KIT
vSwitches
VPP
OvS
Open vSwitch
BESS
Lagopus
Packet Generators
TRex
Realistic Traffic Generator
Pktgen
MoonGen
Ostinato
DPDK in OS Distros
redhat.
Version 7.1 +
FreeBSD
Version 10.1 +
ubuntu
Version 15.10 +
WIND
Version 6 +
CentOS
Version 7.1 +
fedora
Version 22 +
Storage
SPDK
+ Many more
vRouters
OPENCONTRAIL
CloudRouter
VPP
TCP/IP Stacks
mTCP
TLDK & VPP
Seastar
LWIP DPDK

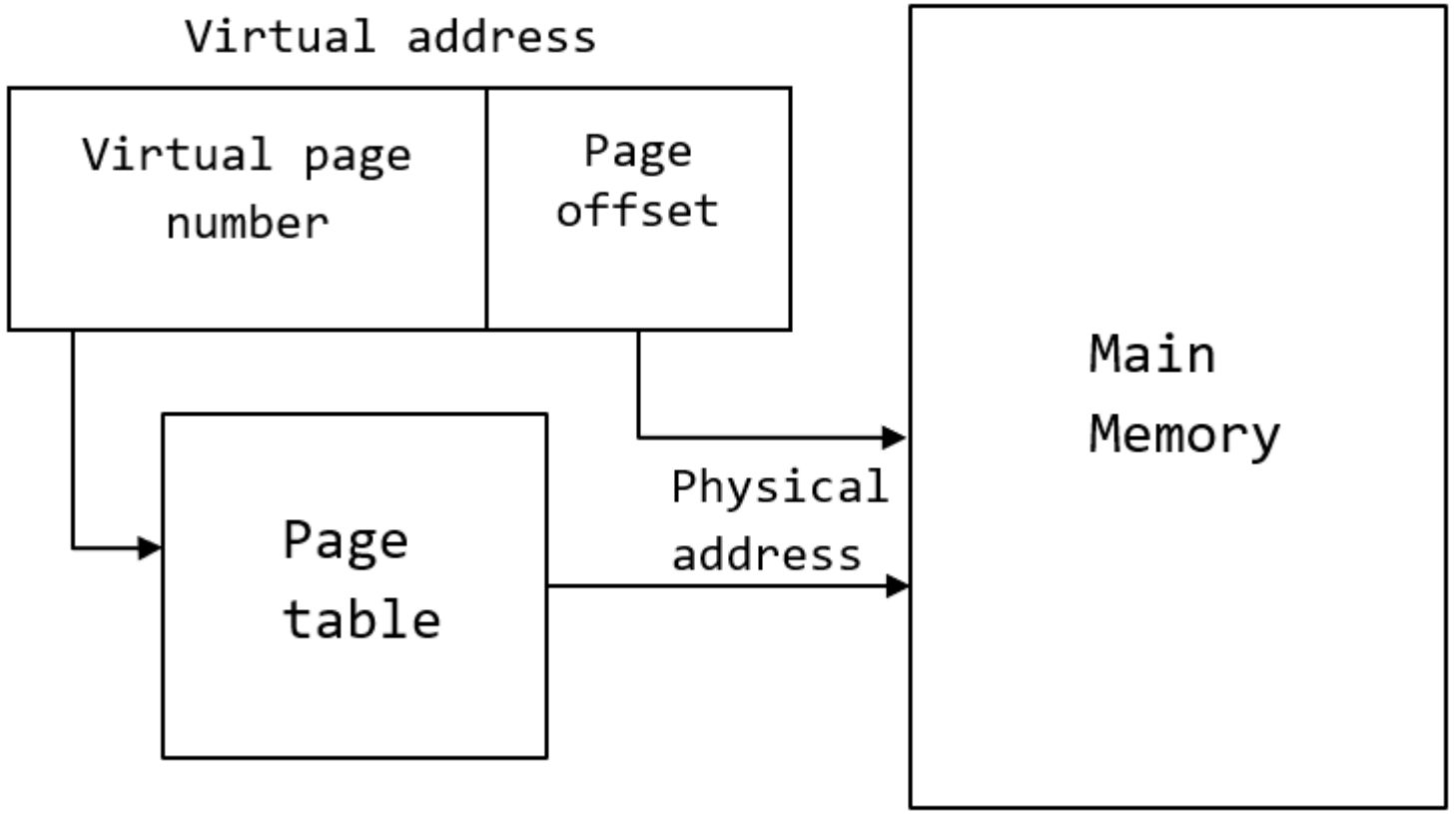
DPDK



DPDK

Why we need huge pages support

$sudo echo 64 > /sys/devices/system/node/node0/hugepages/hugepages-2048kB/nr_hugepages



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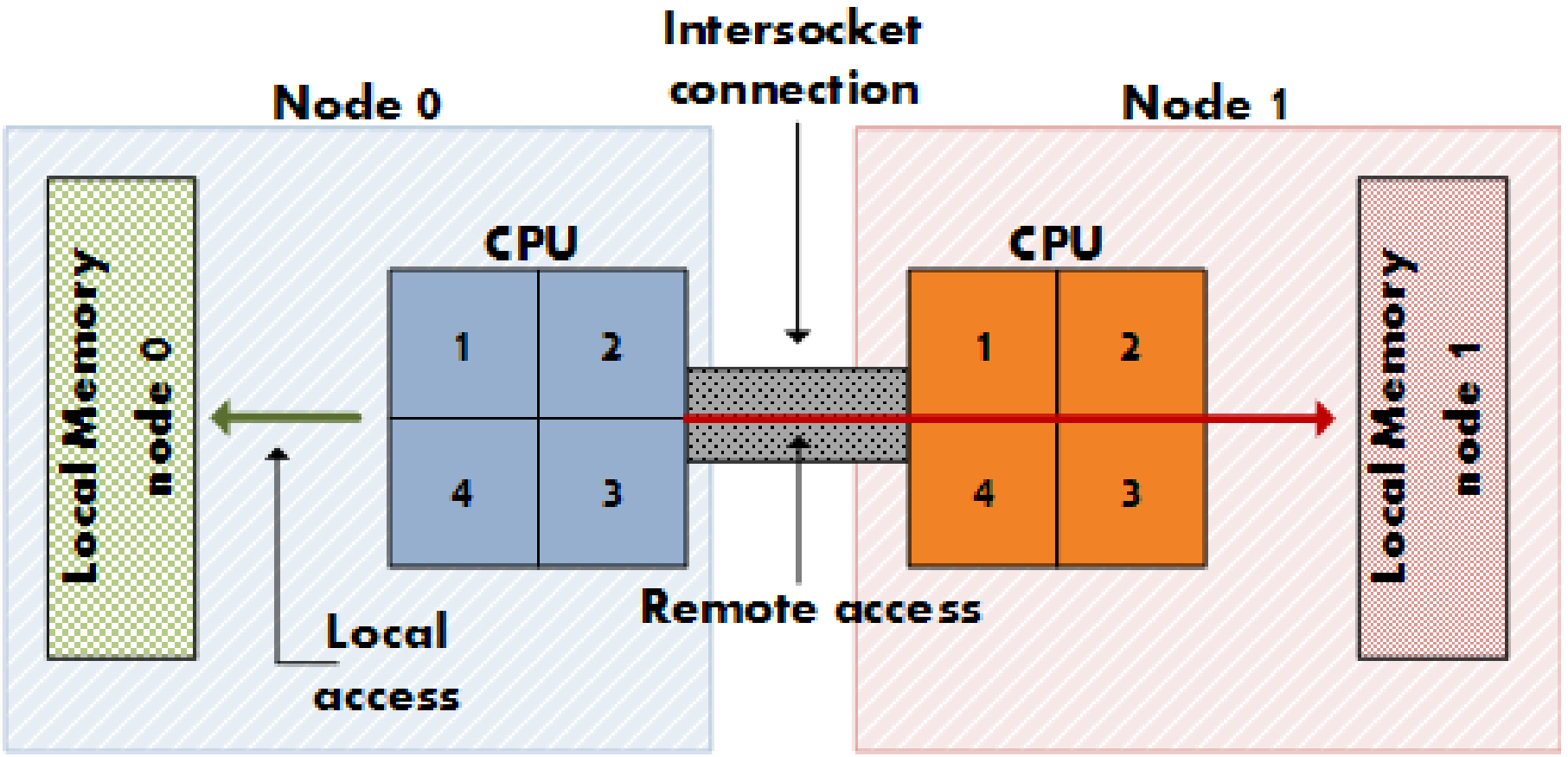
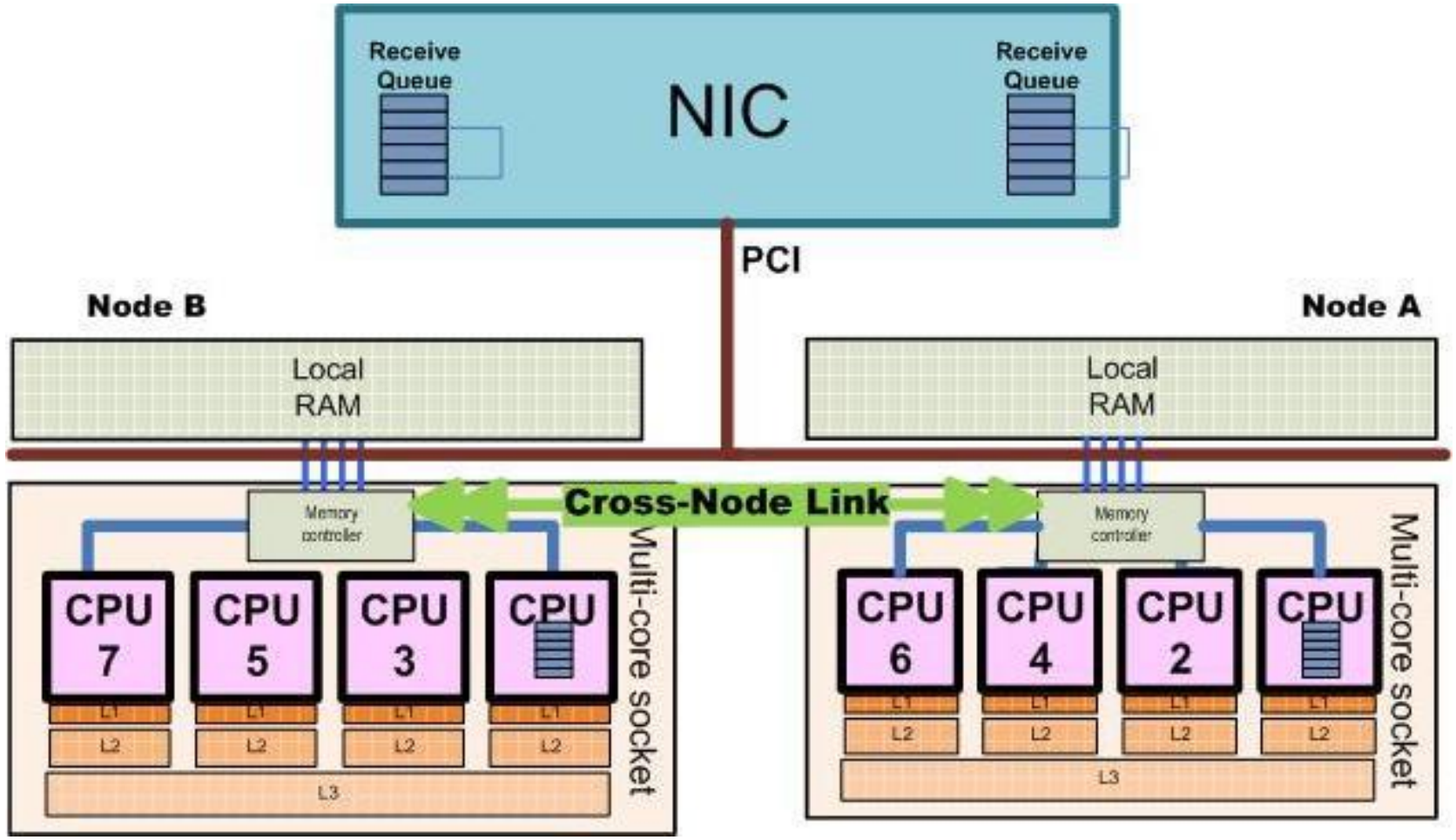
DPDK


Intersocket
connection
Node 0
Node 1
Local Memory
node 0
CPU
1
2
4
3
CPU
1
2
4
3
Local Memory
node 1
Local
access
Remote access

DPDK


Receive Queue
NIC
Receive Queue
PCI
Node B
Node A
Local RAM
Local RAM
Memory controller
Cross-Node Link
Memory controller
CPU 7
CPU 5
CPU 3
CPU
CPU 6
CPU 4
CPU 2
CPU
L1
L2
L3
Multi-core socket
Multi-core socket

DPDK

EAL

9.1.1. Lcore-related options

- `-c <core mask>`

  Set the hexadecimal bitmask of the cores to run on.

- `-l <core list>`

  List of cores to run on

  The argument format is `<c1>[-c2][,c3[-c4],...]` where `c1`,

9.1.4. Memory-related options

- `-n <number of channels>`

  Set the number of memory channels to use.

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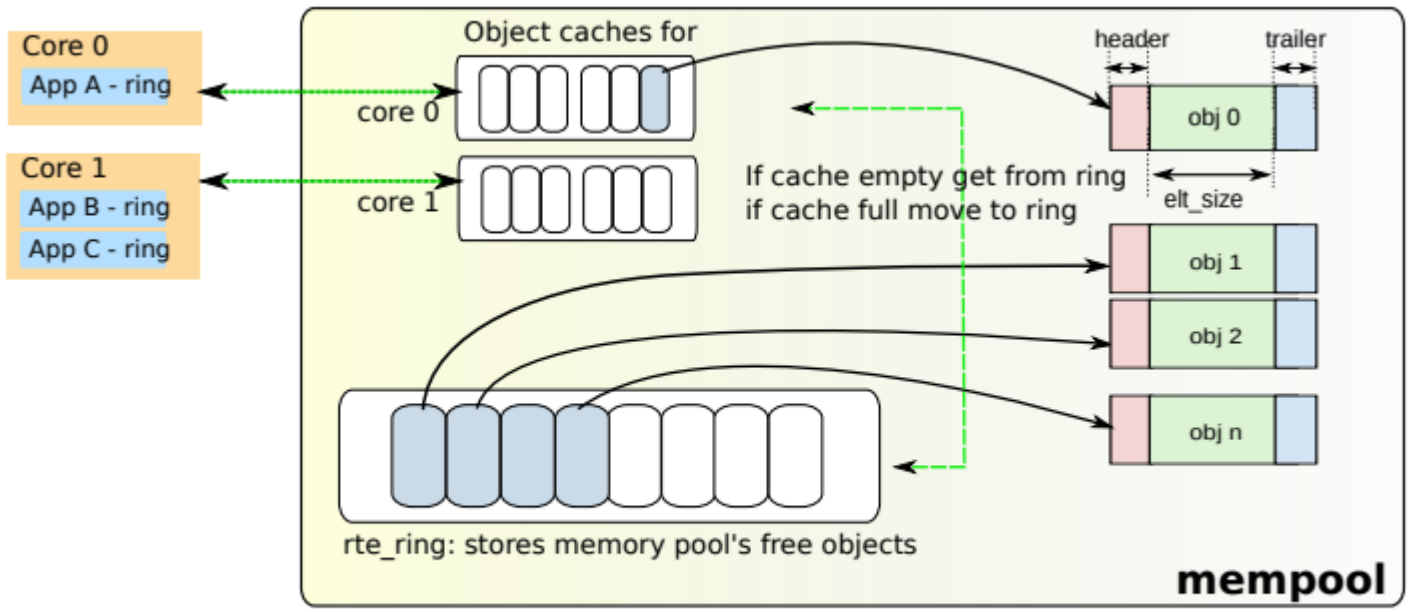
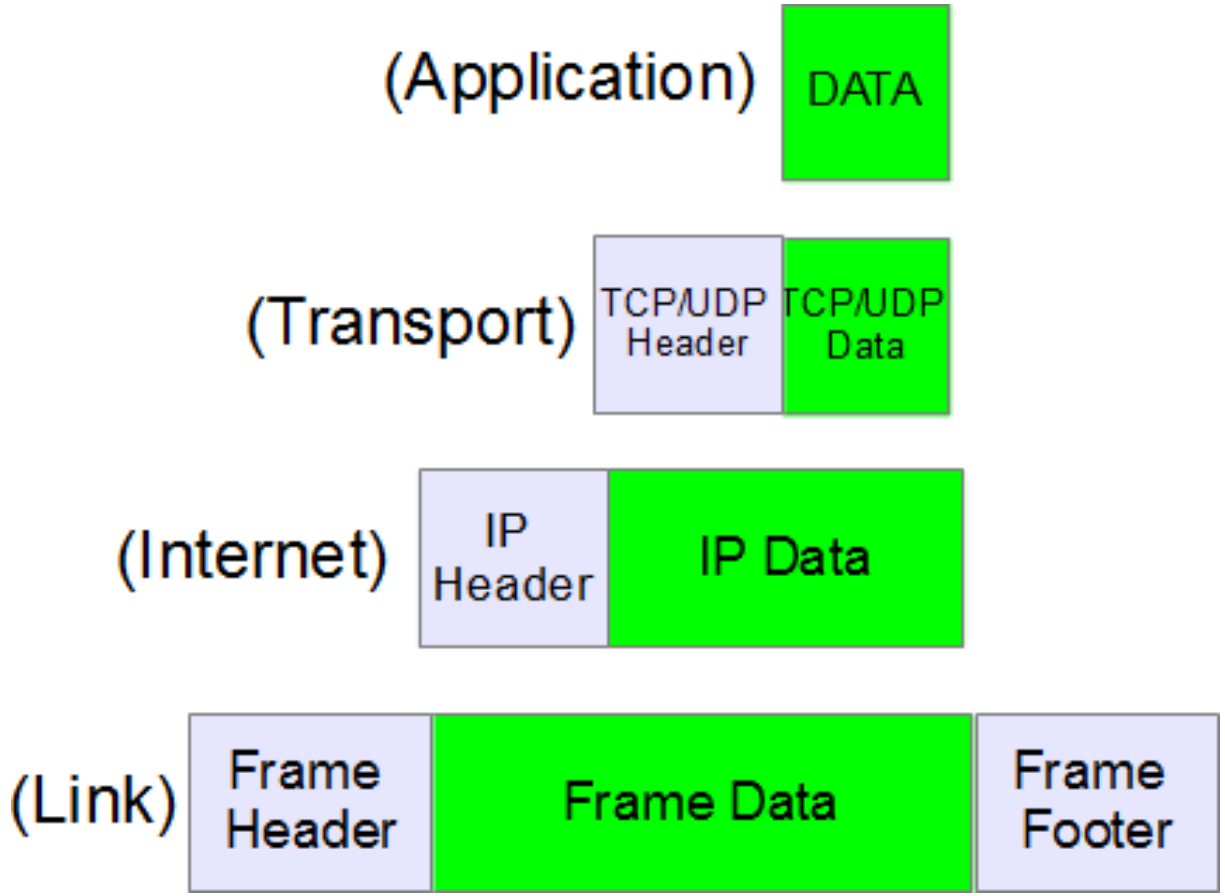
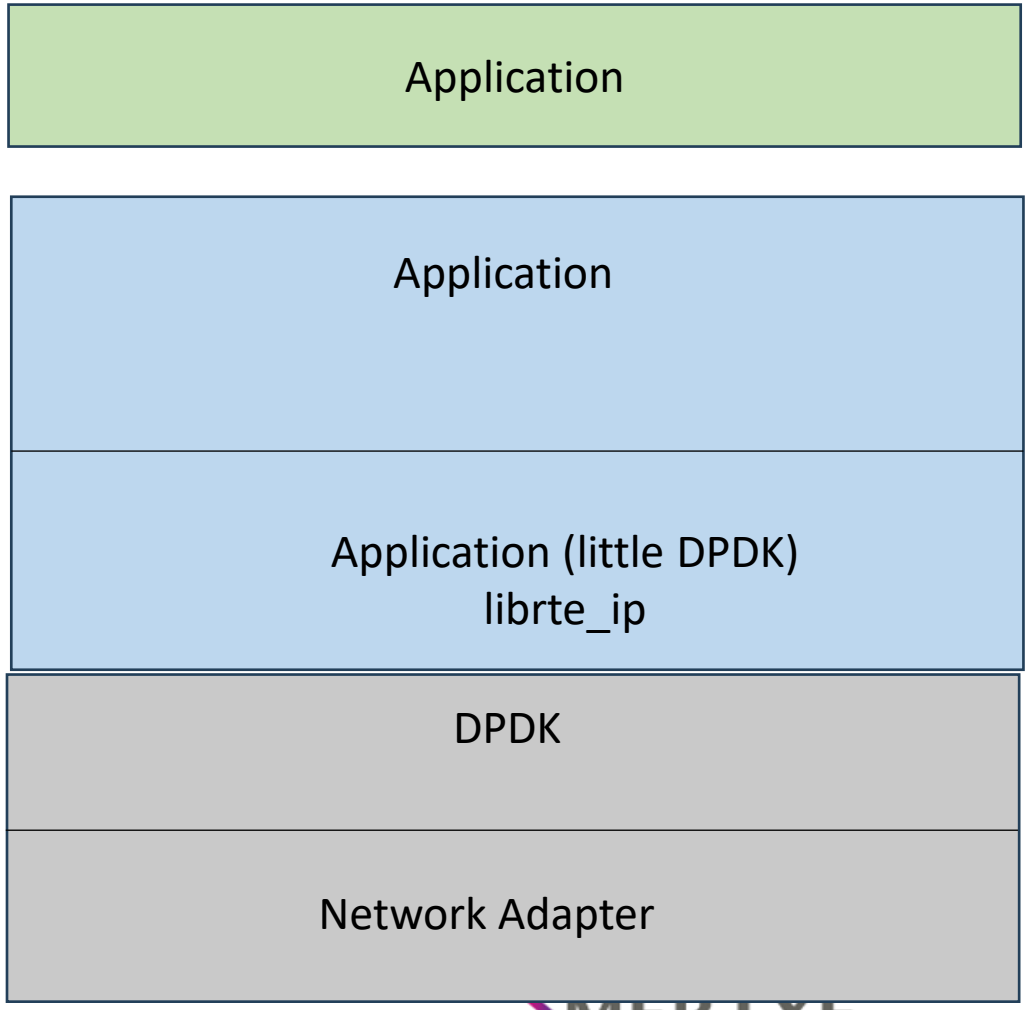


Figure 6.3: A mempool in Memory with its Associated Ring

DPDK


(Application)
DATA
(Transport)
TCP/UDP Header
TCP/UDP Data
(Internet)
IP Header
IP Data
(Link)
Frame Header
Frame Data
Frame Footer


Application
Application
Application (little DPDK)
librte_ip
DPDK
Network Adapter

DPDK

NIC Driver: vmxnet3

- void rte_pci_register(struct rte_pci_driver *driver)
  Populate “struct rte_pci_driver”

After registration, if user uses the device VMware:-

- eth_vmxnet3_pci_probe()
  call wrapper function rte_eth_dev_pci_generic_probe()
  Internally it will call eth_vmxnet3_dev_init()
  vmxnet3_dev_start()

- vmxnet3_dev_start()
  vmxnet3_configure_msix()
  vmxnet3_setup_driver_shared()
  vmxnet3_dev_rxtx_init()

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NIC Driver: vmxnet3

eth_dev->rx_pkt_burst = &vmxnet3_recv_pkts; ← To receive the packet

eth_dev->tx_pkt_burst = &vmxnet3_xmit_pkts; ← To send the packet

eth_dev->tx_pkt_prepare = vmxnet3_prep_pkts; ← Prepare the packet

DPDK

- **Initializing the Environment Abstraction Layer (EAL):**
  - **This should be the first API to be called. It initializes the EAL layer & makes way for the application to use the DPDK framework.**

```
ret = rte_eal_init(argc, argv);
```

  - ***argc:*** **No. of command line arguments (both EAL & application specific parameters)**
  - ***argv:*** **Array storing the command line arguments**
  - ***ret:*** **On success, *ret* stores the no. of parsed arguments, which is equal to the no. of EAL parameters passed. The application can now use *argc & argv* to parse application specific parameters like any other normal C/C++ program using *int main(int argc, char *argv[]).***