

Empowering the User Space Stack on Cloud Native Applications

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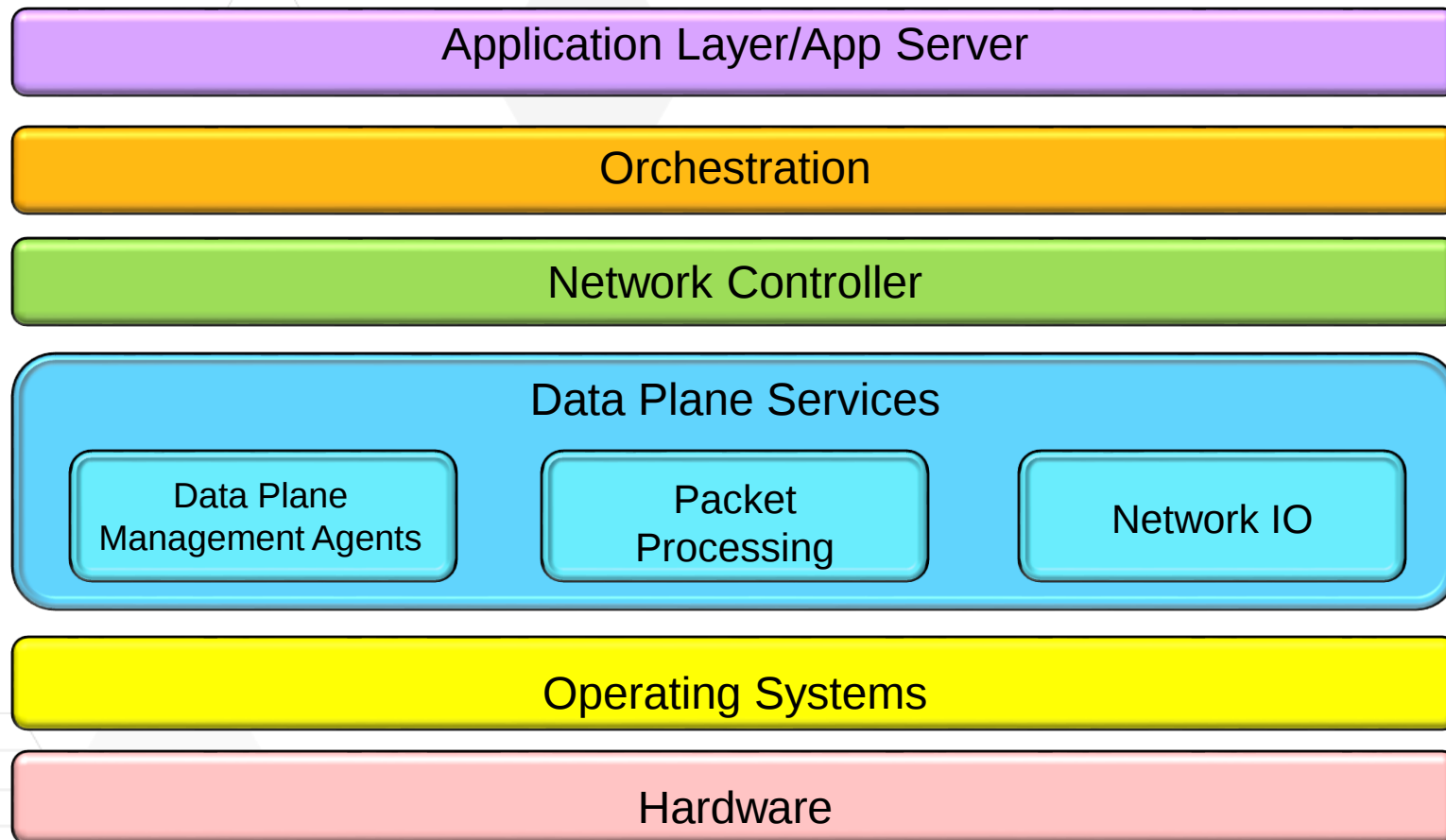
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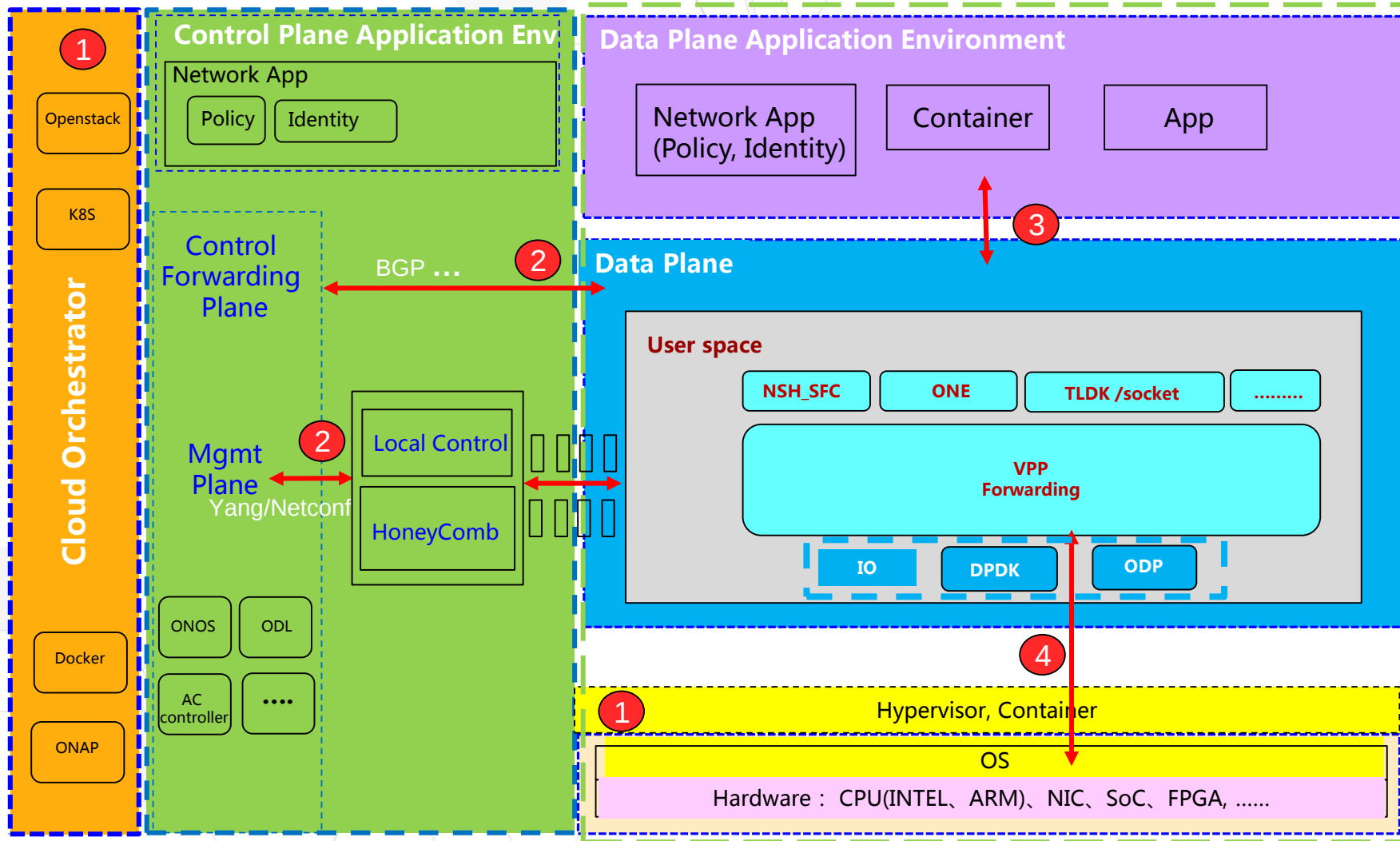
Agenda

- FD.IO Review
- Challenges in Container & Cloud Native Apps
- Proposed Solutions

FD.io in Overall Stack

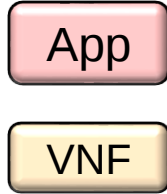
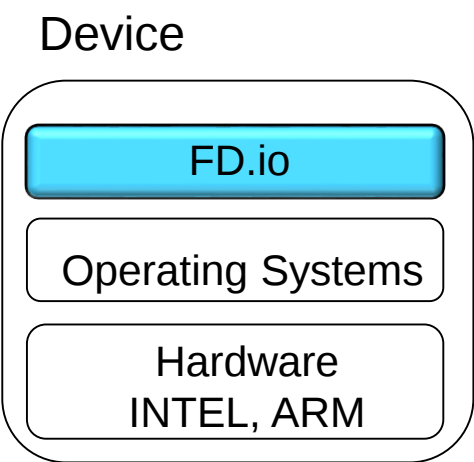
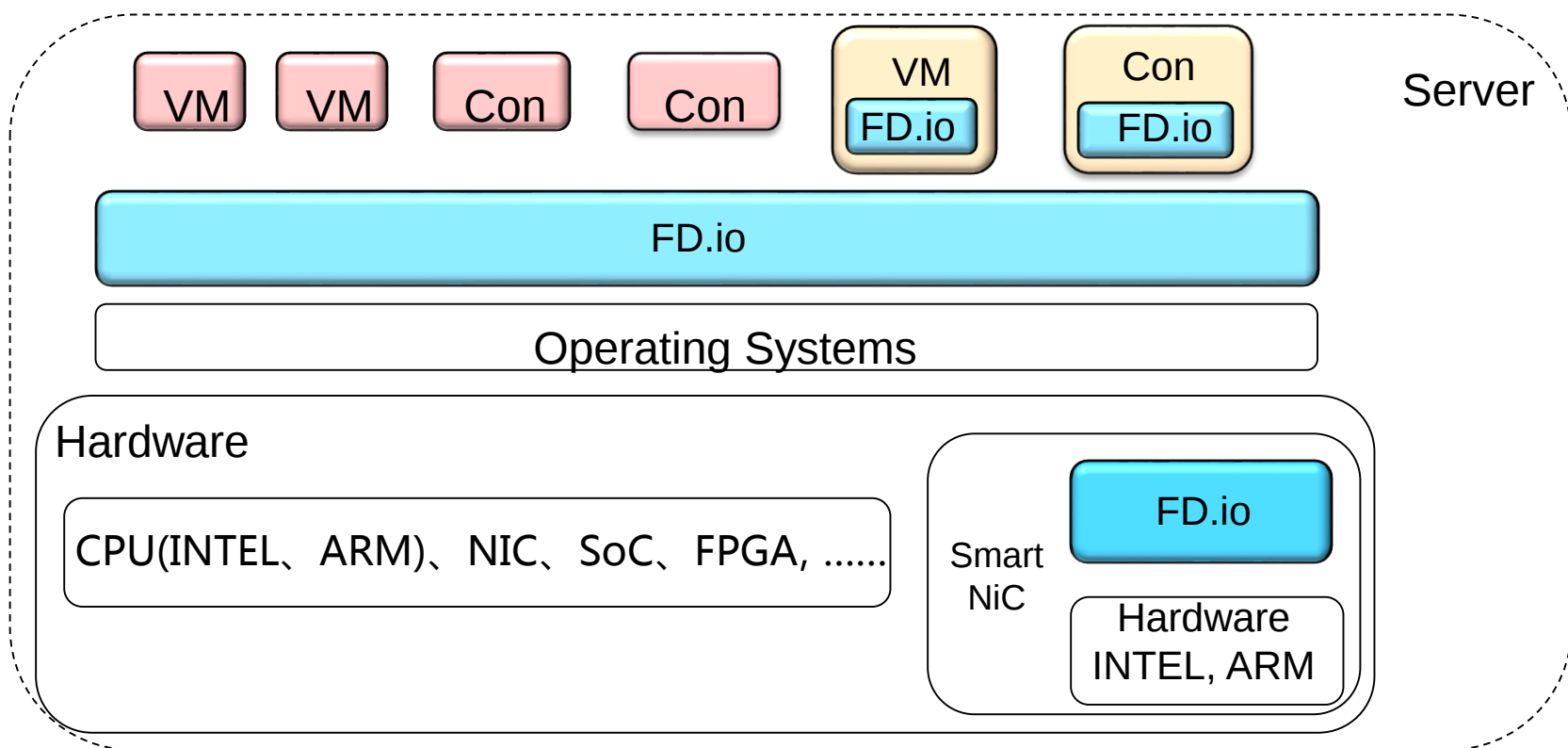


Network Framework



1. **Common Overlay strategy** for VM/Containers/Bare Metal...
2. **Common API to VPP** for control forwarding and **model driven** management planes
3. **Create common application API to VPP forwarding**
4. **Common API to DPDK/ODP to support:**
 - Diverse CPU chips
 - Diverse virtualization environments
 - Diverse NIC, NPU, FPGA

One Data Plane Multiple Deployment Scenarios

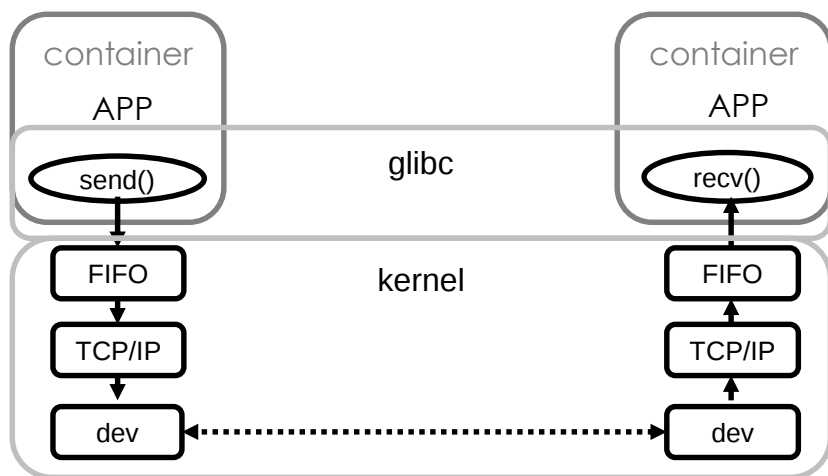


- FD.io enables:
- 1. Bare Metal, Cloud NFVi and Container Infra
 - 2. FD.io based VNFs
- FD.io Ecosystem
- 1. Various OS (Kernels/Hypervisors) and Hardware

Kernel space or User space ?

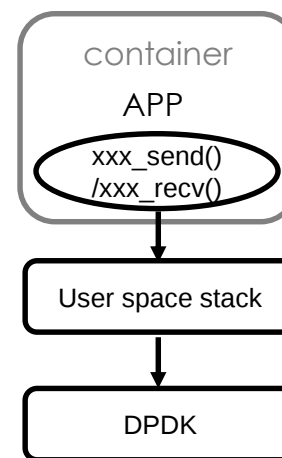
Oops..

Go through kernel space and user space many times when communication between containers



How about

User space stack instead of kernel TCP/IP stack



Challenge : Applications need to adapt to different APIs while using user space stack

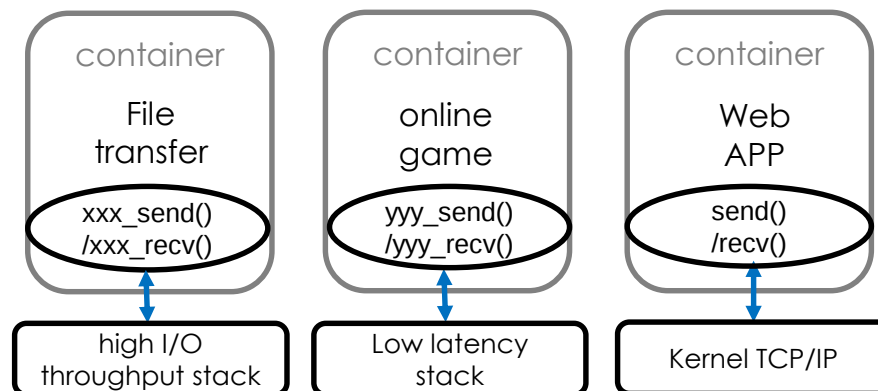
Apps have different flavors

Oops...

different APP different user space stack——Some applications required high I/O throughput(e.g. File transfer, Video on Demand) and Some applications required low latency(e.g. online game , live streaming) ,

How about...

Develop different stack to match different requirement



Challenge: Application can not choose stack dynamic

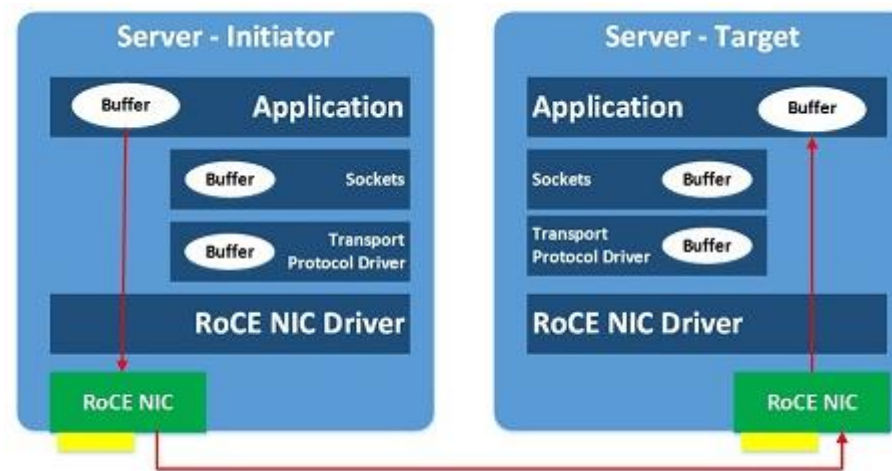
Hardware is not all the same

Oops...

Didn't make full use of the speedup ability of different hardware by kernel stack and user space stack

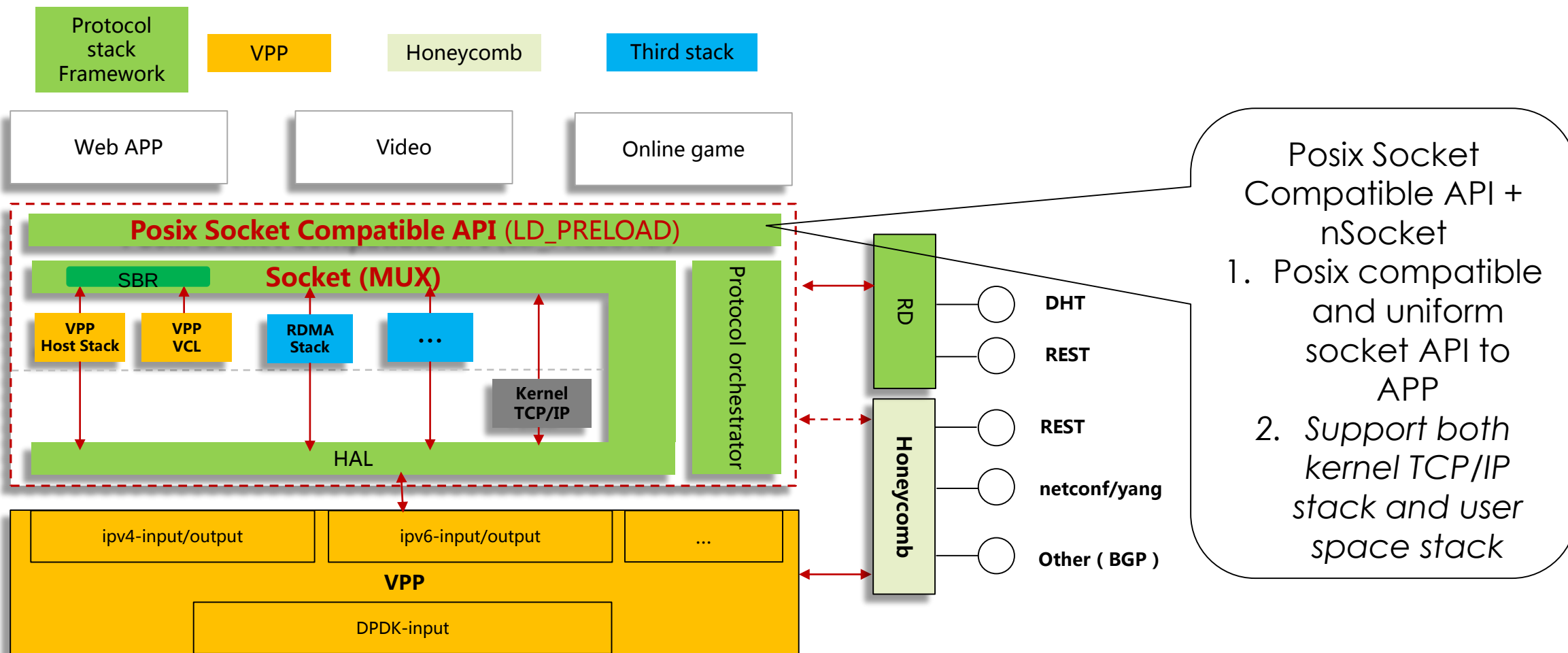
example

RDMA



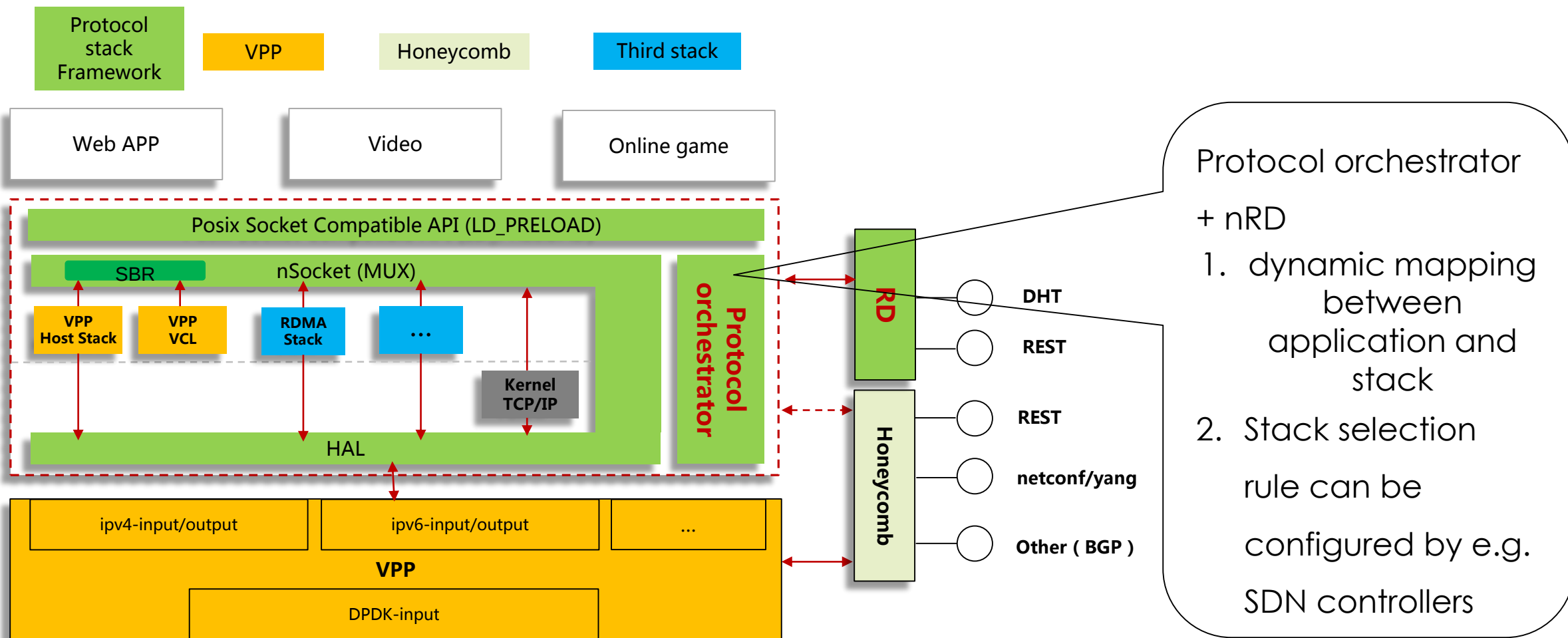
Challenge: How to identify the difference of hardware and how to adapt RDMA

DMM - Protocol Stack Common Framework



RD : Resource Discovery , SBR : Socket Bridge

DMM - Protocol Stack Common Framework

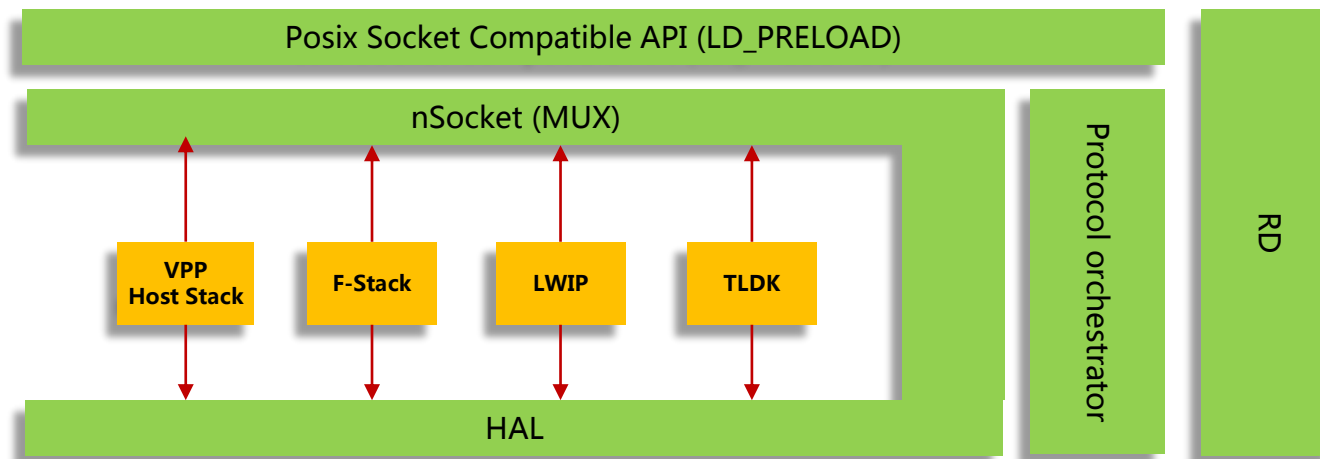


RD : Resource Discovery , SBR : Socket Bridge

Key Takeaways

- Stack developers can **concentrate on** user space protocol innovations;
- Apps can **dynamically choose different protocols.**
- Support both **kernel TCP/IP stack and user space stack ;**
- Container network will easily **build E2E communication capacities.**

Common library for develop user space stack



HAL : Hardware Abstraction Layer, a IO adaptor

Thank you

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