Container在NFV领域中的探索

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PART ZERO

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- OPNFV社区Container4NFV项目的PTL
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- 目前攻读清华大学研究生

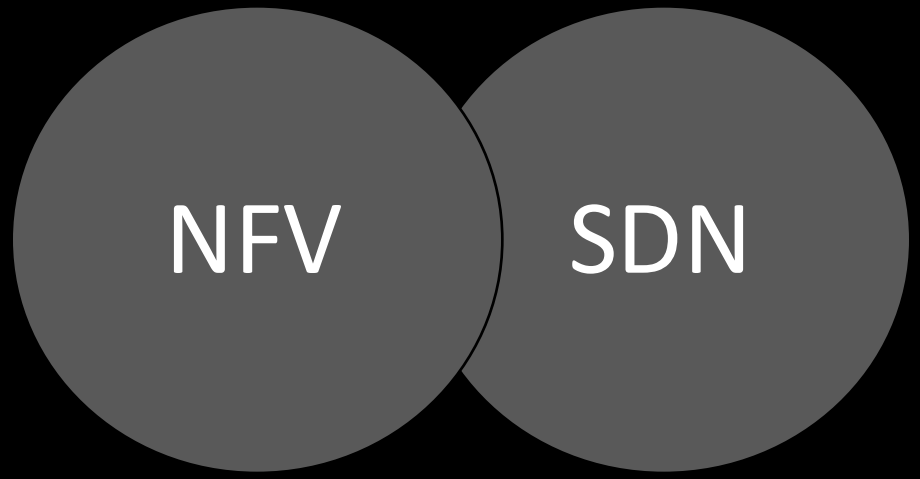
PART ONE / NFV是什么

PART ONE

NFV是什么？

NFV(Network functions virtualization) is a network architecture concept that uses the technologies of IT virtualization to virtualize entire classes of network node functions into building blocks that may connect, or chain together, to create communication services.

NFV实现了软件的灵活加载，实现在数据中心、网络节点和用户端等各个位置灵活的部属配置，降低业务部署复杂度，提高网络设备的统一化、通用化、适配等。

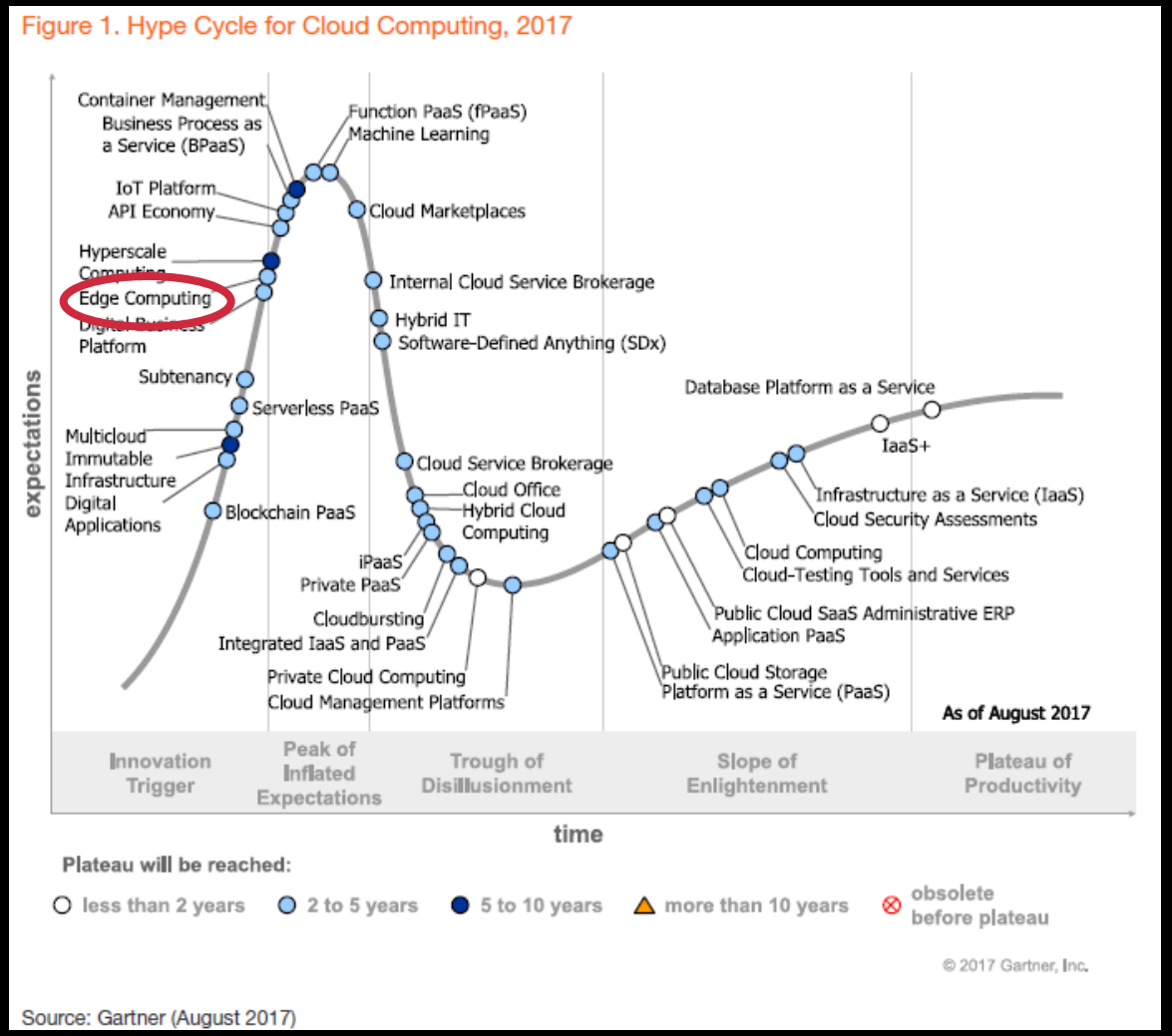


Source from: https://en.wikipedia.org/wiki/Network_function_virtualization

PART TWO / 边缘计算

PART TWO ▶ 边缘计算是什么

Edge computing is a method of optimising cloud computing systems by performing data processing at the edge of the network, near the source of the data.



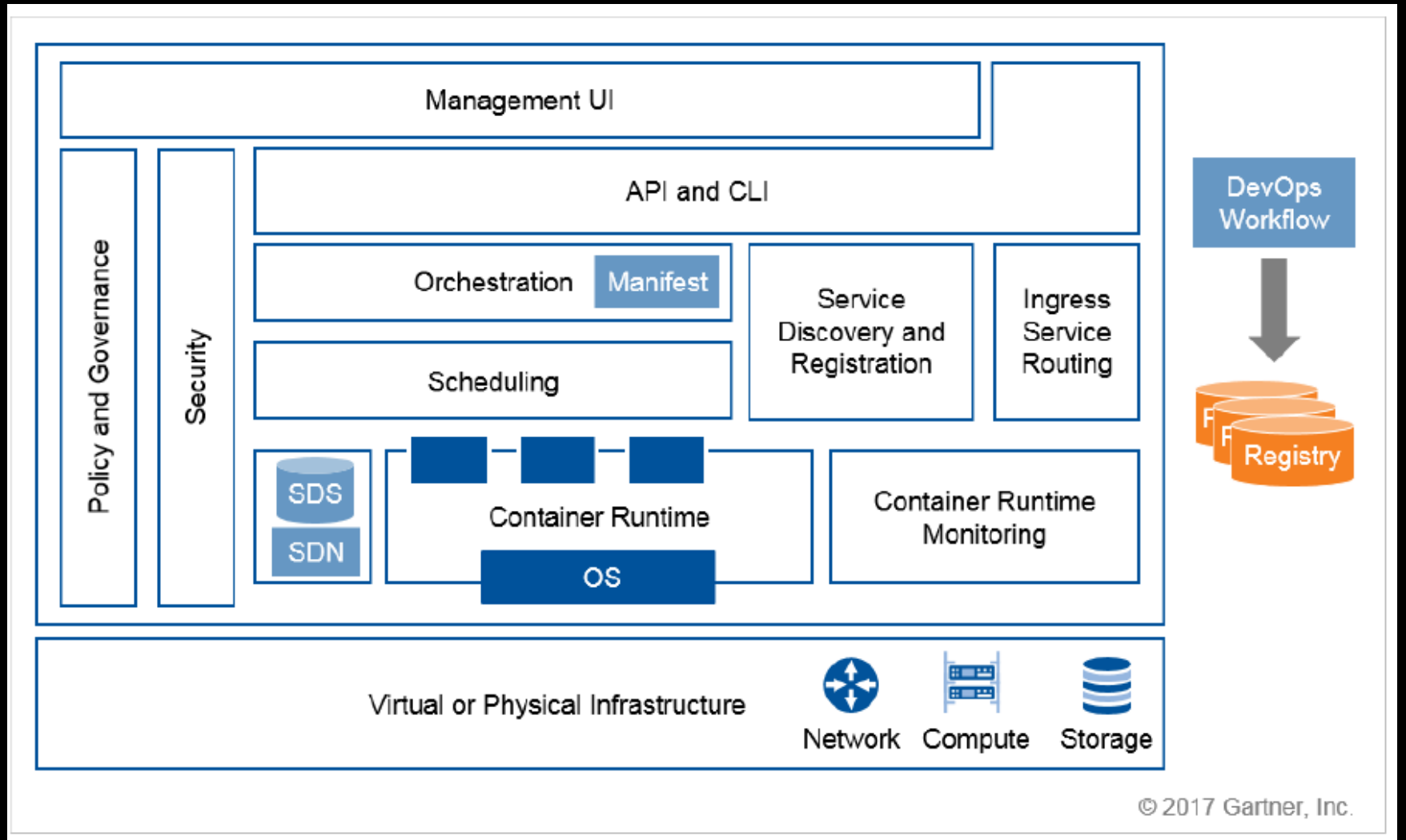
https://en.wikipedia.org/wiki/Edge_computing

PART THREE / Container4NFV

PART THREE[1]

容器在运用中的架构基本趋于稳定

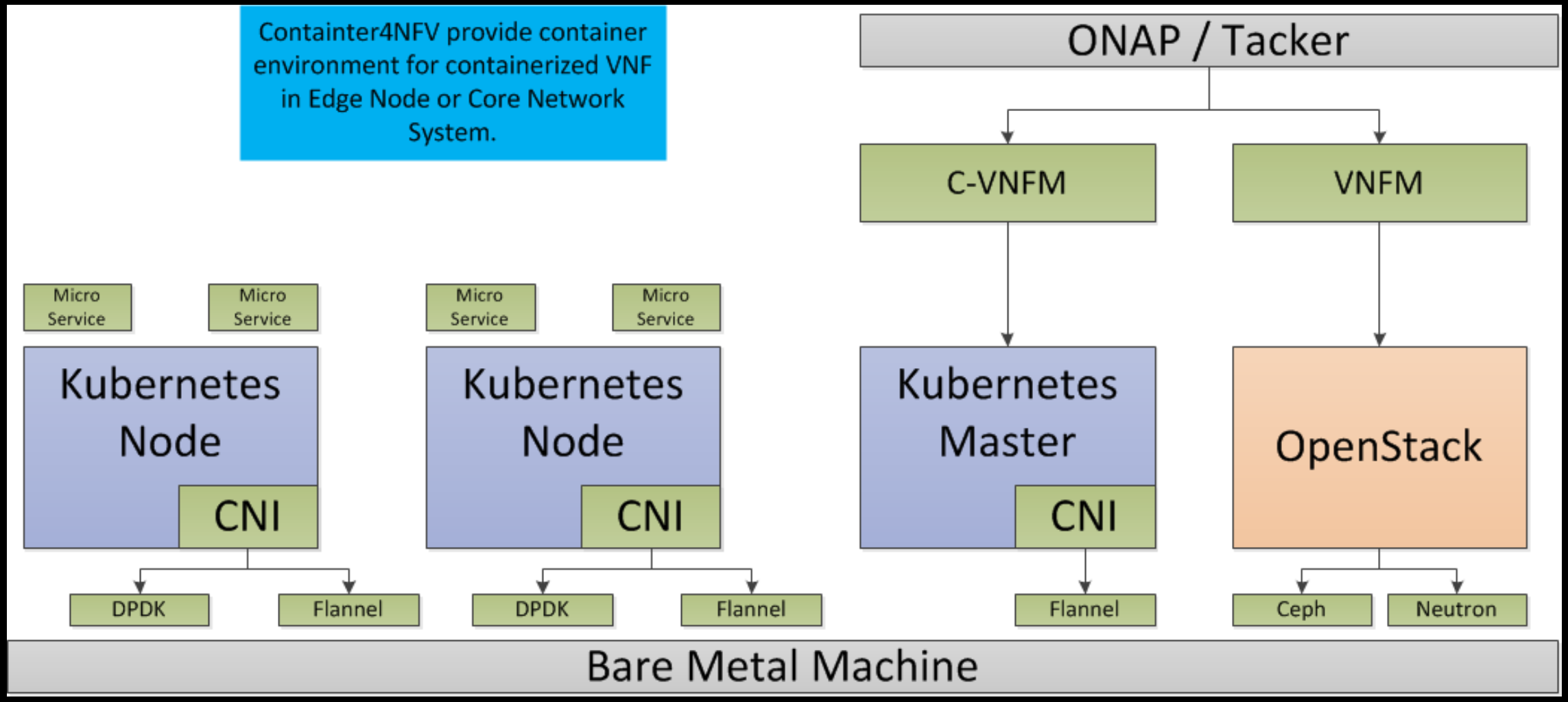
- 容器平台架构如图中所示，包含容器运行态、监控、调度、编排、服务发现等，容器自身架构趋于稳定
- 与各厂商提供的方案基本类似
- 没考虑对现有服务的集成
- 没有考虑与OpenStack的关系



Source: Gartner (August 2017)

Source From Gartner：Market Guide for Container Management Software, 2017

PART THREE² 架构设计



Source: https://wiki.opnfv.org/display/OpenRetriever/Container%27s+Architecture+for+Cloud+Native+NFV

PART THREE³

其他可参考架构

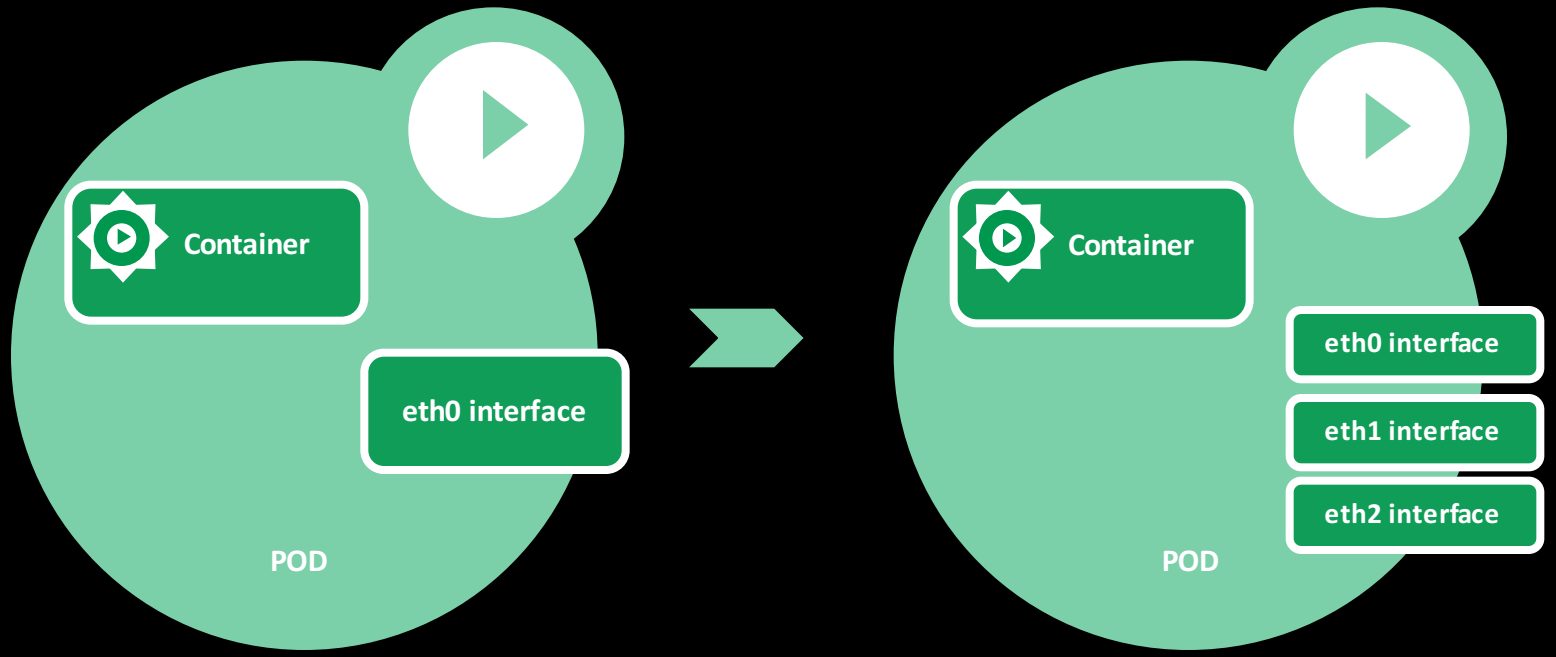
以下两种或者多种组件的组合

- Mangum
- Zun
- Kuyr
- Kubevirt
- Virtlet
- Container in VM
- Clear Container
- Hyper

PART THREE 4

Kubernetes需要支持多网络平面

- NFV应用使用至少两个以上的网络接口(用户面、控制面、管理面等)
- 在一个纯Overlay的网络上，POD网络与Host完全隔离。增加多个接口可完成健康监测。
- 与Legacy应用通信
- ……



Source:https://docs.google.com/document/d/1TW3P4c8auWwYy-w_5afIPDcGNLK3LZf0m14943eVfVg/edit?ts=58877ea7

Kubernetes需要支持多网络平面：开源方案

- Multus
- CNI-Genie
- A solution built into Kubernetes

Source from： https://github.com/opnfv/container4nfv/blob/master/docs/development/gapanalysis/gap-analysis-kubernetes-v1.5.rst

Kubernetes需要支持多网络平面：影响组件

- POD Life Cycle
- CNI
- IPAM
- IP Routing
- APIs
- Network Policy
- ……

PART THREE 5

DPDK 引入Kubernetes

应用场景：

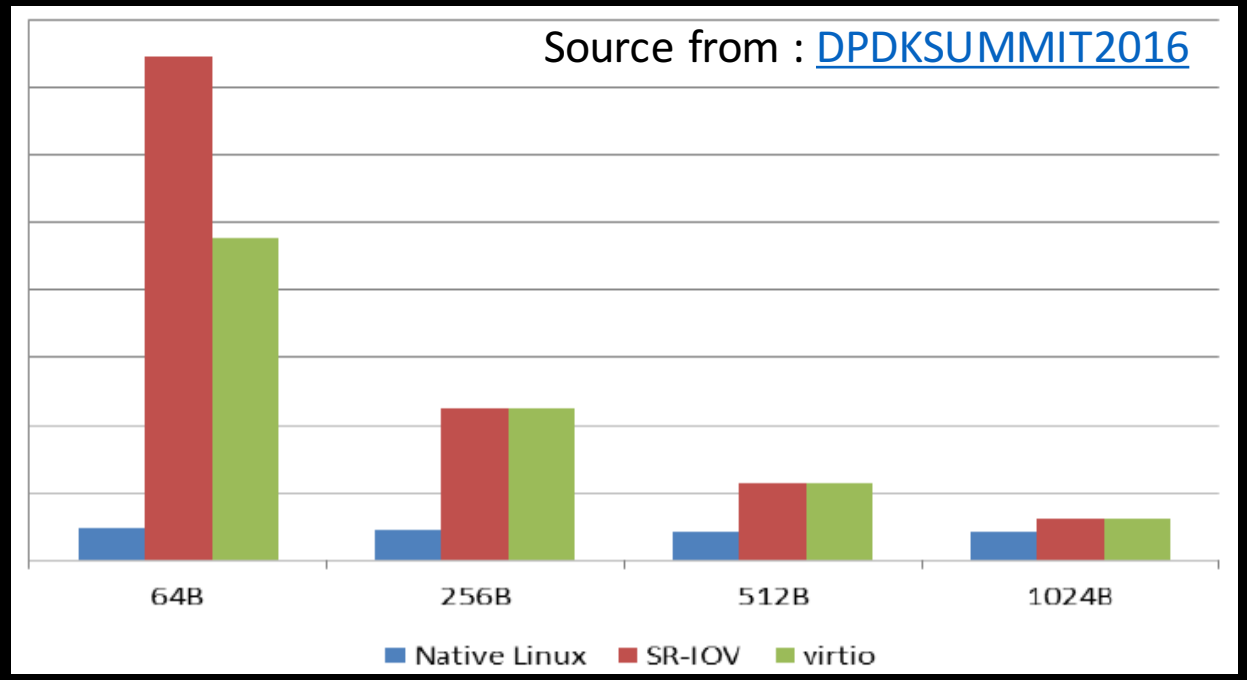
LB、FW、IDS/IPS、VPN、Proxy等

挑战：

- 安全
- 高性能网络（低时延、高吞吐）

虚拟机方案：

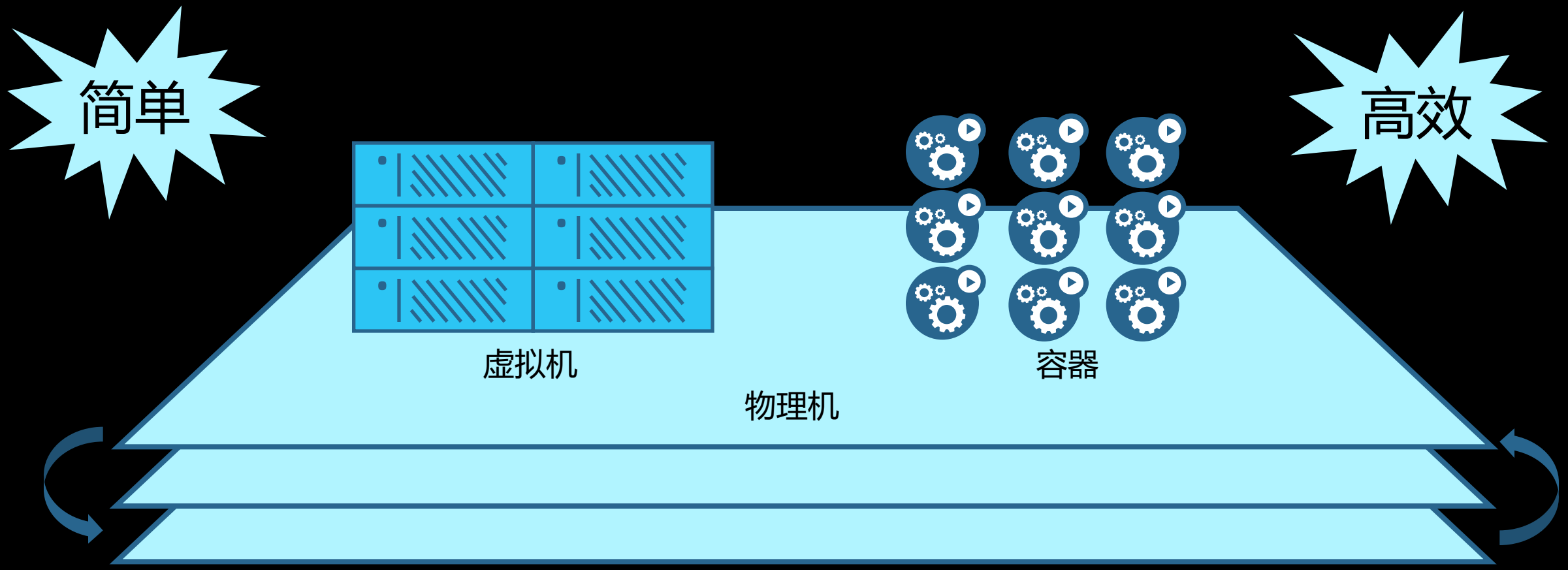
DPDK、SR-IOV、两者结合



- veth-peer 速率最低
- SR-IOV与virtio+DPDK效果基本一致

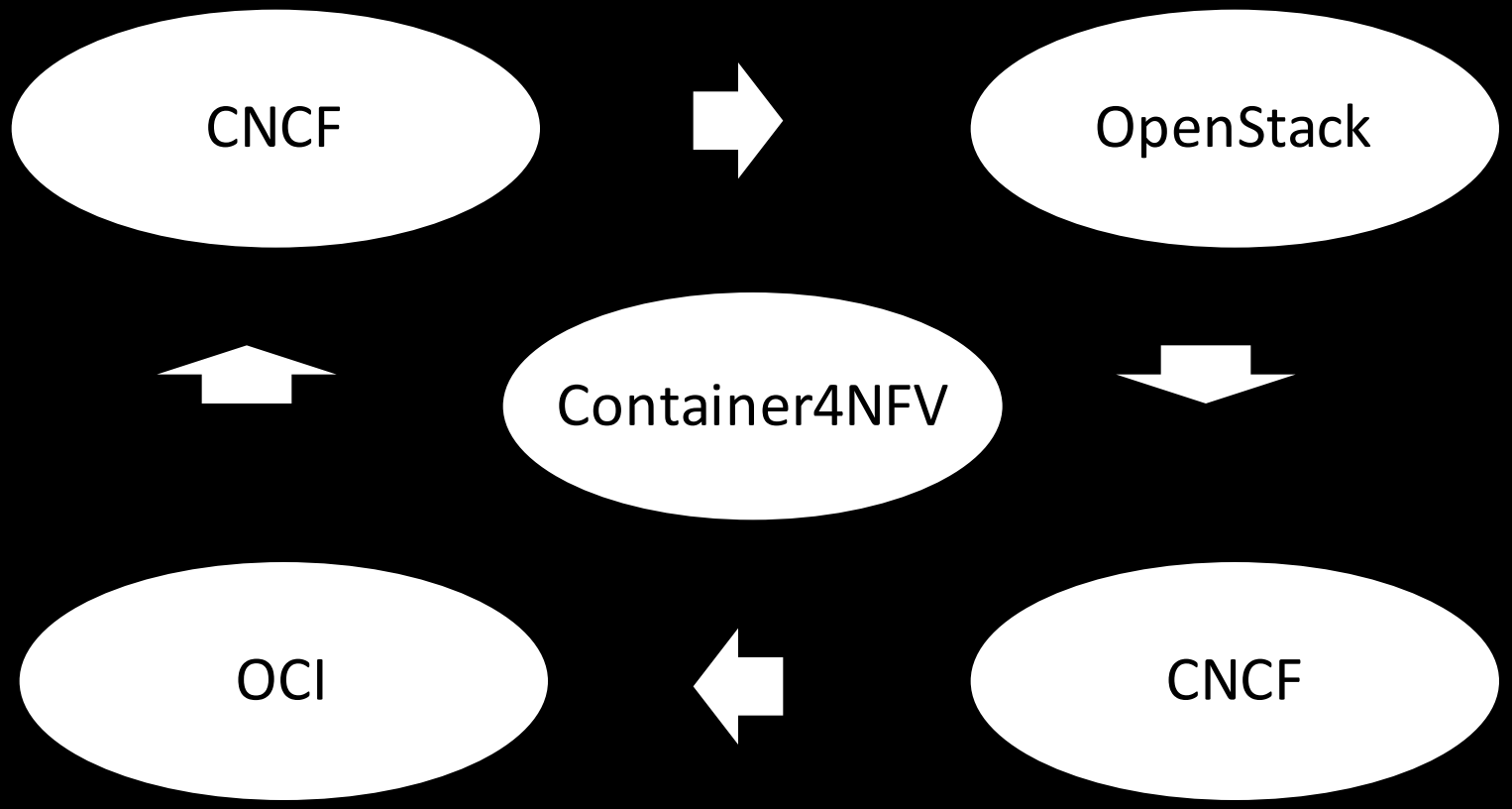
OpenStack与Kubernetes的协作

- 容器和虚拟机混合部署的需求不强
- 所有物理机都被OpenStack管理
- 最大限度提升系统资源利用率
- OpenStack与Kubernetes相互融合



PART THREE 7

Container4NFV 多个社区同时协作



THANK YOU