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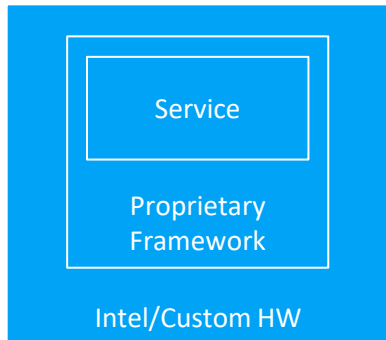
目 录

Cloud Native 演进之路

物理网元

网络功能虚拟化

云化部署

云原生设计

物理网元	网络功能虚拟化	云化部署	云原生设计
Service	Service	Service	Micro Service / Micro Service / Micro Service / Micro Service
Proprietary Framework	Proprietary Framework	Mixed Framework	Open Framework
	VM/Container	Cloud	Containers/Pods
Intel/Custom HW	Intel	Intel	Intel

Cloud Native 架构和组成

微服务	容器化	DevOps	持续集成/交付
Microservices Architecture	Packaged in Containers	Communication Collaboration Integration	Continuous Integration/ Continuous Delivery

Micro Service B

Micro Service C

Micro Service A

docker

kubernetes

Develop — Build — Test — Deploy — Release

App
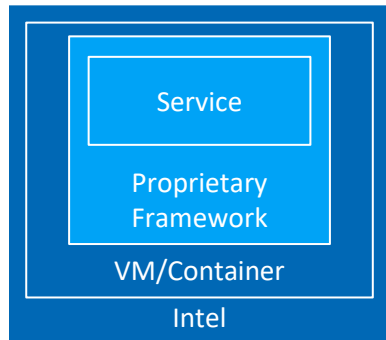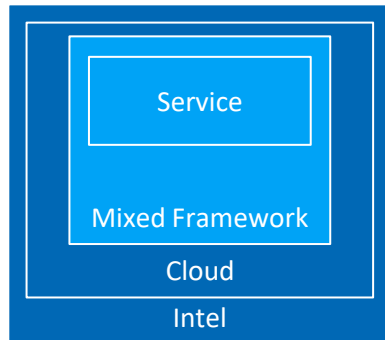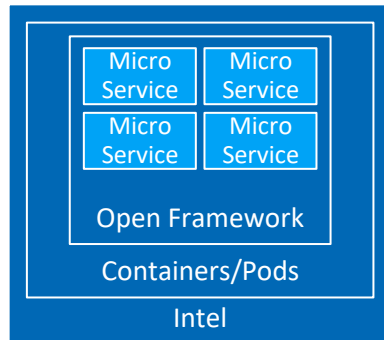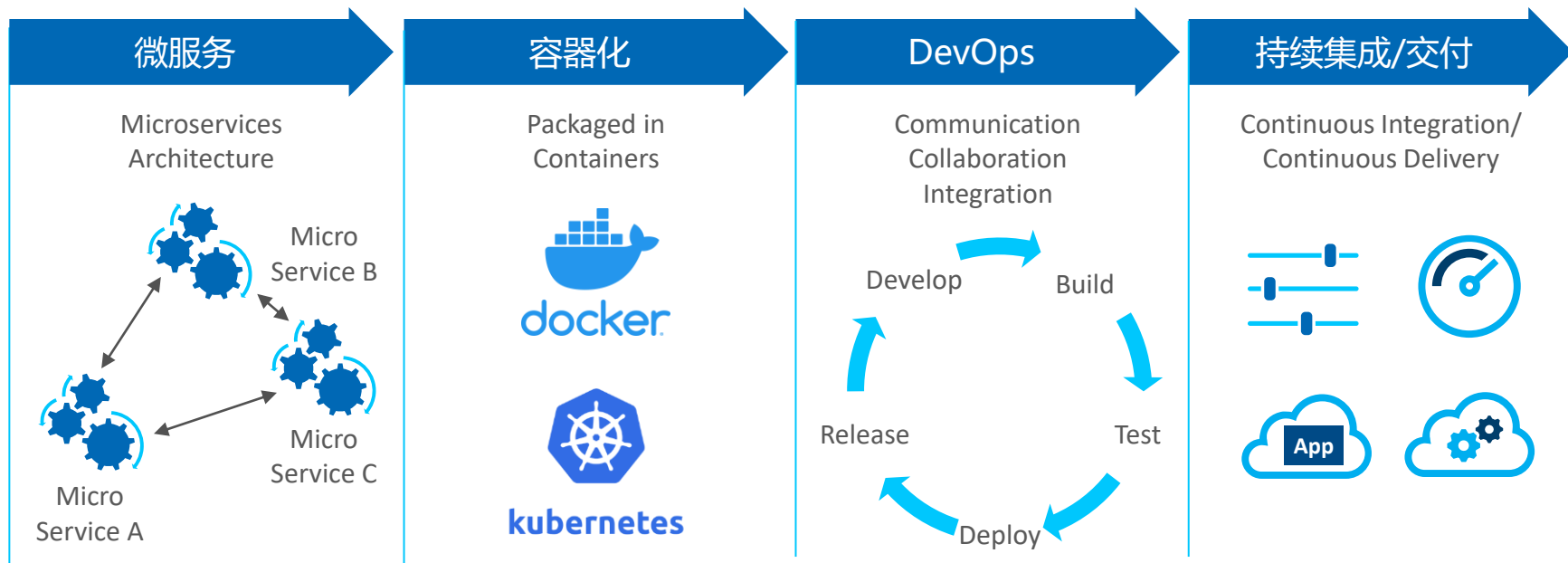
快速的创新，集成，部署

基于 Cloud Native 的 5G 核心网基础架构

- User equipment (UE)

- (Radio) Access Network (RAN)

- User Plane Function (UPF)

- Access and Mobility Function (AMF)

- Session Management Function (SMF)

- Policy Control Function (PCF)

- Authentication Server Function (AUSF)

- User Data Management (UDM)
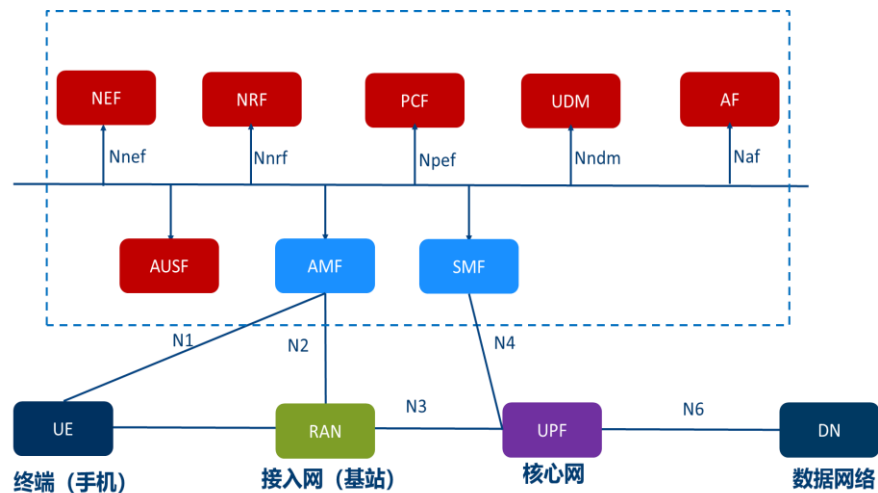
With 5G Core SA, cloud native is not nice to have but a must have !!

基于 5G 的端到端解决方案

Containers in VMs on Edge

Edge Cloud Site

1msec < E2E RTT < 10msec

Baremetal UPF (E2E RTT < 1ms)

Mobile Network

IP Backbone

Cell Site

E2E RTT < 1msec

Internet

Service/Control Plane as cloud native microservices

Core Site A

UPF currently as monolithic VM. Future, microservices, appropriately decomposed

Core Site B
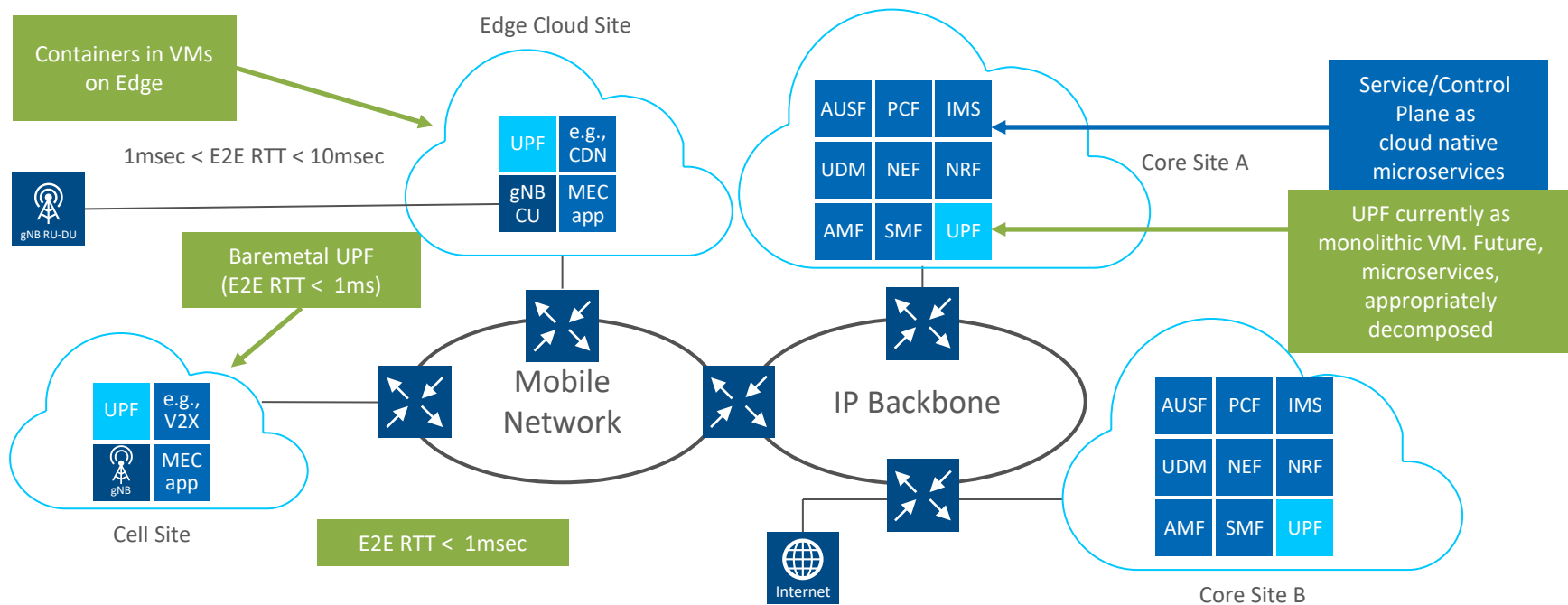
UPF currently as monolith. Future as microservices?

英特尔与社区的合作
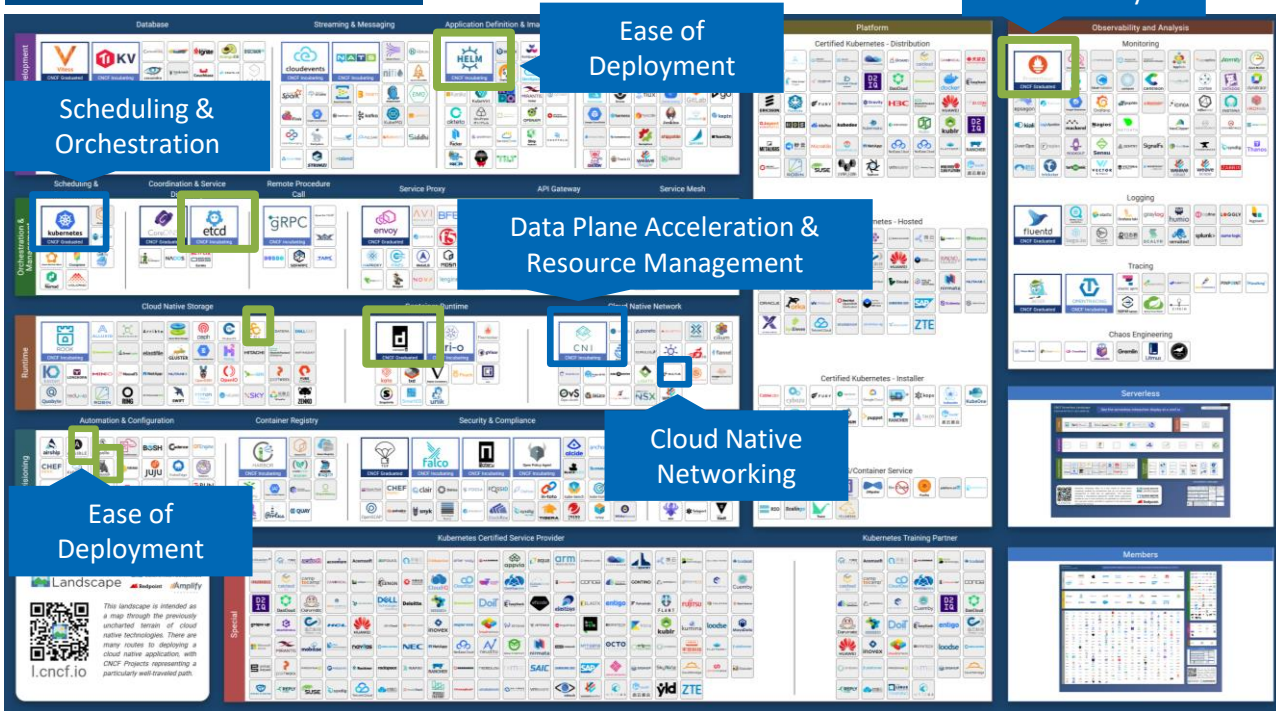
Source: https://github.com/cncf/landscape
*Other names and brands may be claimed as the property of others.

Cloud Native 在电信领域的痛点

自动化部署

应用可移植

报文处理加速

资源管理

平台安全

Cloudification

Scalable Platforms

Enabling Software

Platform Technologies

Intel® Ethernet Controller

Intel® QuickAssist Technology

intel OPTANE PERSISTENT MEMORY
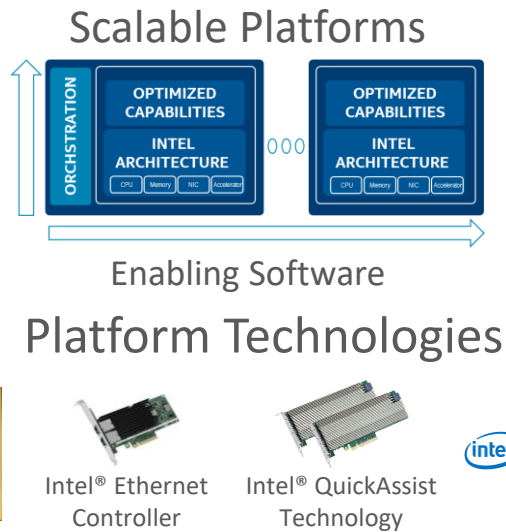
Supporting material available on Intel® Network Builders site:

Network Transformation Experience Kits: https://networkbuilders.intel.com/network-technologies/network-transformation-exp-kits

Containers Experience Kits: https://networkbuilders.intel.com/network-technologies/container-experience-kits

英特尔对 Cloud Native 的增强

Industry Gaps

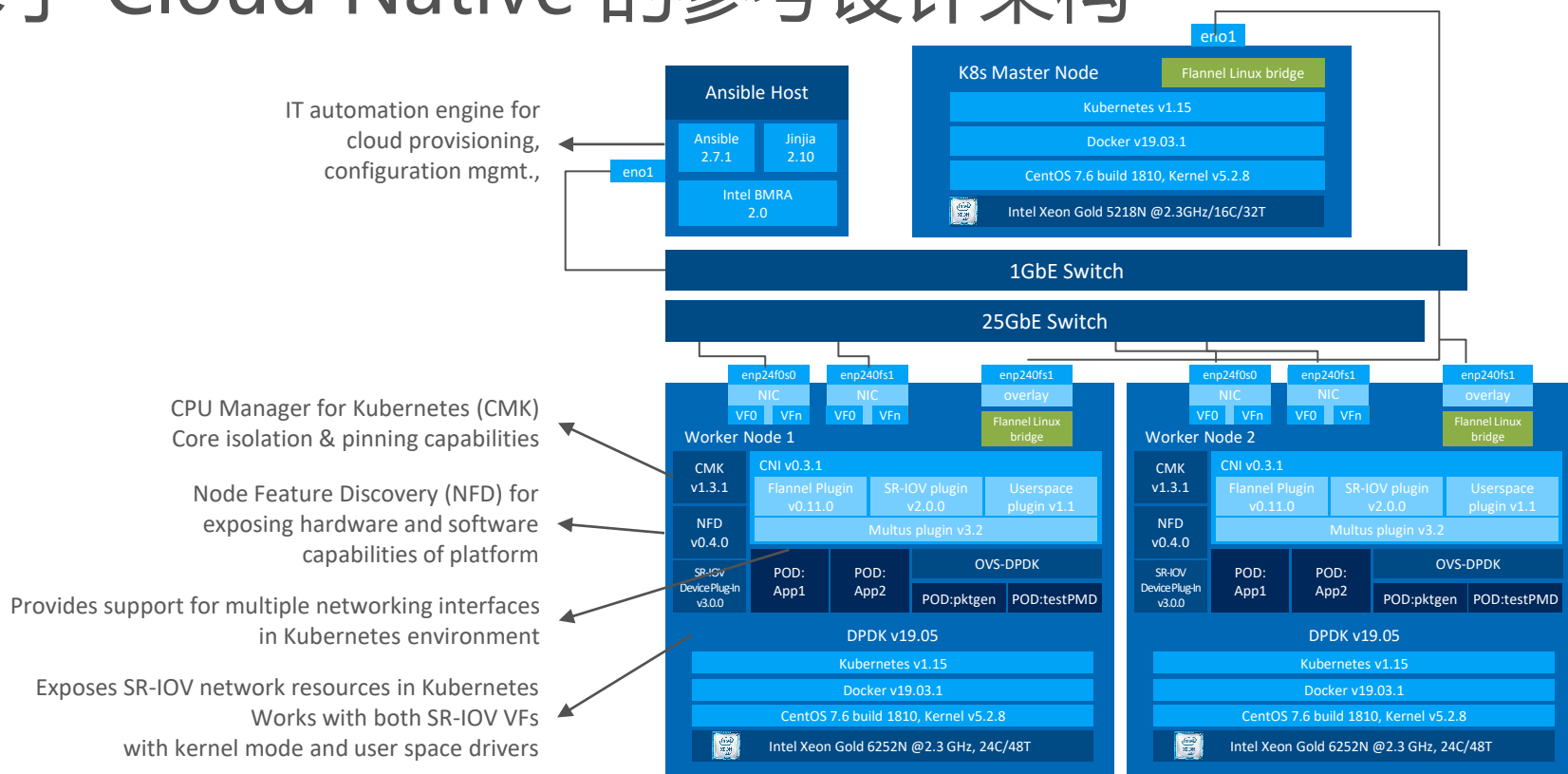| K8s Networking 🔒 |
| Packet Processing 🔒 |
| Resource Management (Enhanced Platform Awareness) 🔒 |
| Telemetry 🔒 |
| Ease of Deployment 🔒 |

Addressed

Addressed	
Multiple Network for CNF	MULTUS
High Performance E-W	CNI USERSPACE CNI / DPDK
High Performance N-S	CNI SR-IOV / DPDK
HA Networking	CNI BOND-CNI
Platform Discovery	Node Feature Discovery (Intel AVX; SR-IOV; etc.)
CPU Pinning/Isolation	CPU Manager for Kubernetes (CMK)
Dynamic Huge Page	Native Huge Page Support for Kubernetes
Manage Devices	Device Plugin (SR-IOV, Intel QAT, GPU, user space)
Set NUMA Alignment	Topology Manager (NUMA)
Scheduling per Telemetry	Telemetry Aware Scheduler
Platform Telemetry	collectd
Deployment Playbook	HELM ANSIBLE

Experience Kits:

https://networkbuilders.intel.com/network-technologies/container-experience-kits

基于 Cloud Native 的参考设计架构

IT automation engine for cloud provisioning, configuration mgmt.,

CPU Manager for Kubernetes (CMK) Core isolation & pinning capabilities

Node Feature Discovery (NFD) for exposing hardware and software capabilities of platform

Provides support for multiple networking interfaces in Kubernetes environment

Exposes SR-IOV network resources in Kubernetes Works with both SR-IOV VFs with kernel mode and user space drivers

https://github.com/intel/container-experience-kits/
https://builders.intel.com/docs/networkbuilders/container-bare-metal-for-2nd-generation-intel-xeon-scalable-processor.pdf