SOSCON
Samsung Cloud Platform

Cloud Native Infrastructure for Telco

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NFV

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NFV = Network Function Virtualization

- 가상화 기술을 이용하여 H/W Appliance 기반 네트워크 장비의 기능을 S/W로 제공
- S/W를 통해 지능적인 네트워크 자원 관리와 다양한 정보처리가 가능

Classical Network Appliance


Message Router


CDN


Session Border Controller


WAN Acceleration


DPI


Firewall


Carrier Grade NAT


Tester/QoE monitor


SGSN/GGSN

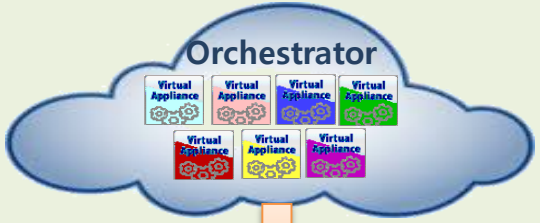

PE Router


BRAS


Radio/Fixed Access Network Nodes

진화

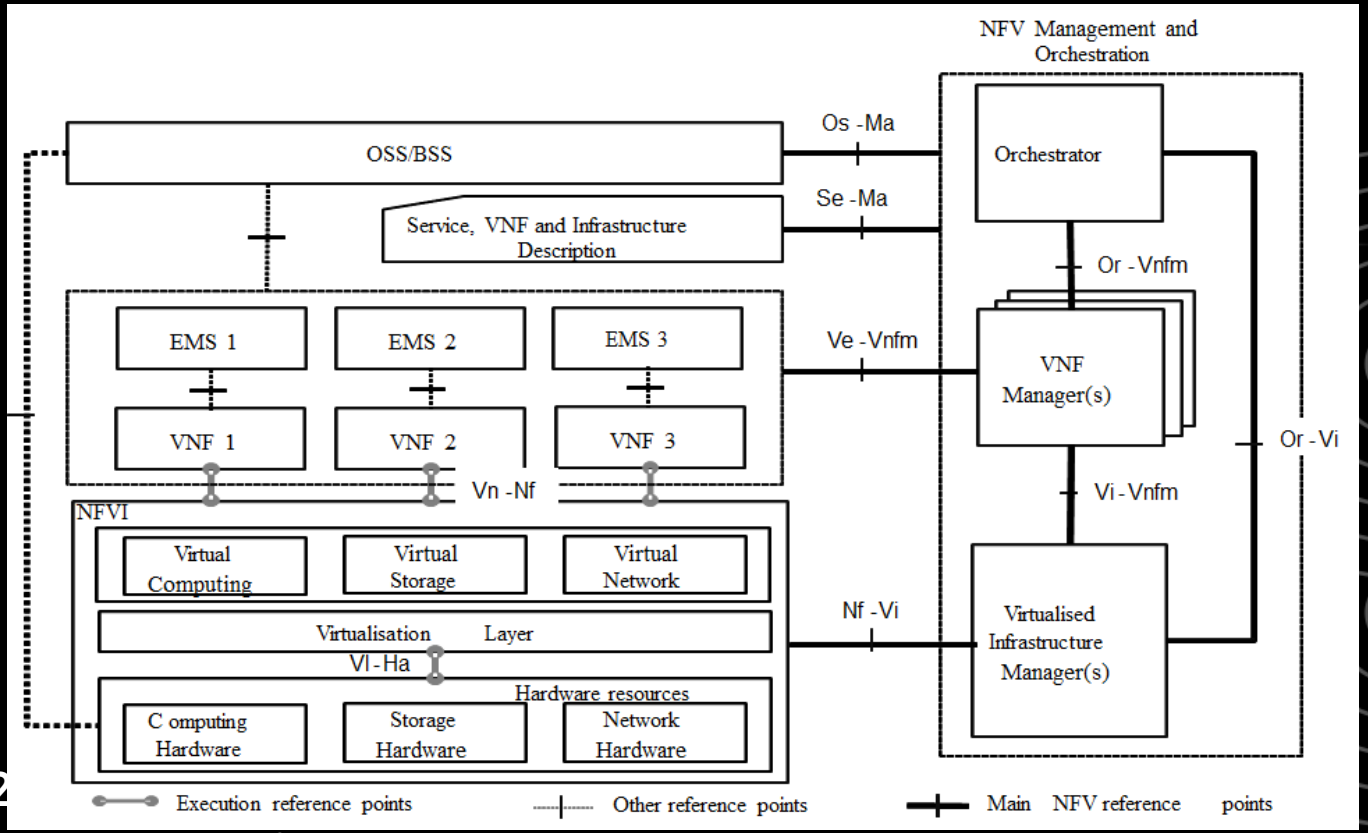
Network Function Virtualization



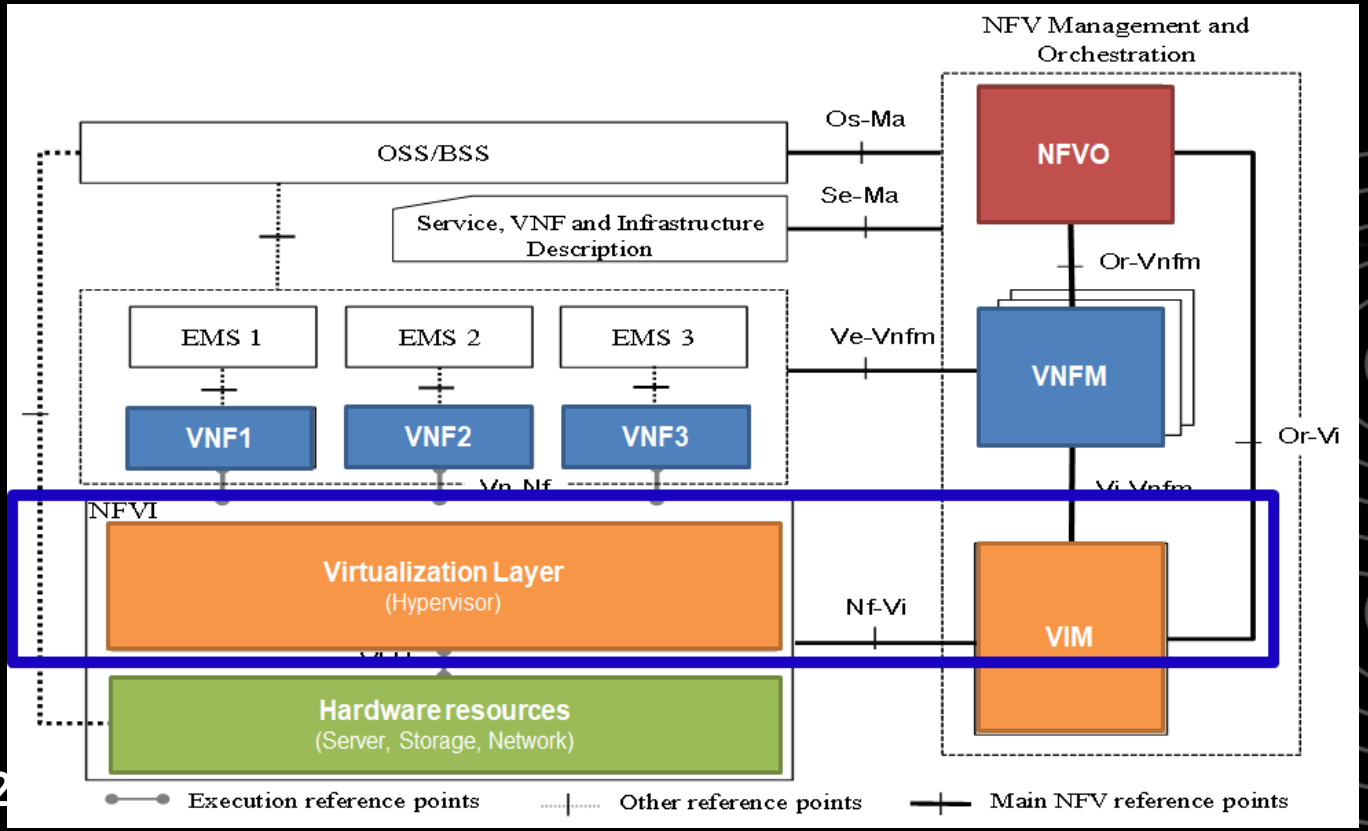
Orchestrated, Automatic & Remote Call

* Compute
* Storage
* Network

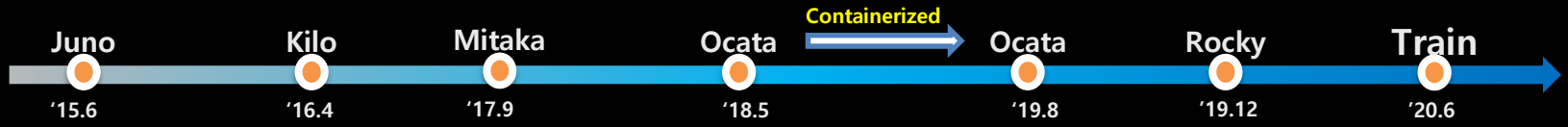
ETSI - NFV Architecture

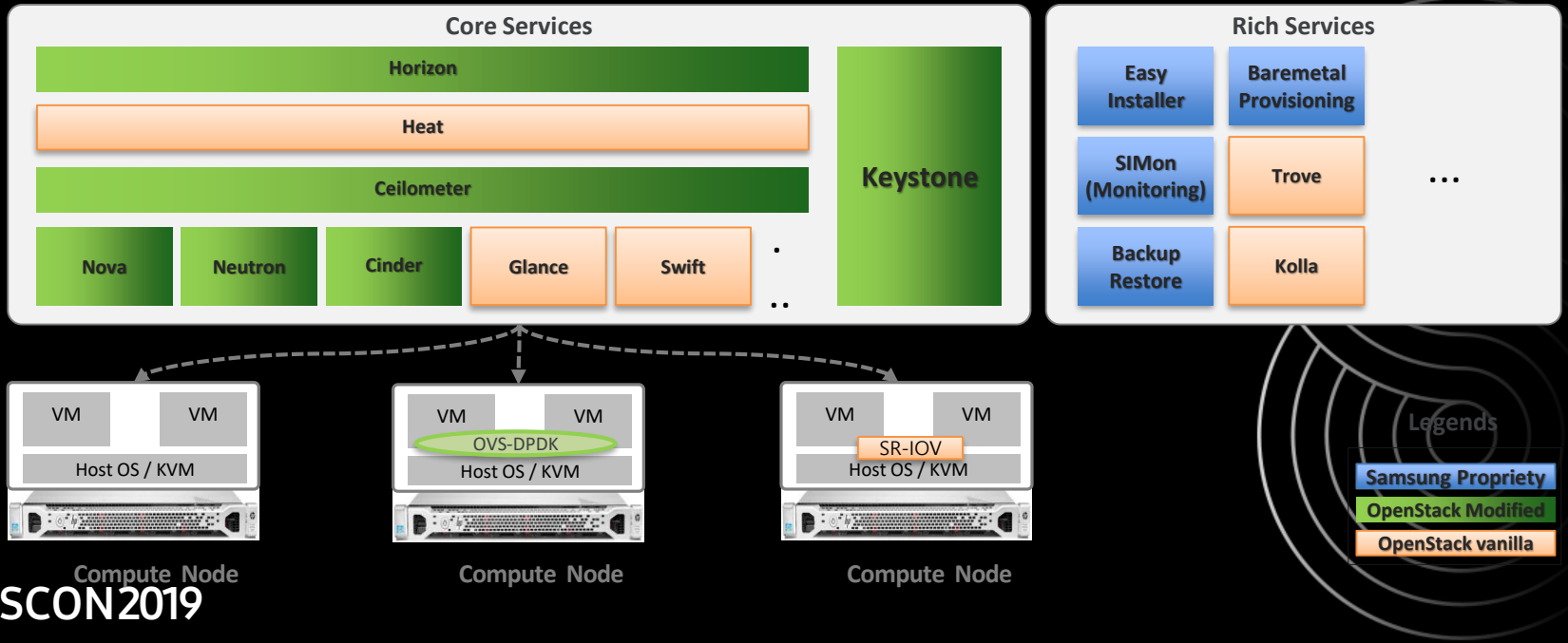


NFV Architecture with Openstack



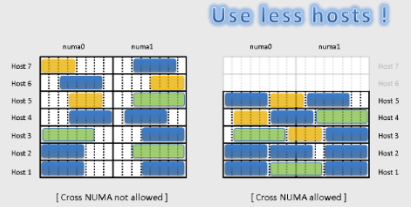
SOfTI = Samsung Openstack for Telco & IT





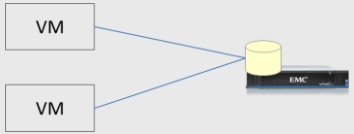
SOfTI = Samsung Openstack for Telco & IT

NUMA Aware Smart CPU Pinning



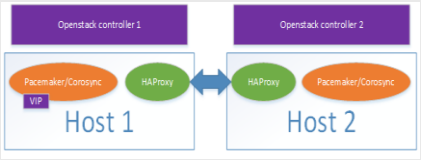
- 독자 개발한 Scheduler를 통한 Cross NUMA allocation 가능
  → Cloud 환경에 유리
- Balance Mode : 두 NUMA 중 더 많은 resource가 남은 Node에 VM 배치

Shared Disk



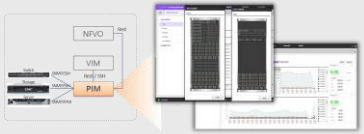
- "Virtual SAN 공유" 기능을 지원
  → VM 이중화를 위한 별도의 module 없이 Infra (Openstack) 기능 사용

Controller HA



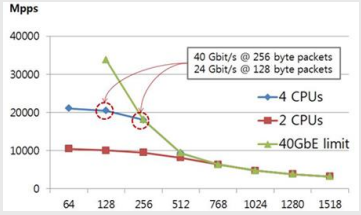
- 소규모 Data Center 환경에 맞도록 최소 형상 구성
  - Controller 서버 수 감소에 따른 비용 절감
  - 자체 File Sync mechanism으로 외부 Storage 없이 사용 가능

DCIM (DC Infrastructure Manager)



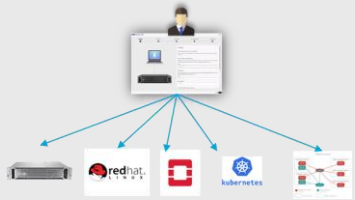
- 서버, 스위치, 스토리지 관리를 위한 통합 UI 제공
- 주요 Vendor의 H/W 지원
- 실시간 H/W 장애 통지
- H/W 관리를 위한 직관적인 Rack View 제공

OVS-DPDK



- Telco 수준 I/O 성능과 트래픽 제어를 위해 SDN과 연계한 고속 가상 스위치 개발
- 효과
  - 5G Workload를 만족하는 고속/저지연 가상 스위치 제공

Easy Installer



- 하나의 UI에서 모든 설치 과정 수행
  - Server 자동 감지 및 OS 설치
  - Openstack 설치 및 서버 증/감설
  - 외장 Storage 설정

Cloud Native NFV

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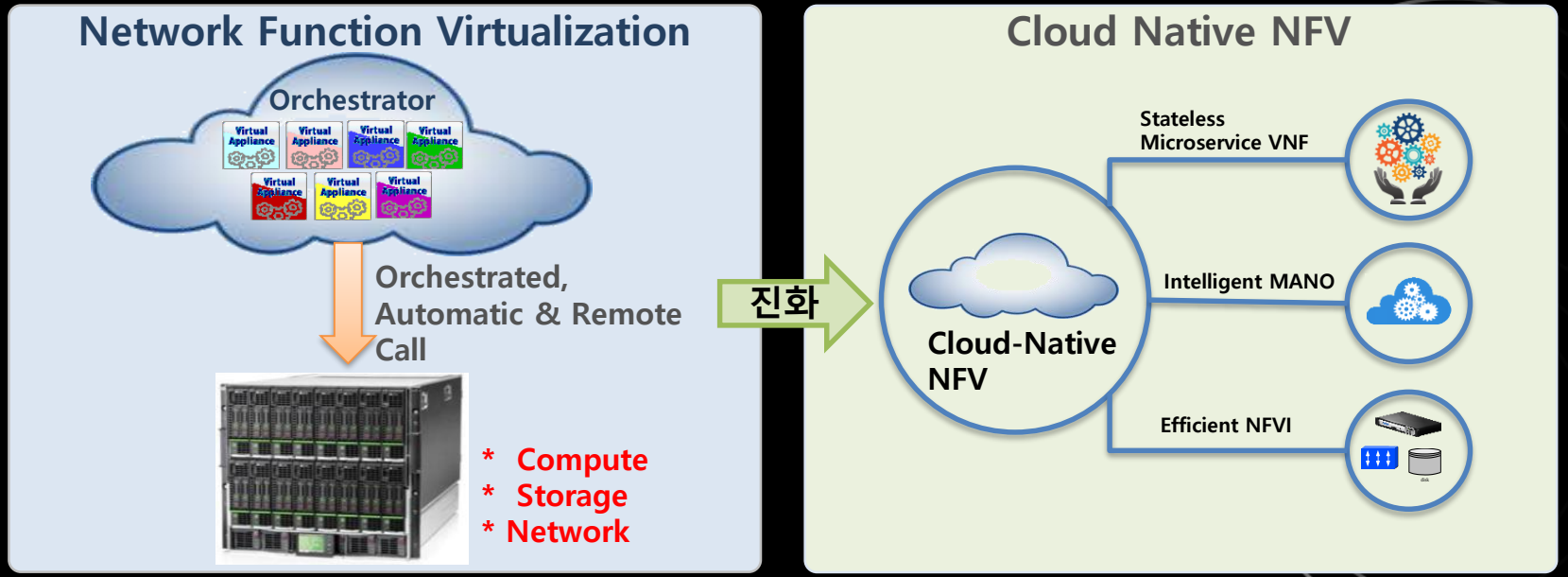
Cloud Native NFV

- VNF의 모듈화 및 이를 통한 스케일링 및 유연한 라이프사이클 관리
- 컨테이너 기반의 VNF 실행 환경

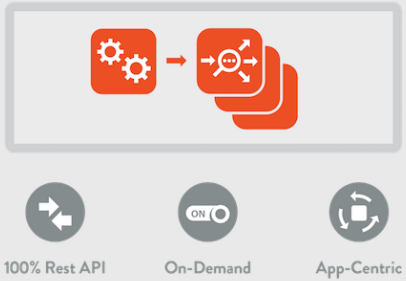


Cloud Native NFV

Auto Provisioning

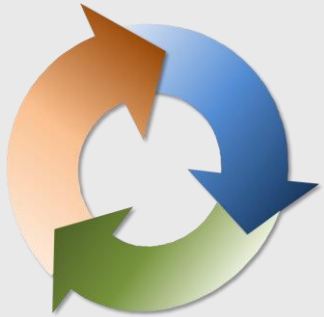
• Application 스스로 instance를 provisioning

Auto Scaling



• 자동(Automatic) 또는 요청 (On demand)에 따른 Scaling

Auto Healing



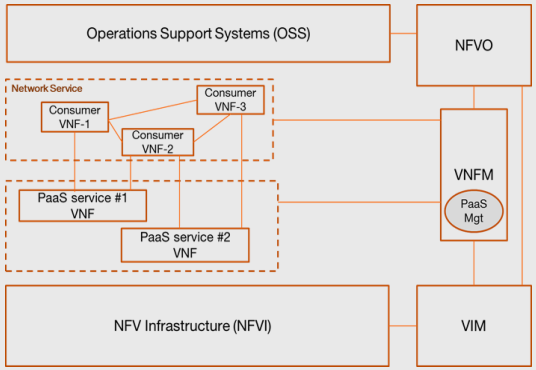
• Infrastructure 또는 application에 장애 발생시 자동으로 detect하여 복구

ETSI - Cloud Native NFV

- Resiliency
- Scaling
- 분해 및 조합 (Composition/Decomposition)
- 가상 자원 위치와 독립적인 VNF 디자인
- VNF state 관리
- Container
- Automation
- Load balancing

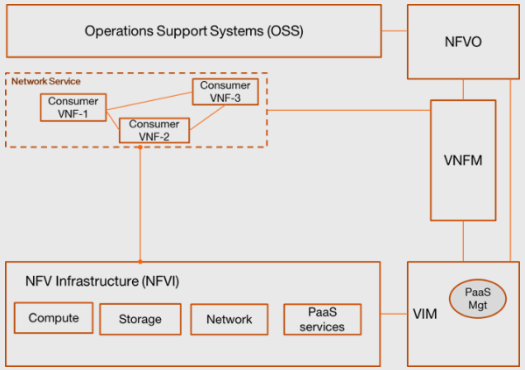
ETSI – PaaS for Cloud Native NFV

PaaS as a VNF



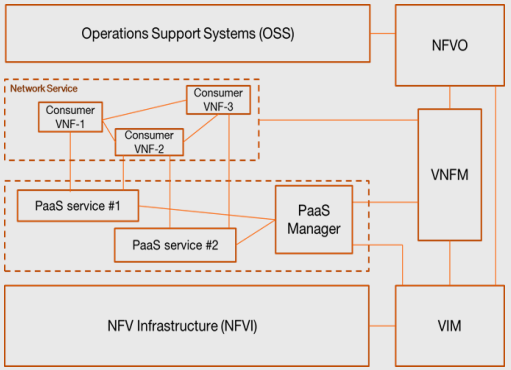
- 각 VNF는 PaaS service로 지원되는 하나 이상의 VNF들이 제공하는 특정의 서비스를 이용
- PaaS type으로 제공되는 VNF들을 제어/관리하는 기능이 VNFM에 포함

PaaS as a NFVI



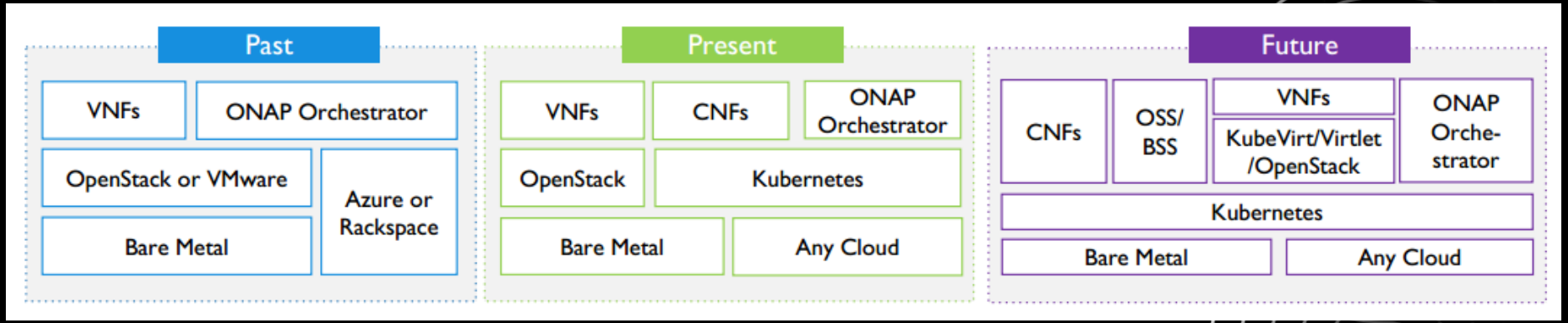
- PaaS Service가 새로운 유형의 NFV 자원으로 제공
- PaaS type으로 제공되는 가상 자원들의 제어 관리 기능이 가상 인프라 관리자(VIM)에 포함

PaaS as a new Object



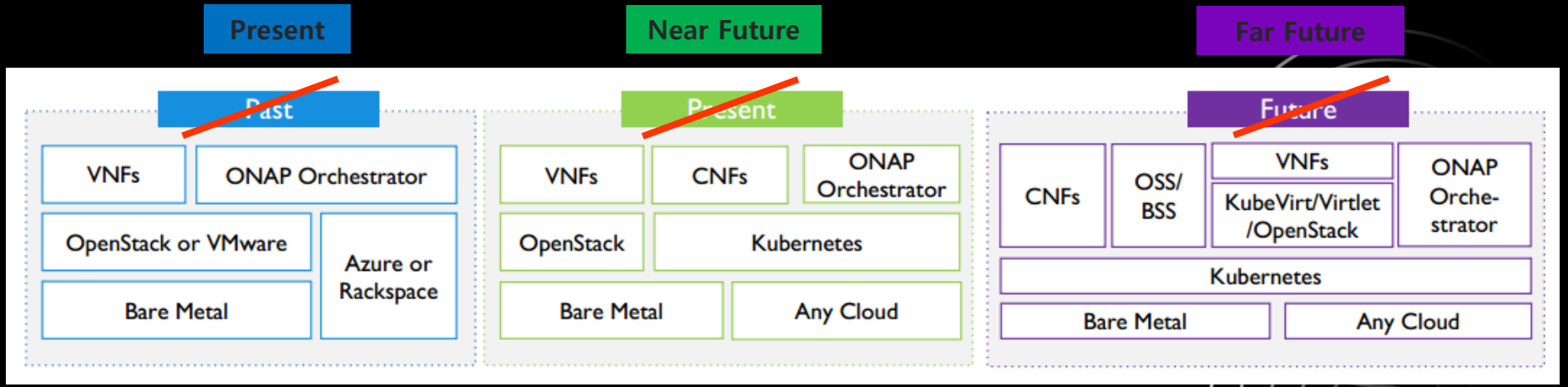
- PaaS Service와 이를 제어/관리하는 기능들이 하나의 기능 요소로 지원
- PaaS Manager는 VNFM및 VIM과의 인터페이스를 제공

CNCF – Evolution to Cloud Native



* 출처 : CNCF TUG (Telecom User Group)

CNCF – Evolution to Cloud Native



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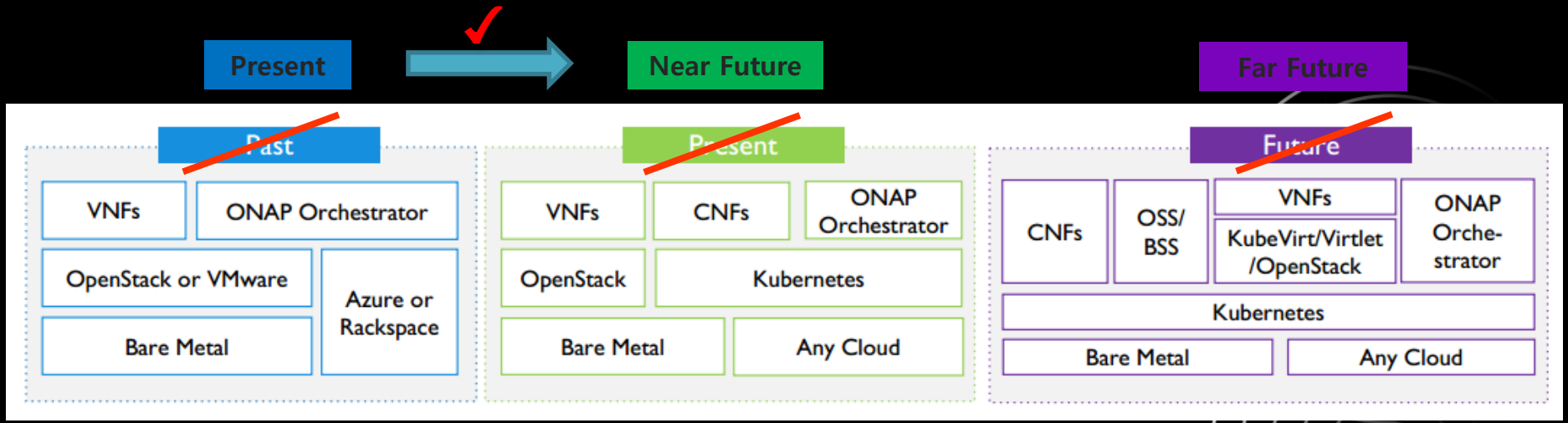

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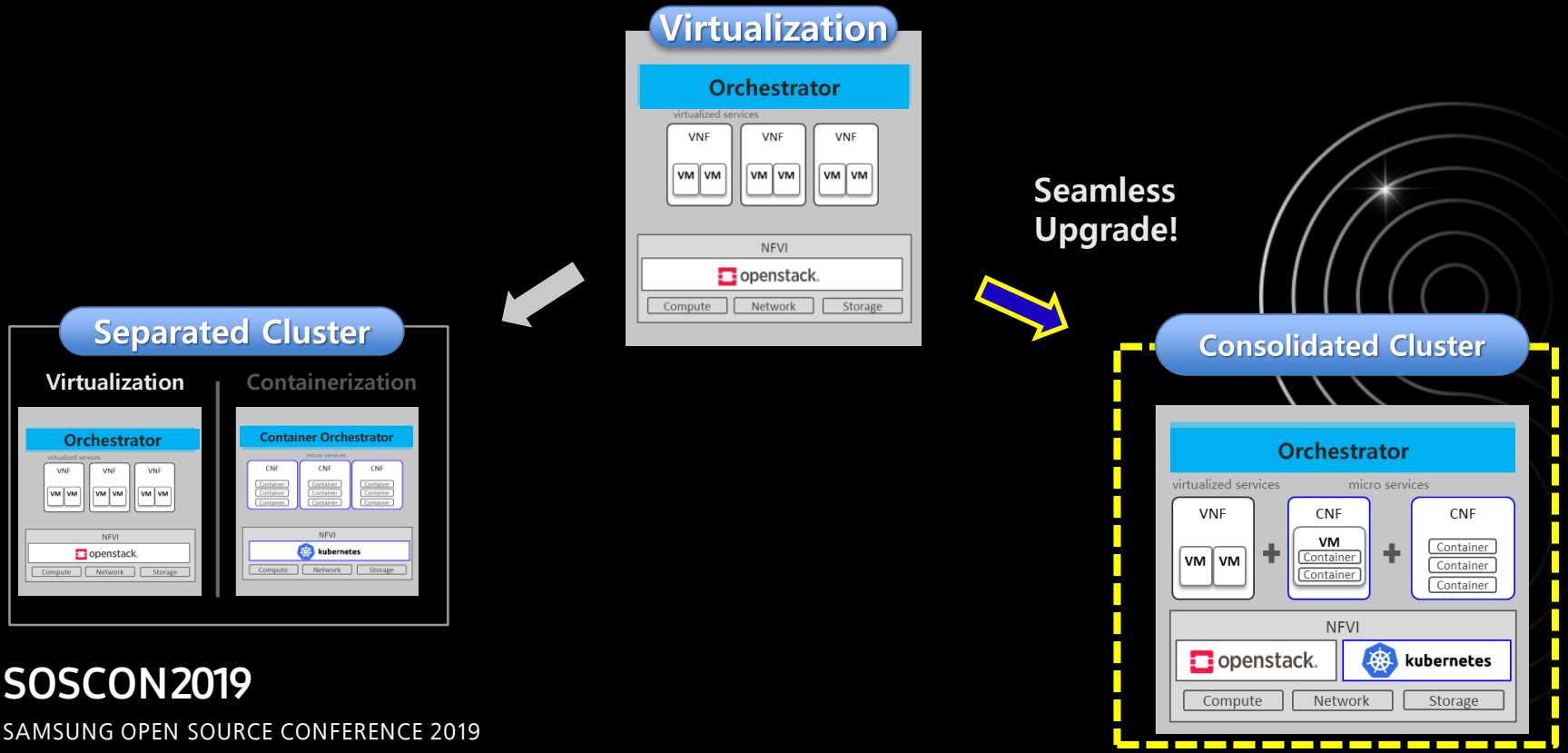
Evolution to Cloud Native ?



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SCP

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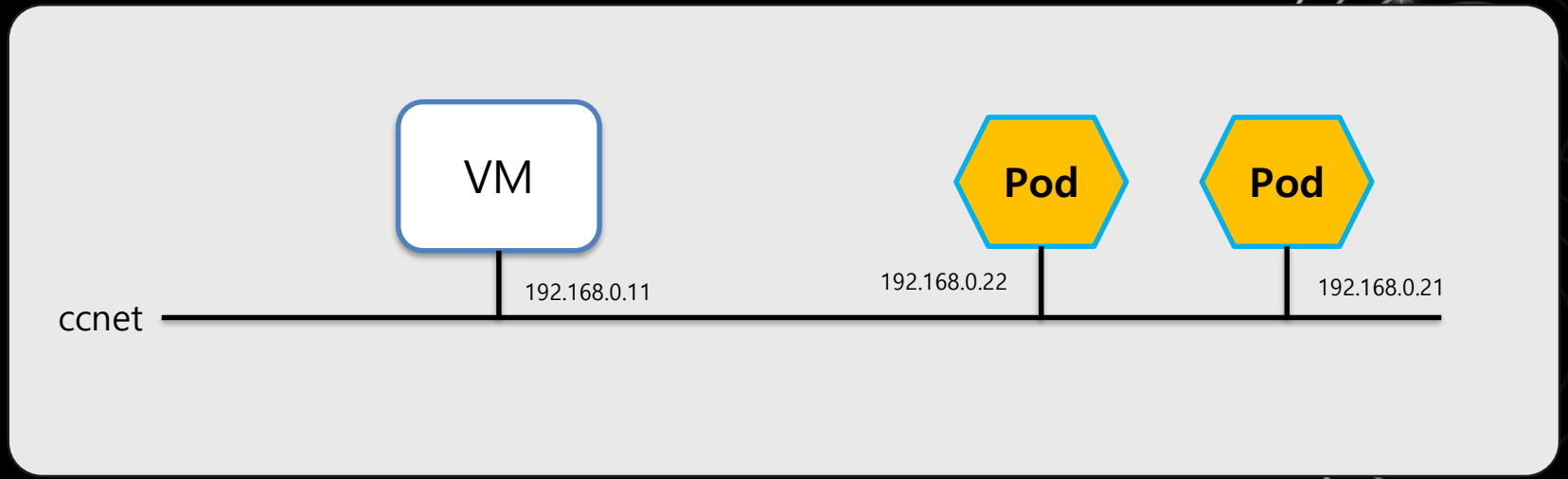
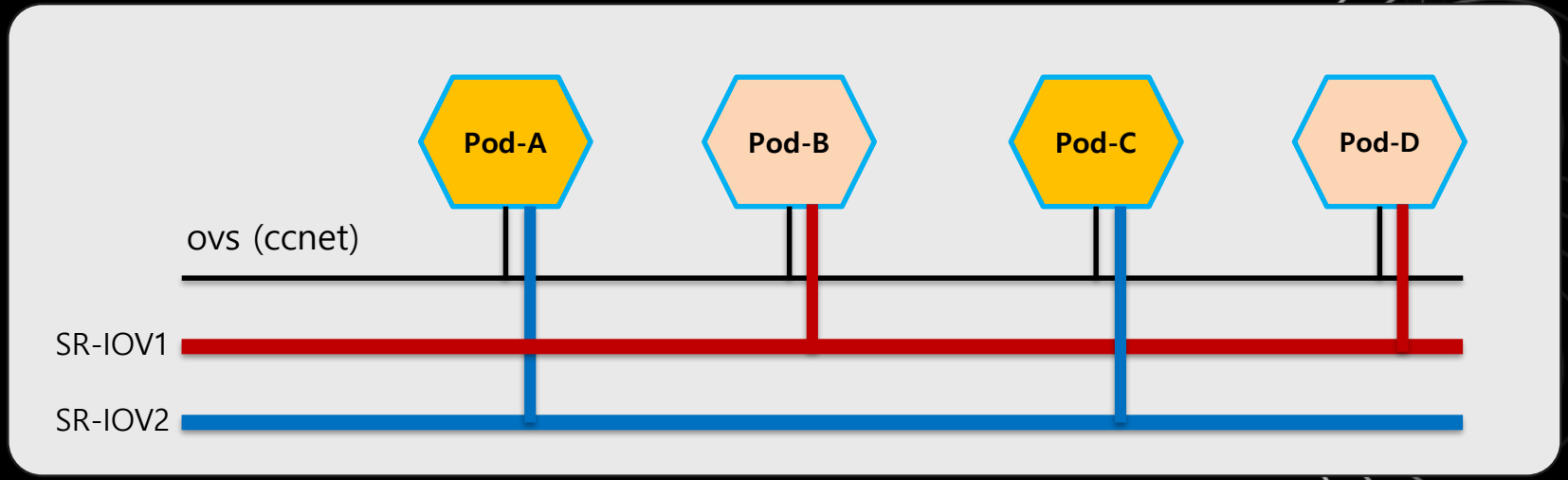
SCP – CNI

- Openstack Neutron을 이용하기 위해 Kuryr CNI 사용
  - 네트워크 관련 정보 (IP, MAC, Allocation States 등)을 통합 관리
  - VM과 Container 간 L2 통신 가능

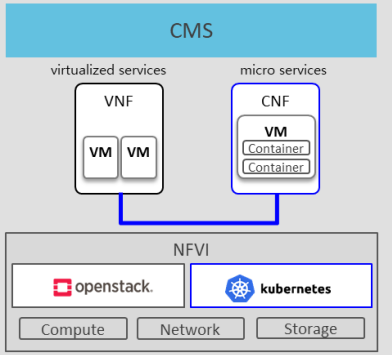


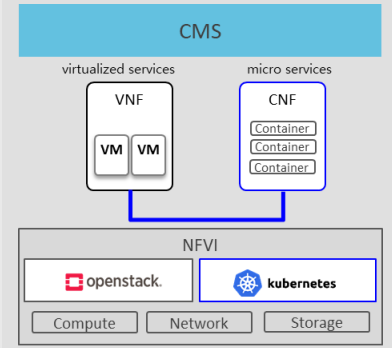
SCP – Multi Interface

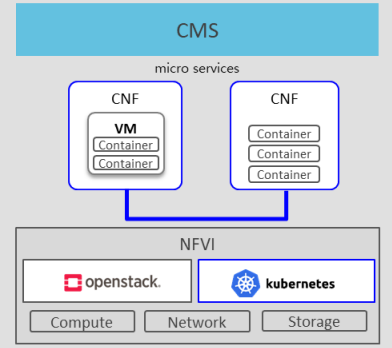
- Multi Interface를 지원하도록 Kuryr CNI 확장
  - OVS와 SR-IOV를 동시에 지원 가능

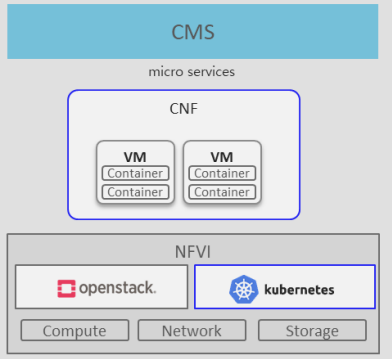


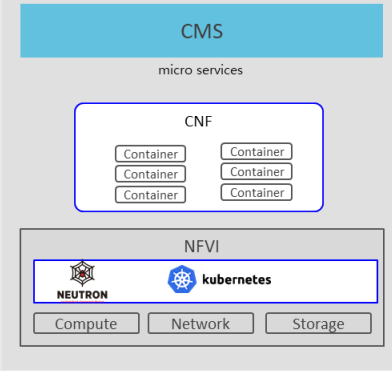
SCP – Multi Cluster type

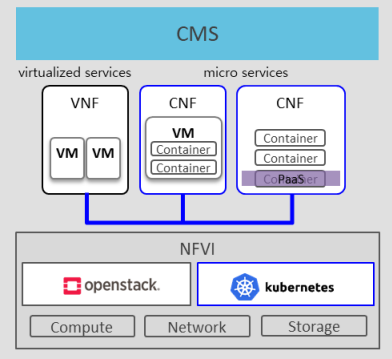












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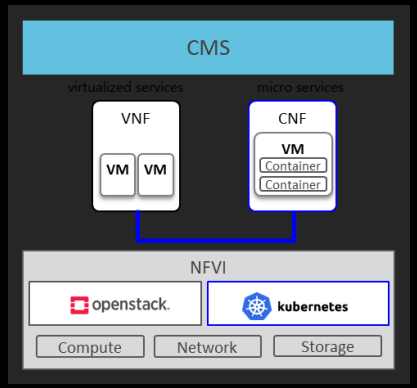
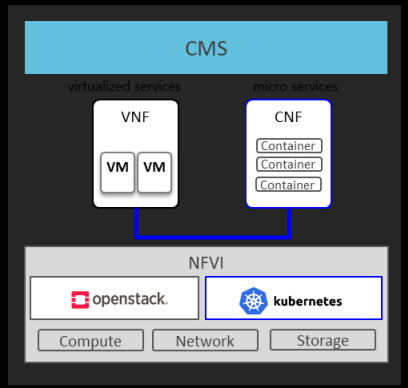
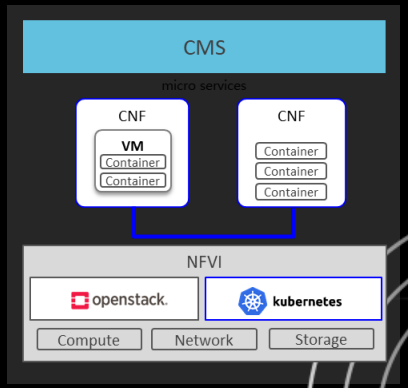
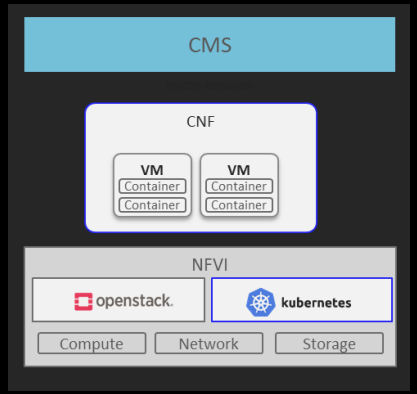
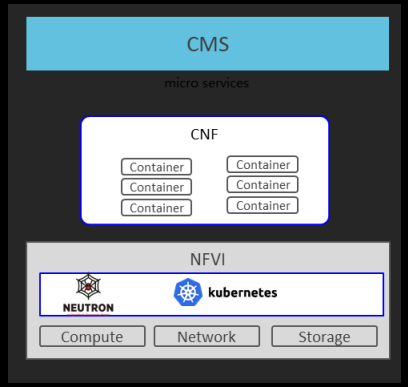
Cluster types with OwC

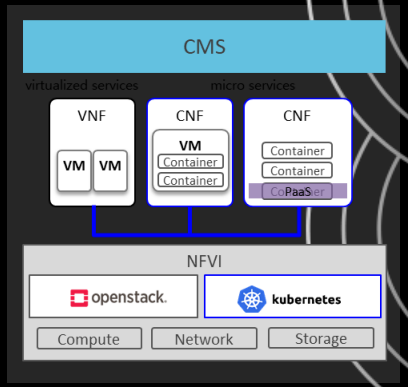






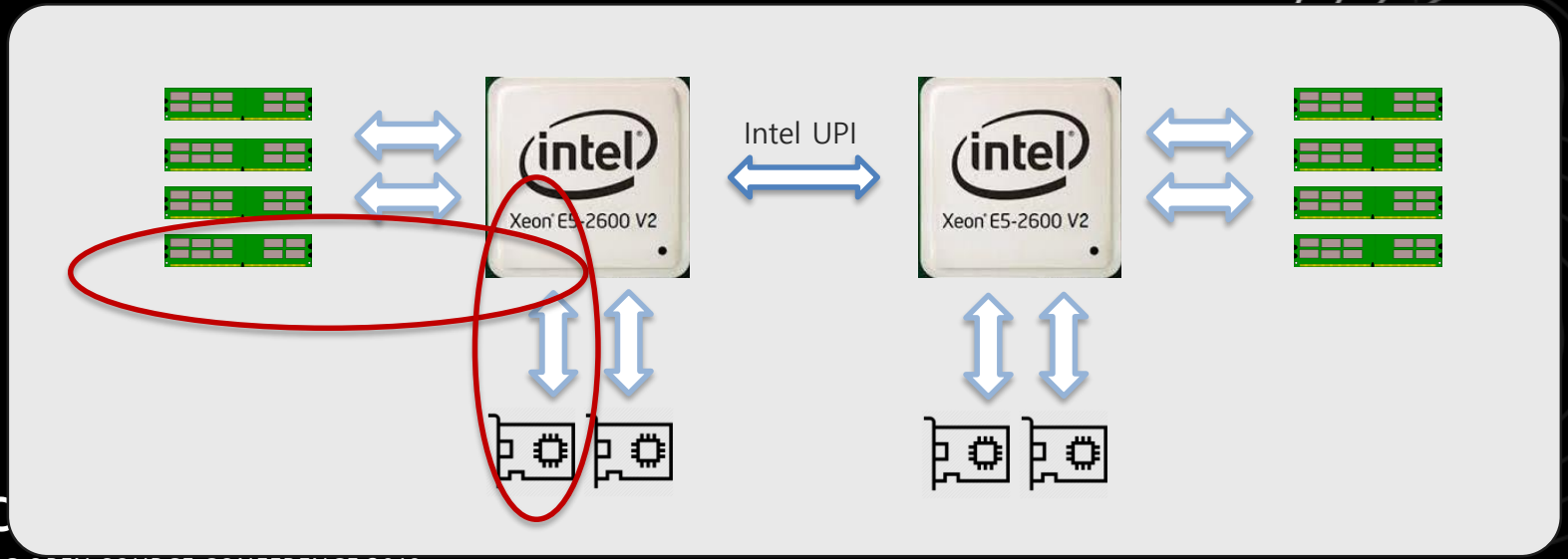






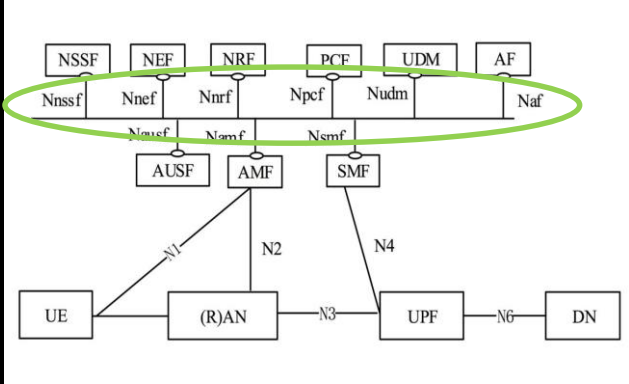
SCP – Samsung Cloud Platform

- EPA (Enhanced Platform Awareness) 지원
  - Intel CMK 및 Node Topology Manager 사용 및 확장
  - NUMA Aware한 CPU 및 Memory 할당
  - Container별 Hugepage dedication 기능 확장

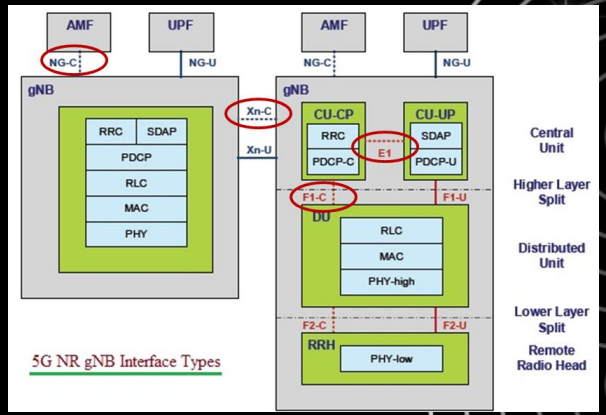


SCP – Load Balancer

- On-Premises 환경에서 K8s cluster를 구축하기 위해서는 Load Balancer가 필수
- Telco 환경에 사용할 Load Balancer는 End-to-End HTTP/2 및 SCTP 지원 되어야 함



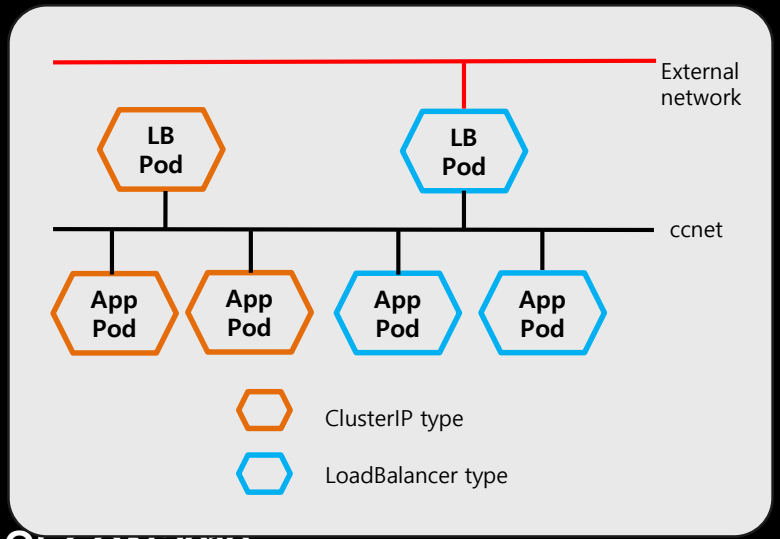
End-to-End HTTP/2

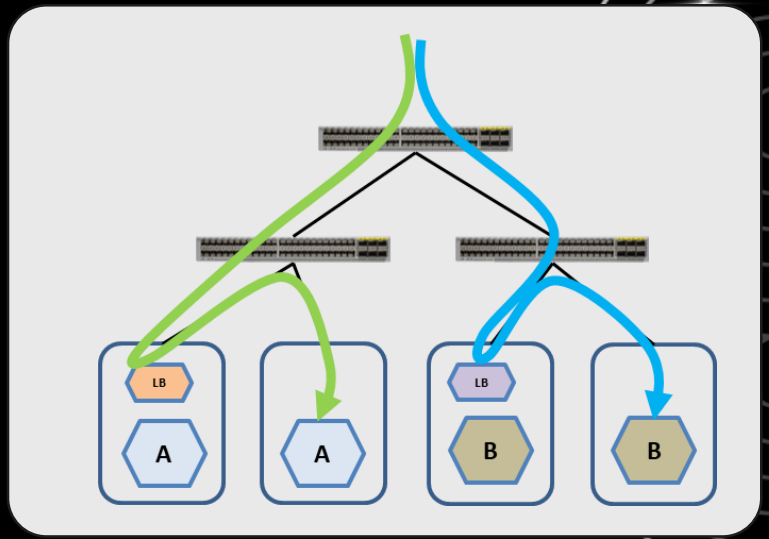


SCTP

SCP – Load Balancer

- End-to-End HTTP/2 및 SCTP 처리 가능한 Load Balancer를 Pod 형태로 구성
  - North-South traffic과 East-West traffic 을 같은 방식으로 처리
  - Service별로 Load Balancer Pod가 생성되기 때문에 Scalability 측면에서 유리





THANK YOU

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