

GSMA OP and how to implement it with Open Source Solutions

--- Thoughts and choices of China Unicom

Gao Chen @ China Unicom
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Agenda

- **GSMA Operator Platform**
- **Building OP as a PaaS**
- **Open Source Solutions**

GSMA Operator Platform and Telco Edge Cloud

- The Operator Platform Project is defining an open technical framework
- The TEC Project is exploring commercial frameworks (aggregation / federation / interop) including the creation of an enabling commercial entity

30 Operators 15 Vendors



Operator Platform Group (OPG)

- Architecture, technical requirements
- Liaison with SDOs for technical specs and OSCs for open source code

Telco Edge Cloud (TEC)

- Commercial, business and contractual models
- PoC and trials
- Definition of a legal entity to run the platform

25 Operators



2nd Half 2020

*Note: The contents of this slide are copied from GSMA Operator Platform Group

What is the relationship between OP and TEC?

- › **TEC's definition** in TEC whitepaper is: **A type of the Operator Platform** that exposes Edge Cloud capabilities (Naas, IaaS, and PaaS) to Customers and Service Providers.
- › **Operator Platform** will **federate** multiple Operator's edge computing infrastructure to give application providers access to **a global edge cloud (TEC)**.
- › **Application Provider** will consume the **TEC services** through the NBI of Operator Platform.

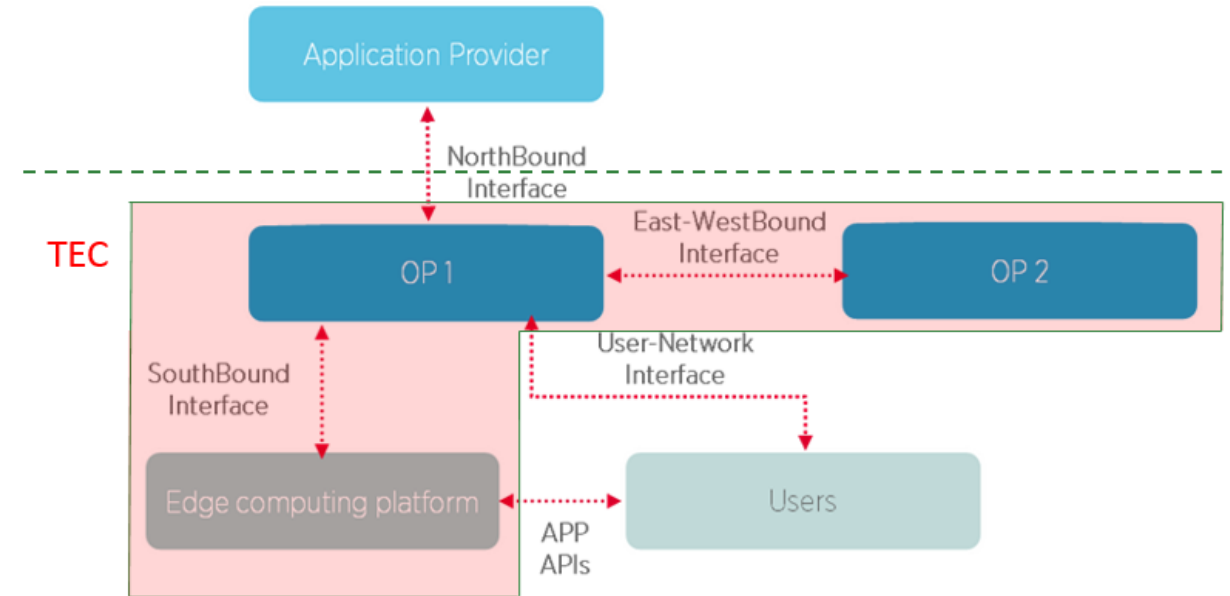


Figure: High-Level Reference Architecture of Operator Platform
Source from GSMA Operator Platform Telco Edge Proposal v1.0

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What is PaaS ?

- › **Platform as a Service(PaaS):** Cloud computing service in which the capability that is provided to the cloud service Customer is the functionality **to deploy, manage, and run Customer-created or Customer-acquired applications** using one or more programming languages and one or more execution environments supported by the cloud service provider, as defined in ITU-T Y.35

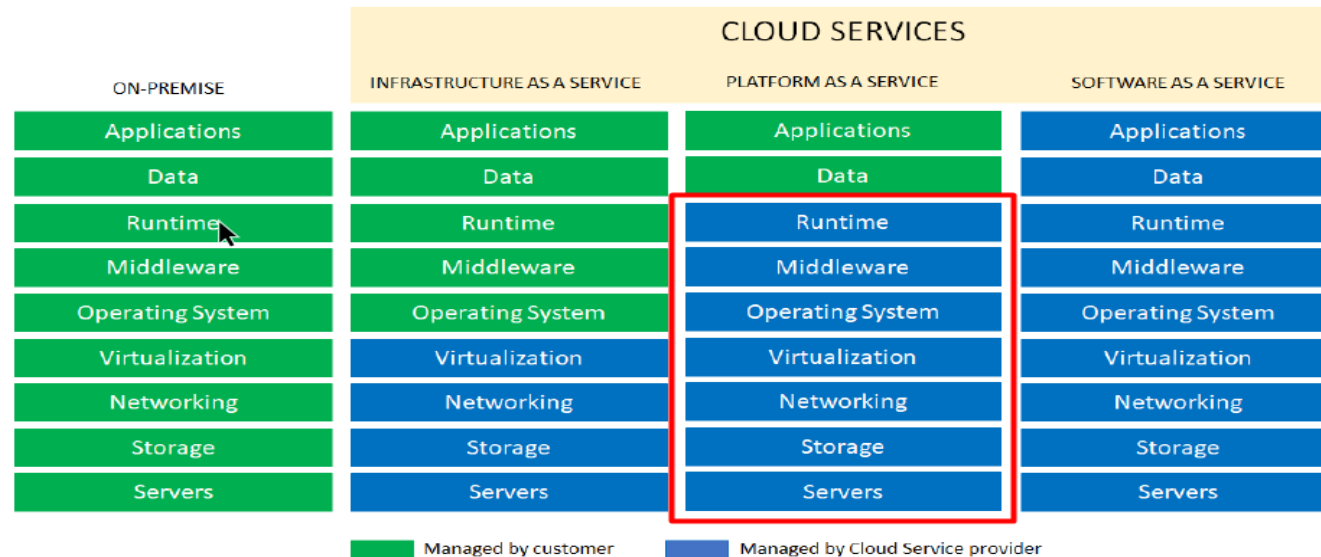


Figure 1 – Cloud Services

- › **TEC Platform as a Service:** As any other PaaS, TEC PaaS includes **application enablement services**, and allows Customers to focus on the data and application logic and abstract from the physical infrastructure, virtualisation layer, operating system, middleware, and runtime environment.

How to implement GSMA OP?

- China Unicom has proposed a new topic in GSMA OPG during last phase 2 period, as shown in below table:
 - Building OP as a PaaS supporting multi-cloud and hybrid cloud with Cloud Native technologies, that is **Cloud Native PaaS**
 - PaaS related topics also include #11“Serverless models” and #12“ Management Plane”

Rank	Topic	Concept impacts the following areas (x)	Comments
1	API gap analysis with SDO & Associations, specifying API gaps	X	The details of the external exposure of the capabilities, such as support for RNIS(Radio Network Information Service) and OP interactions with 5GS
2	Use case and capabilities		
3	Service access by devices that are attached to networks other than their home network (e.g. roaming, Wi-Fi, service discovery etc.)		
4	Access to OP services in a network different from the one to which the device is attached (e.g. those provided on another operator's network)		
5	Device mobility		
6	Changes resulting from the commercial principles whitepaper		
7	Security considerations		
8	Call flows		
9	NEW TOPIC: Edge features landscaping (proposed by Intel)		
10	Low latency interaction between OP applications in different networks		
11	Serverless models	X	Serverless vs. PaaS, which is more suitable to OP? Need to deep dive on this concern.
12	Management plane	X	PaaS also includes some extended functionalities, like the identification of the optimal edge node to deliver an application to a certain end user. Does it mean that management plane include some PaaS functionalities?
13	Local interfaces on an end-user device		
14	NEW TOPIC: Building OP as a PaaS supporting multi-cloud and hybrid cloud with Cloud Native Technologies (proposed by China Unicom)		
15	Resource reservation		

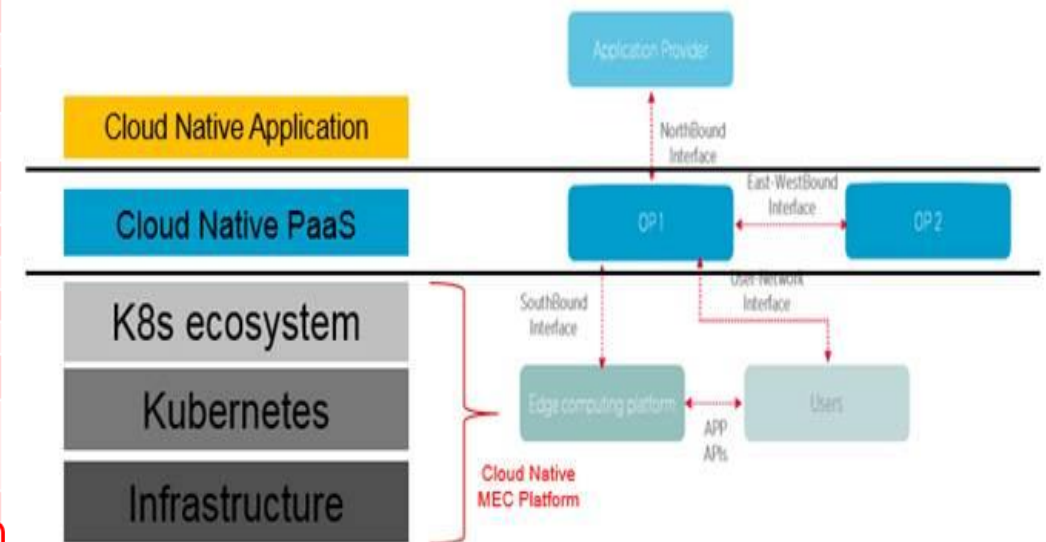


Figure: mapping of Cloud Native PaaS and GSMA OP

The requirements for PaaS (from China Unicom's perspective)

I. Supporting Multi-Cloud & Hybrid Cloud

- ✓ customers of TEC who may already use public cloud, multi-cloud, hybrid cloud, or on-premise solutions .
- ✓ A multi-cloud strategy allows benefiting from the best services that **the popular cloud service providers** like AWS, Azure, and Google Platform provide.
- ✓ as shown in right picture. we can draw a conclusion that multi-cloud, edge cloud and hybrid cloud is the trend.

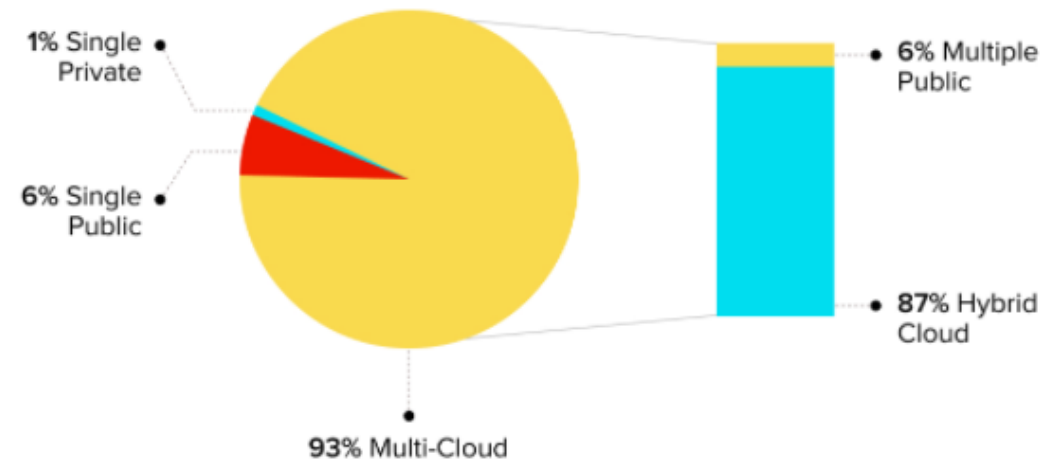
II. Supporting NaaS

III. Using Cloud Native technology

IV. Perhaps there are other

Enterprise Cloud Strategy

% of enterprise respondents



N=554

Source : Flexera 2020 State of the Cloud Report

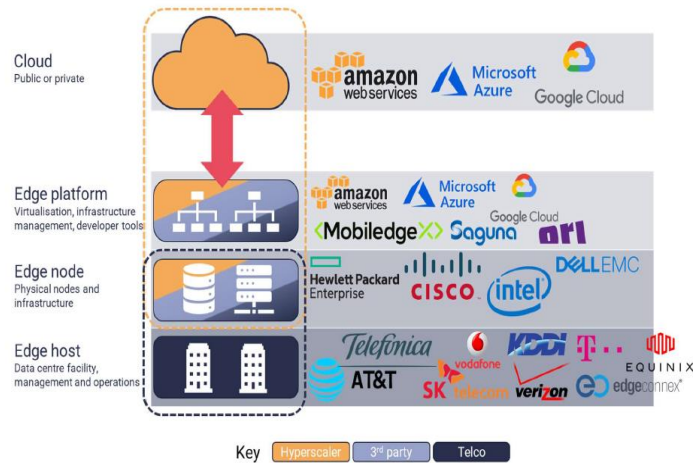
According to the [Flexera 2020 State of the Cloud Report](#), as much as 93% of respondents (n=554) vouch for a **multi-cloud strategy that includes hybrid cloud too**. Whereas, only a few rely on single public or single private in the current times.

Requirement for PaaS: supporting NaaS

What is the difference between the edge cloud of Hyperscalers and the one of Operators?

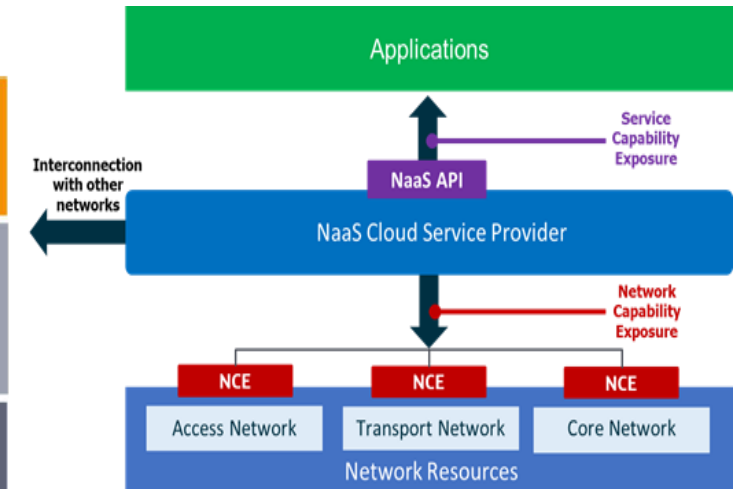
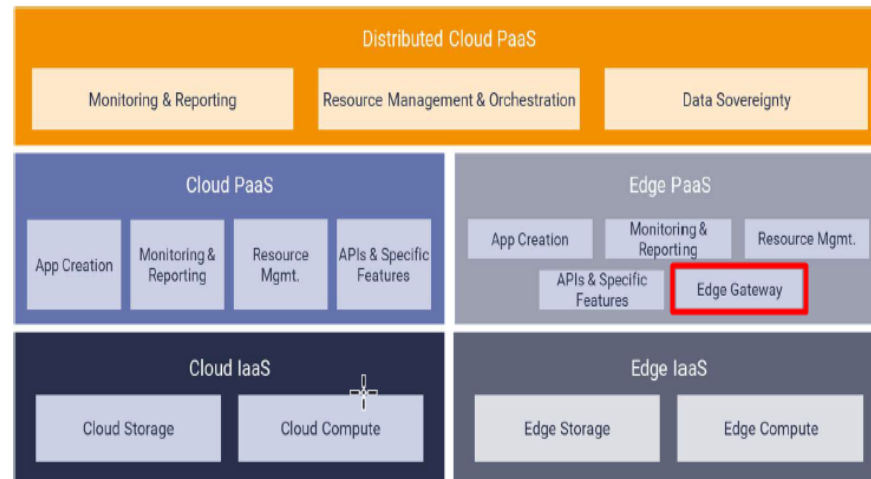
- ✓ **Hyperscaler cloud providers**, such as AWS and Microsoft Azure, which have extended their IaaS and PaaS offering to the edge, providing infrastructure resources in an as a service structure
- ✓ **NaaS is an operator specific service functionality**
 - K8s Clusters are not meant for Network functions, need for comprehensive converged Edge platforms --- cited from Srinu Addempali @Intel EMCO(Edge Multi-Cluster Orchestrator) Overview & Roadmap, 28th Oct 2020 PCEI weekly meeting
 - Running on top of the IaaS is the MEC application platform, or Edge PaaS, which enables services such as traffic routing and API gateway function.

Figure 2: Edge computing stack and stakeholder examples



Source: STL Partners

Figure 3: Edge computing platform architecture



NaaS, an operator specific service
TEC will mainly focus on IaaS and PaaS, offering NaaS as it becomes developed and standardised --- source from TEC whitepaper P8

Requirements for PaaS: Using Cloud Native technology

❖ Using Cloud Native Technology to implement PaaS has already been the de facto standard for Hyperscalers

- With a cloud native PaaS platform, many benefits can be achieved, for example, All kinds of cloud are widely supported and no platform locking, Network capability and general capability in PaaS can be divided reasonably, etc.
- The TEC PaaS is based on **Containerized infrastructure**, as for example **Kubernetes**. Containers are becoming the most common virtualization mechanism and a must for cloud-native applications --- cited from TEC whitepaper 2020

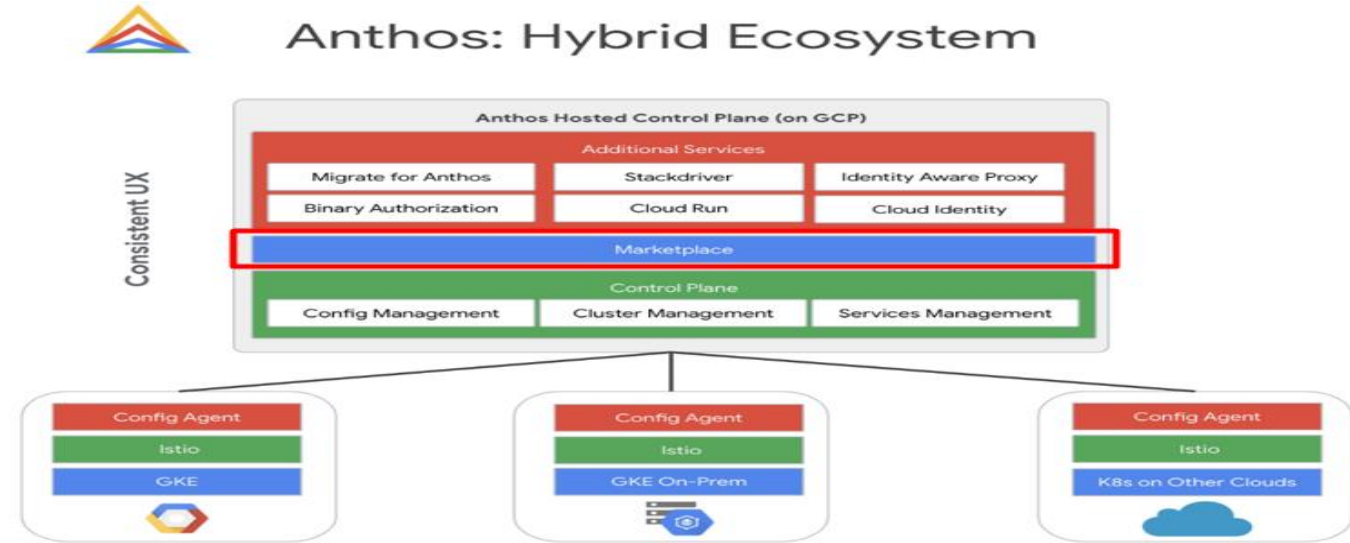


Figure: Anthos - a smarter Kubernetes Platform

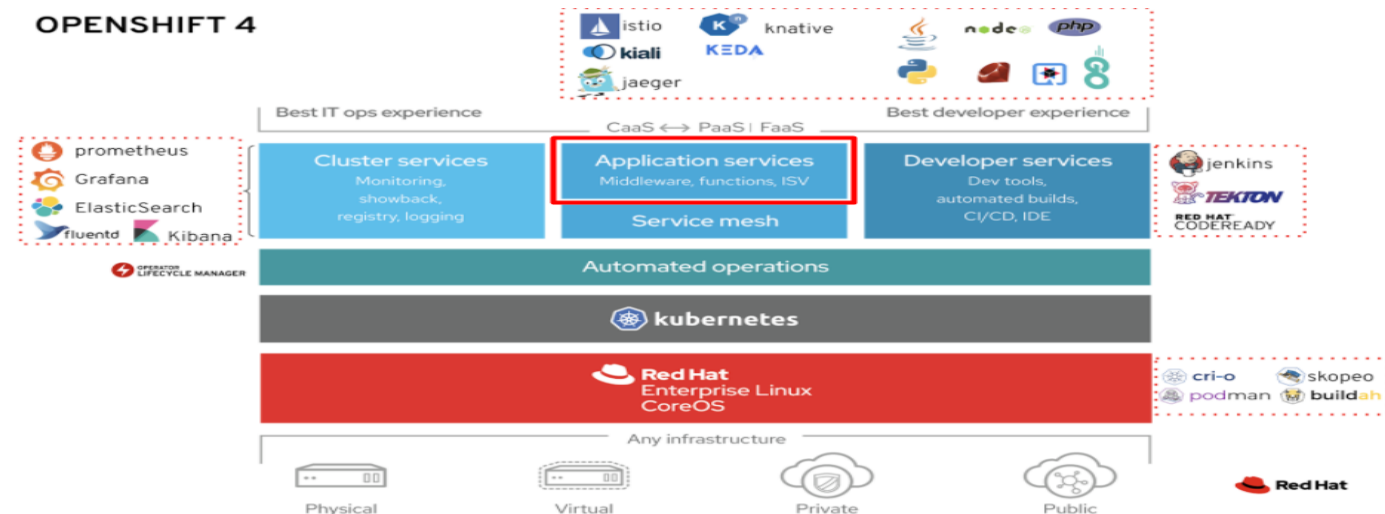


Figure: OpenShift - a smarter Kubernetes Platform

Source from : https://www.openshift.com/blog/enterprise-kubernetes-with-openshift-part-one?extIdCarryOver=true&sc_cid=701f2000010H7iAAG

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- **GSMA Operator Platform**
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How to select a Open Source Solution for GSMA OP?

- How to select seed code for OP? There are some basic requirements as following:
 - › Is it Open Source project?
 - › Is it fully Compatible with the Kubernetes ecosystem?
 - › Is it based on requirements defined in OPG
 - › Is it providing a basis for an interoperable platform
 - ›
- Is there a Platforms or Open Source Project or their combination we can select it as the seed code for GSMA OP?
 - › Anthos, OpenShift, EMCO, KubeEdge, etc
 - › XGVela, PCEI, Anuket
 - › Another option from GSMA OPG: **CNCF Global Telco APIs project ?**
 - Hosted by CNCF
 - Focuses on driving developer use of telco capabilities
 - Follows OPG requirements and Roadmap

XGVela

➤ XGVela Overview

- An open source cloud native PaaS for applications and telco network functions (NaaS), which is to enable new services and help mobile operators to seize the business opportunity from vertical industries in the 5G era.
- Using OpenShift Container Platform as the general PaaS
- Project links
Github Wiki: <https://github.com/XGVela/XGVela/wiki>
Domain: <https://xgvela.org/>

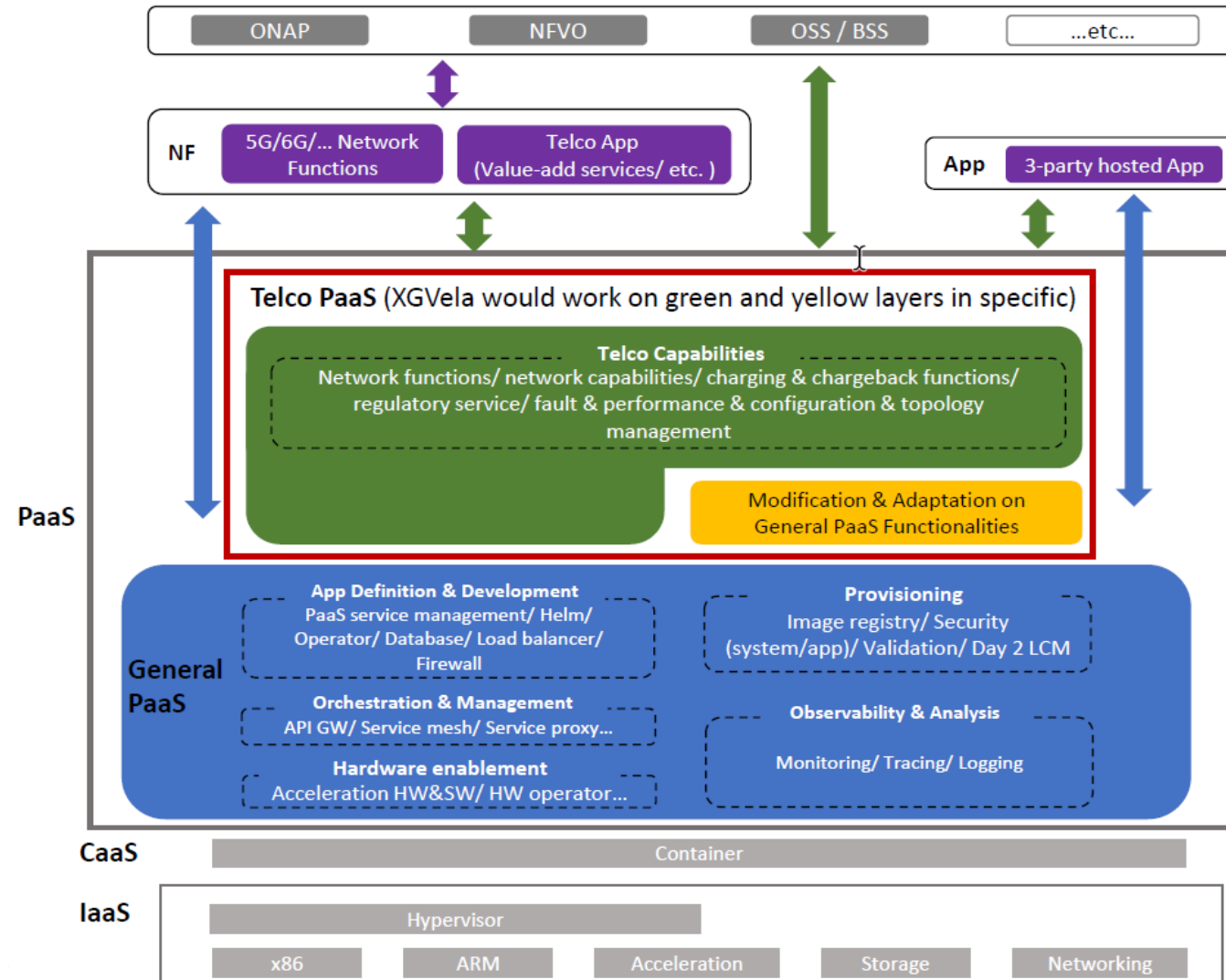
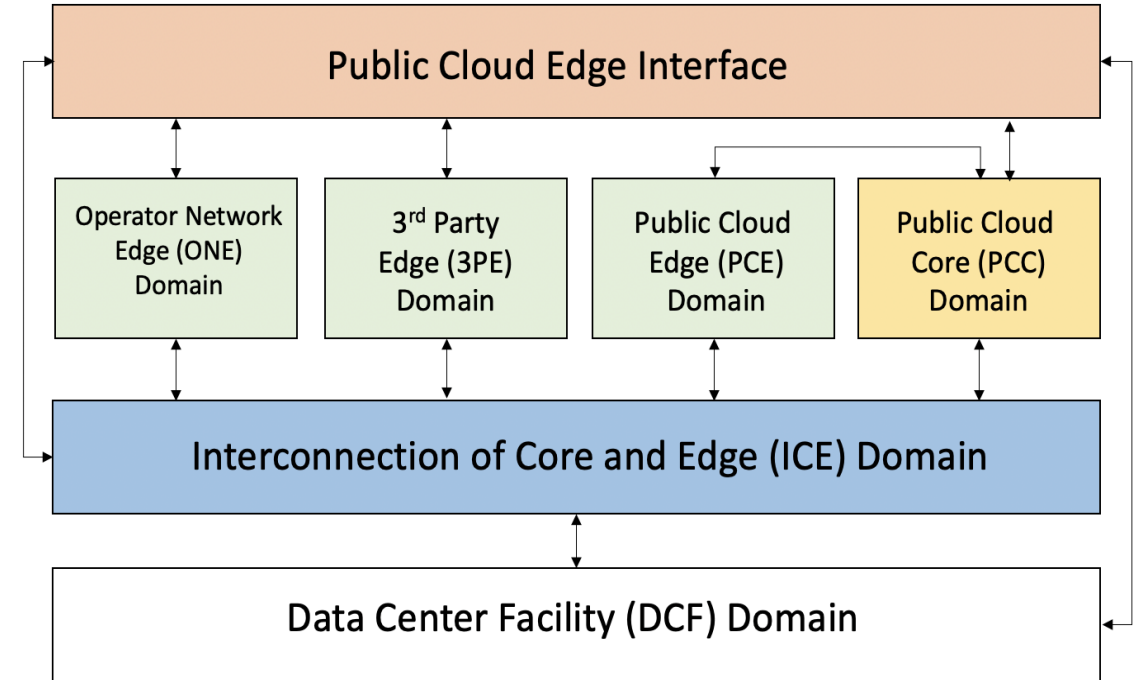


Figure: the high level architecture of XGVela

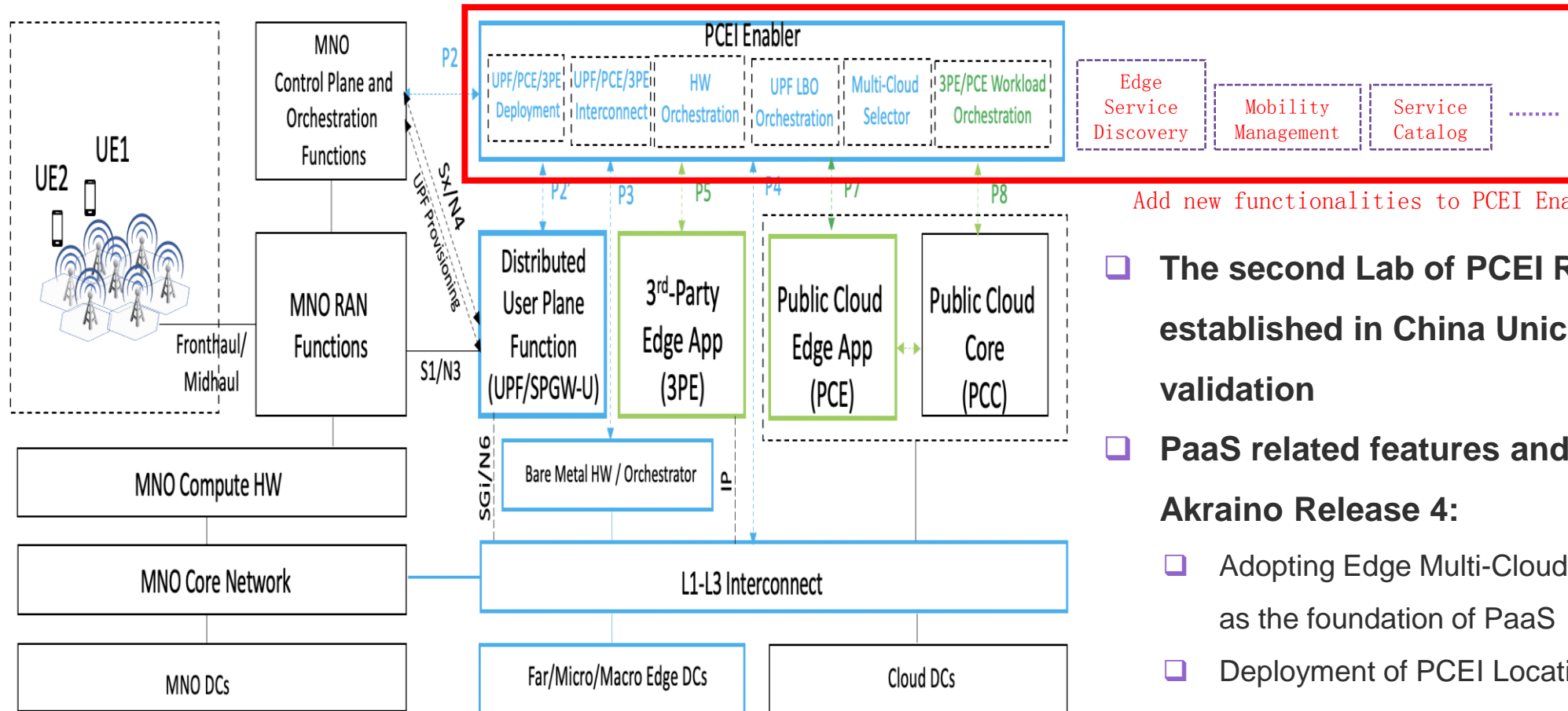
PCEI(Public Cloud Edge Interface)

- The purpose of Public Cloud Edge Interface (PCEI) Blueprint is to develop a **set of open APIs, orchestration functionalities** and **edge capabilities** for enabling Multi-Domain Interworking across the Operator Network Edge, the Public Cloud Core and Edge, the 3rd-Party Edge as well as the underlying infrastructure such as Data Centers, Compute Hardware and Networks.



PCEI Release 4

PaaS/NBI of GSMA OP

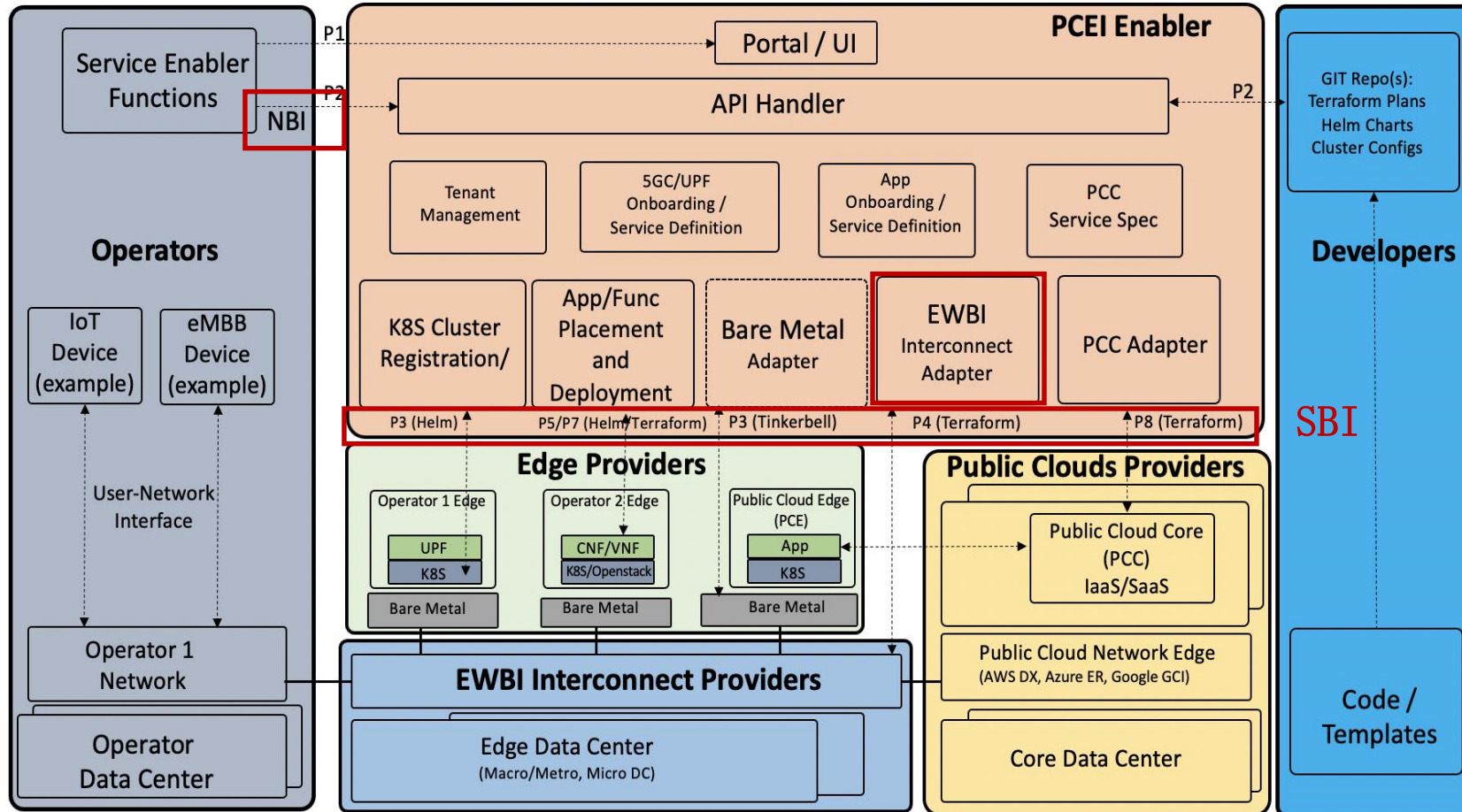


Add new functionalities to PCEI Enabler

- ❑ The second Lab of PCEI R4 has been established in China Unicom's lab for validation
- ❑ PaaS related features and implementations in Akraino Release 4:
 - ❑ Adopting Edge Multi-Cloud Orchestrator (EMCO) as the foundation of PaaS
 - ❑ Deployment of PCEI Location API App
 - ❑ PCEI Location API App Implementation based on ETSI MEC Location API Spec



PCEI Release 5 Overview



[PCEI Release 5 Demo Video Link](#)



- Start a new branch PCEI family, That is “Federated Multi-Access Edge Cloud Platform”

<https://wiki.akraino.org/display/AK/Federated+Multi-Access+Edge+Cloud+Platform>

- NBI APIs**
 - GIT Integration
 - Dynamic Edge Cluster Registration
 - Dynamic App Helm Chart Onboarding
 - Automatic creation of Service Instance in EMCO and deployment of Apps
 - Automatic Terraform Plan Execution
- Integrated Terraform Plan Executor**
 - Azure (PCC)
 - AWS (PCC)
 - Equinix Fabric (Interconnect)
 - Equinix Metal (Bare Metal Cloud)
 - Openstack (3PE)
- Equinix Fabric Interconnect
- Multi-Public Cloud Core (PCC) Orchestration
- Kubernetes Edge
- Openstack Edge
- Cloud Native 5G UPF Deployment

Thank you!

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Appendix: whitepapers published by GSMA OPG&TEC

- ✓ **Operator Platform Telco Edge Requirements Version 1.0 (Jun 2021)**
<https://www.gsma.com/futurenetworks/wp-content/uploads/2021/06/OPG-Telco-Edge-Requirements-2021.pdf>
- ✓ **Operator Platform Telco Edge Proposal (Oct 2020)**
<https://www.gsma.com/futurenetworks/wp-content/uploads/2020/10/GSMA-Operator-Platform-Proposal-Oct-2020.pdf>
- ✓ **Telco Edge Cloud: Edge Service Description & Commercial Principles white paper (Oct 2020)**
<https://www.gsma.com/futurenetworks/resources/telco-edge-cloud-october-2020-download/https://www.gsma.com/futurenetworks/wp-content/uploads/2020/10/GSMA-Telco-Edge-Service-Description-Commercial-Principles-Oct-2020.pdf>
- ✓ **Operator Platform Concept Whitepaper (Jan 2020)**
<https://www.gsma.com/futurenetworks/resources/operator-platform-concept-whitepaper/>

