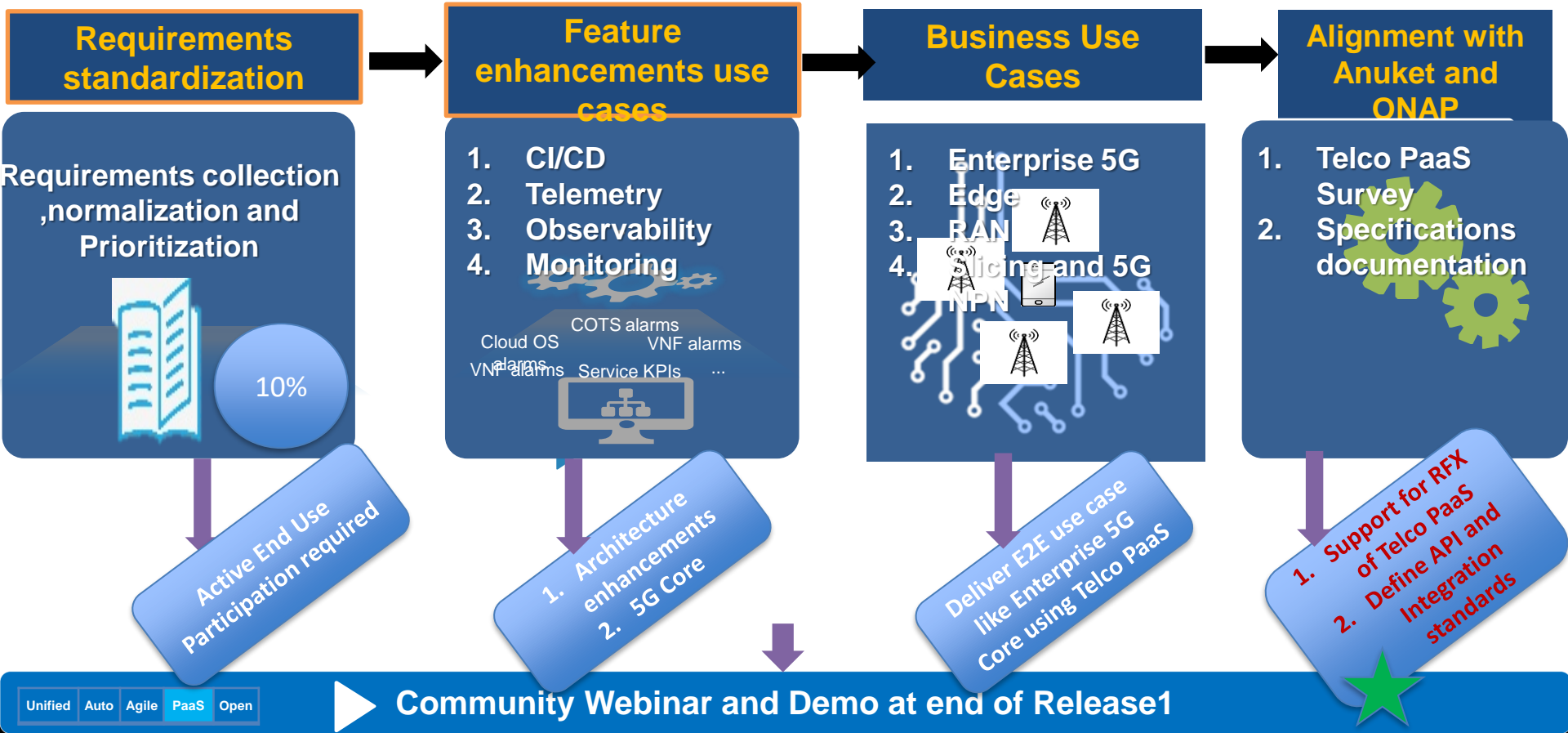


XGVELA Telco PaaS Requirements and Use cases

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What are our Targets for 2021 (Release-1)?



Requirements Standardization

Input operator and end user requirements on XGVELA Wiki

<https://wiki.lfnetworking.org/display/XGVela/XGVELA+Architecture+and+Operator+Requirements>

Contents

1	Overview.....	1
2	Pain points and Traditional CaaS limitations.....	1
3	XGVELA Architecture	3
3.1	Proposed XGVELA Architecture.....	3
4	Analysis of XGVELA requirements Survey.....	4
4.1	Top Challenges in building the Architecture and Release Planning	4
4.2	Requirements and features required.....	4
5	Use cases of Telco PaaS.....	5
5.1	5G Private Network.....	6
5.2	Edge Services deployment	6
6	Conclusion	6
7	Annex.....	6

Active End Use Participation is strongly requested to update architecture and use cases as per real projects



Adobe Acrobat
Document

1. NF as Code (App-aaC)

- 1.1** Different vendor Diff understanding
- 1.2** No unified way to define VNF package with testing ,validation and automation requirements
- 1.3** Even simple para change will change result

3. KPI/SLA Definition

- 3.1** Being TOSCA as standard template for both VNF/CNF need to agree on KPI/SLA baseline for Infra to be validated after every change
- 3.2** TST010/TST012 need to define some KPI that can be enforced e.g Data Plane forwarding , OVS throughput ,VPP etc

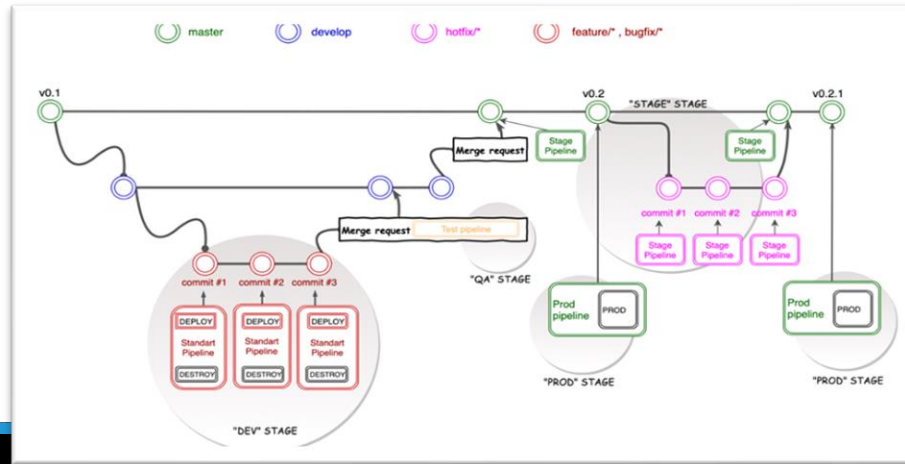
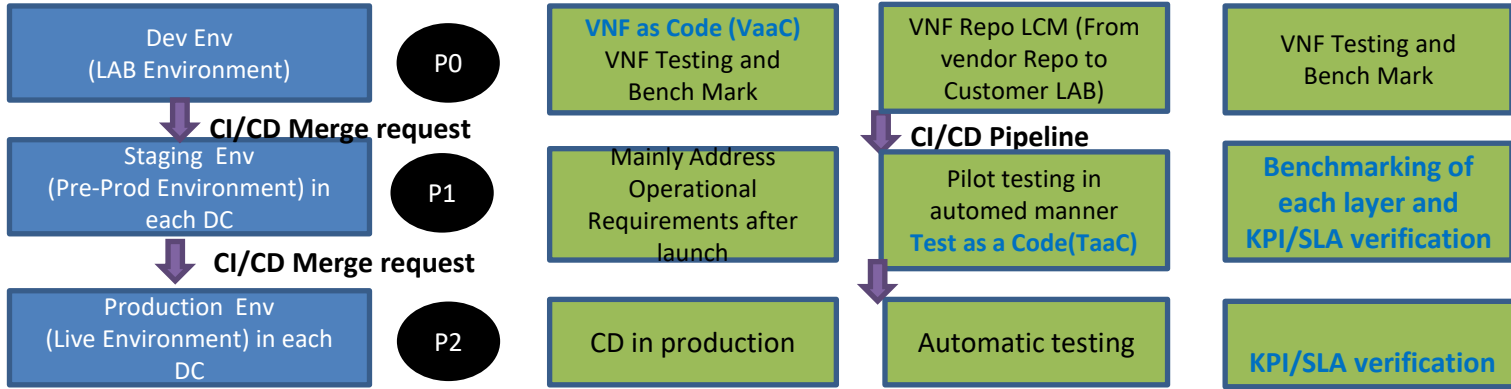
2. Test Case Automation

- 2.1** Only Address NFR requirements
- 2.2** For FR testing strong dependence on vendors , no uniform language to code/adapt it
- 2.3** Relation between NFR and FR to independently benchmark KPI/SLA by diff teams is important
- 2.3** Conduct **80%** Test automatically







4. Operational Requirements

- 4.1** After Telco Cloud live very difficult to upgrade/validate changes in Infra
- 4.2** No Standard definition of tools to define TaaC ? Can ETSI support to give normative standard

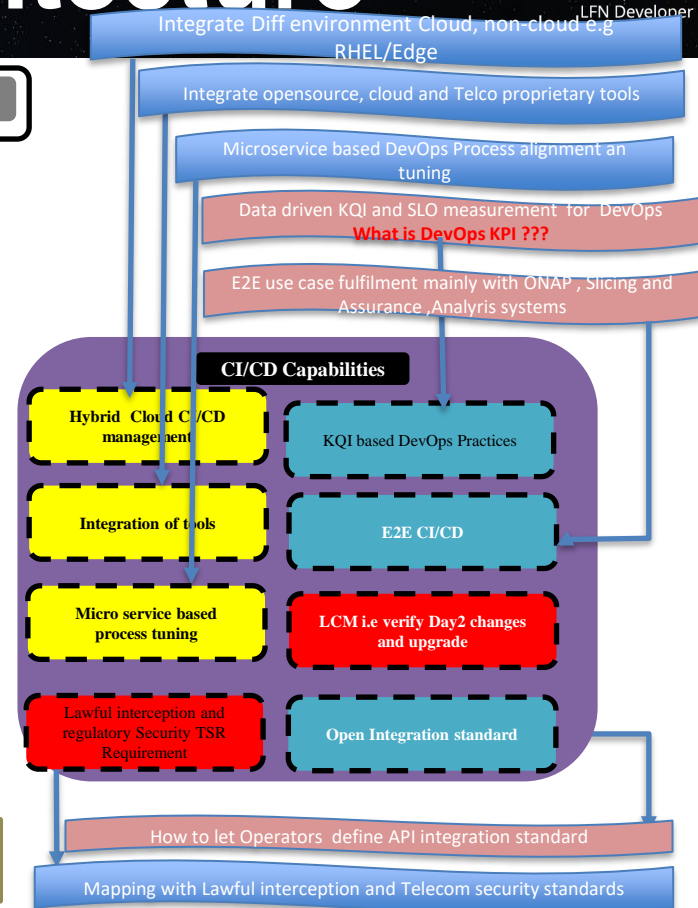
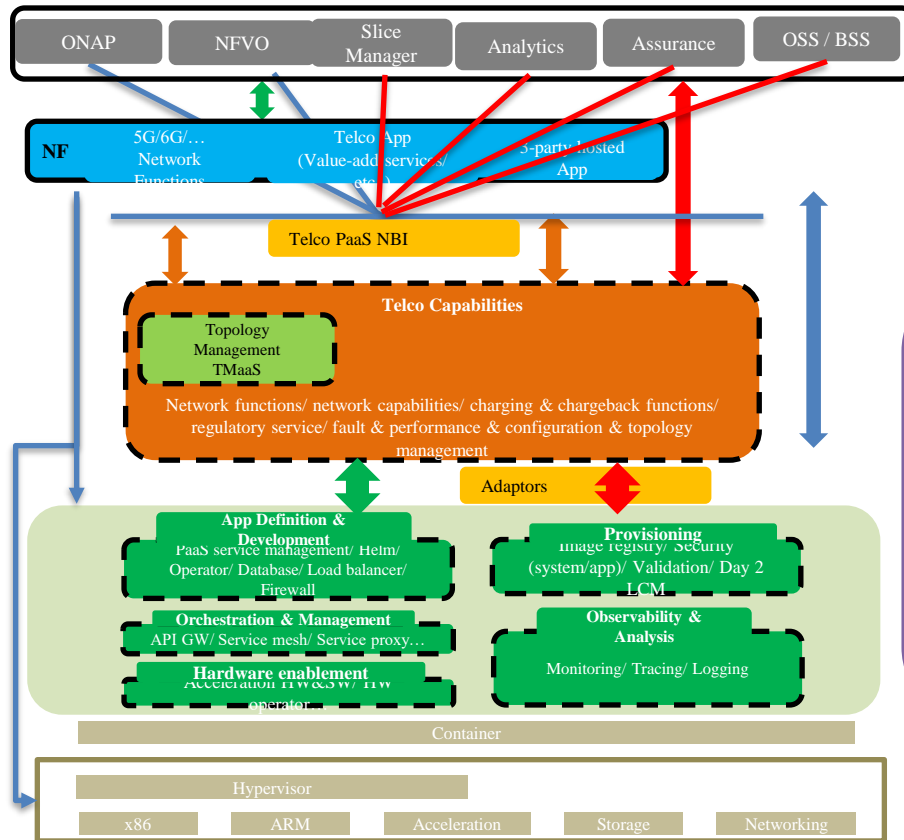
Architecture Requirements to build a 3 Stage CI/CD Pipe Line Proposal



5G SA Deployments for Core and Edge require some new features considerations in Telco PaaS CI/CD fulfillment

	Domain	Major Challenges	Proposed Solution
	Hybrid Networks	Summit/Demos do not depict integration requirements of real world Projects	Frameworks that are not static but dynamic to handle hybrid network needs
	Tools Preference	Locking of tools/preferences is not a good idea in Telco with so many Telco vendor tools also need to be integrated	Integrate all Tools in your CI/CD involving Open source , Cloud and provided by Proprietary Telco Vendors
	Business Process Frameworks	Each Micro service in NF is not equal and so process for its CI can not be same	Build process per service and sub NF level
	SBI Integration	All tools should integrate with NF's with out any customizations not possible today	Open Integration Standards frameworks
	KQI compliance	Missing Definition of KQI in CNF's management specially w.r.t Infrastructure means Sliows and manual processes	Data Driven KQI compliance
	End to End CI/CD	Frameworks do not integrate with HIM and NFVO to deliver end to end use case	All LCM from design to Ops must be considered together with other frameworks

CI/CD Proposal Architecture



Call for Action 2021



Requirements



Proposed Solutions



Targets 2021

Observability Use case

LCM i.e verify Day2 changes and upgrade

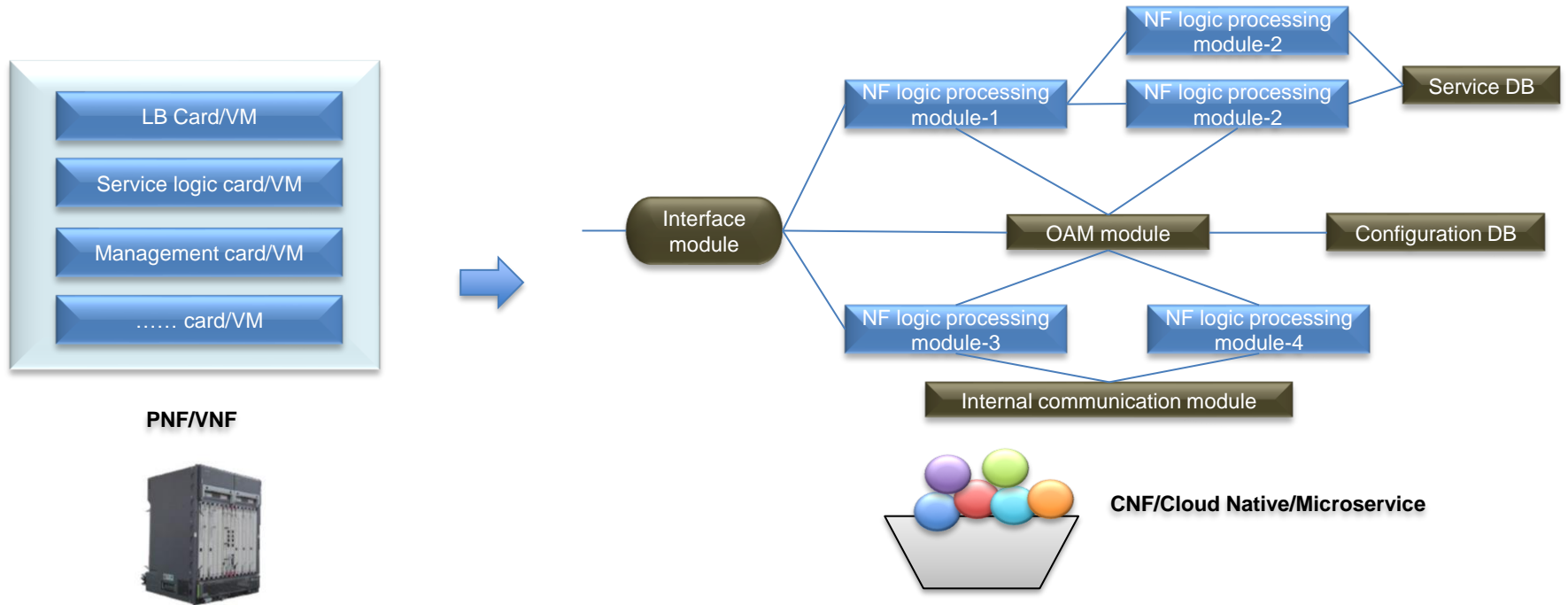
KQI based DevOps Practices

Integration of tools

Hybrid Cloud CI/CD

Use Case—5G Core-Microservice

- NFs in PNF/VNF format was designed as distributed application. In CNF/cloud native format, during which NFs are usually microservices, NFs are still distributed application but finer-grained split.

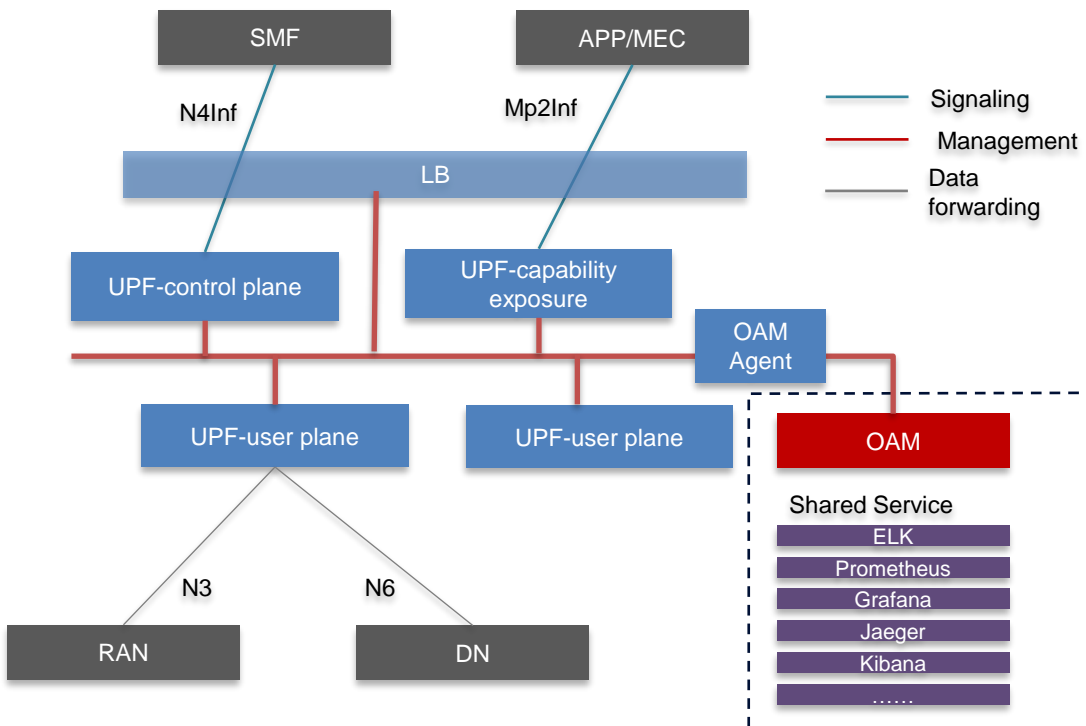


Use Case—5G Core-Microservice

- **Common service splitting method:**
 - **Interface Module:** module in charge of South-North communication between different NFs, which is usually implemented as **load balancing gateway**. This module is often used in control plane.
 - **NF logic processing modules:** modules contains service logics. Methods to further splitting NF logic processing modules can follow 3GPP NF definition (e.g. AMF contains functions of access management, security management, session management etc.), or vendors can self-decide split method.
 - **DB:** service DB which store service processing context. Cloud native NF requires network logic processing module is stateless and supports scaling in/out horizontally, which results in that the **service processing context and NF states are stored in independent DB**.
 - **OAM module:** module in charge of NF management, configuration, monitoring and maintain. OAM can also be microservice, for example monitoring/alert/tracing functions can be independently implemented by Prometheus, Jaeger.....
 - **Internal communication module:** there are two types of communication within a NF, direct (point to point) and indirect (rabbitmq, service mesh)
- **The above common reusable modules can be provided by PaaS, which currently are LB, observability, DB, service mesh, so that developers can focus on pure service logic development.**

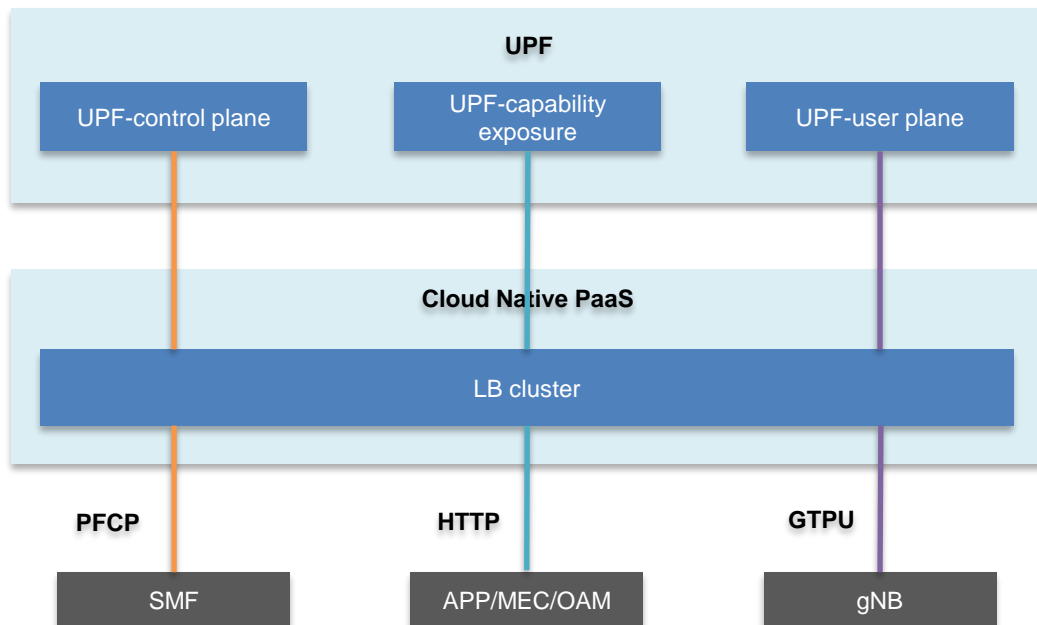
Use Case—5G Core—Example

- There is no standards or rules for microservice splitting.



Service Provider	Function	Service Client	Protocol
UPF-control plane	<ul style="list-style-type: none"> Connect with SMF PCFP session management 	SMF	PCFP
UPF-capability exposure	<ul style="list-style-type: none"> Provide UPF capability to APP/MEC 	APP/MEC	HTTP
UPF-user plane	<ul style="list-style-type: none"> User data forwarding 	RAN, DN	GTPU
LB	<ul style="list-style-type: none"> Control plane load balancing 	SMF, APP/MEC, UPF	PCFP, HTTP,
OAM Agent	<ul style="list-style-type: none"> Maintaining, Monitoring, Notification data collection OAM management anchor point 	All service & pod	HTTP

Use Case—5G Core—LB



- The biggest difference between CT system and IT system is network design. CT system needs to connect with different network plane, for each plane the protocol used, interface requirement and security requirement are different.
- Using PaaS to provide LB can free service developers developing protocol processing unit and let them focus on pure service logic design.
- Requirement on LB:
 - Support PFCP protocol (connection between UPF and SMF, which uses N4 interface)
 - Support HTTP protocol (connection between UPF and MEC/APP, UPF and OAM,)
 - Support GTPU protocol (connection between UPF & gNB, which uses N3 interface)

Use Case—5G Core—Observability

- 5G Core is designed as microservices and exists as pod in k8s environment, which may be running on bare metal and virtual machines. Complicated environment, great number of management objects, dynamic instance information bring huge challenge for O&M. This makes observability an important functionality that PaaS should provide.
- Observability is usually independent from service logic, which is a good start point for XGVela release 1.

- Support tracing the traffic of NF microservice and PaaS services, which includes number of request, duration, fault, etc.

Tracing

- Typically used PaaS service: Istio + Envoy + Jaeger

- Support collect and analysis log of NF microservices, PaaS services, and cloud native PaaS platform, which includes operation log, error log, etc.

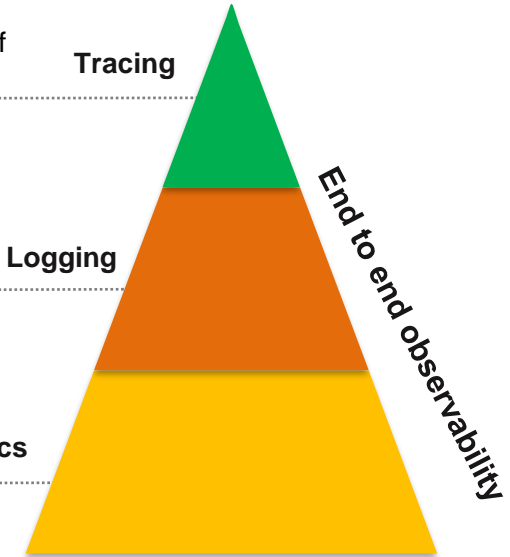
Logging

- Typically used PaaS service: Elasticsearch + Kafka

- Support collect and analysis metrics of NF microservices, PaaS services, and cloud native PaaS platform, which includes resource metrics, NF network metrics, NF metrics, PaaS service metrics, etc.

Metrics

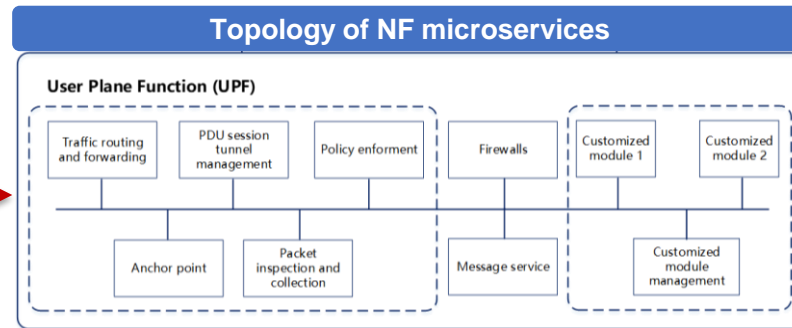
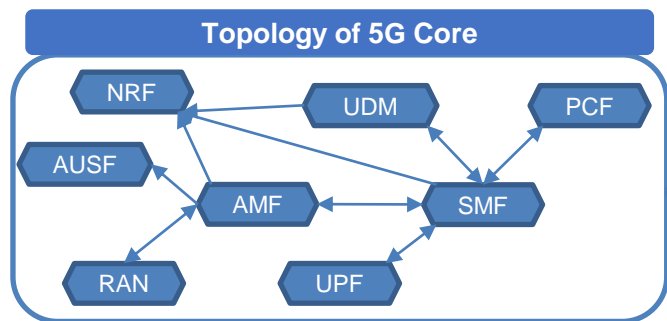
- Typically used PaaS service: Prometheus



Use Case—5G Core—Observability

【Observability – Topology (Telco PaaS)】

K8S can provide resource topology, which include relationship between container, pod, service and worker node. However, for OSS/BSS, NFVO, and other management system, a **mapped topology containing 3GPP NF info, NF microservice info, resource info is required.**



Mapping

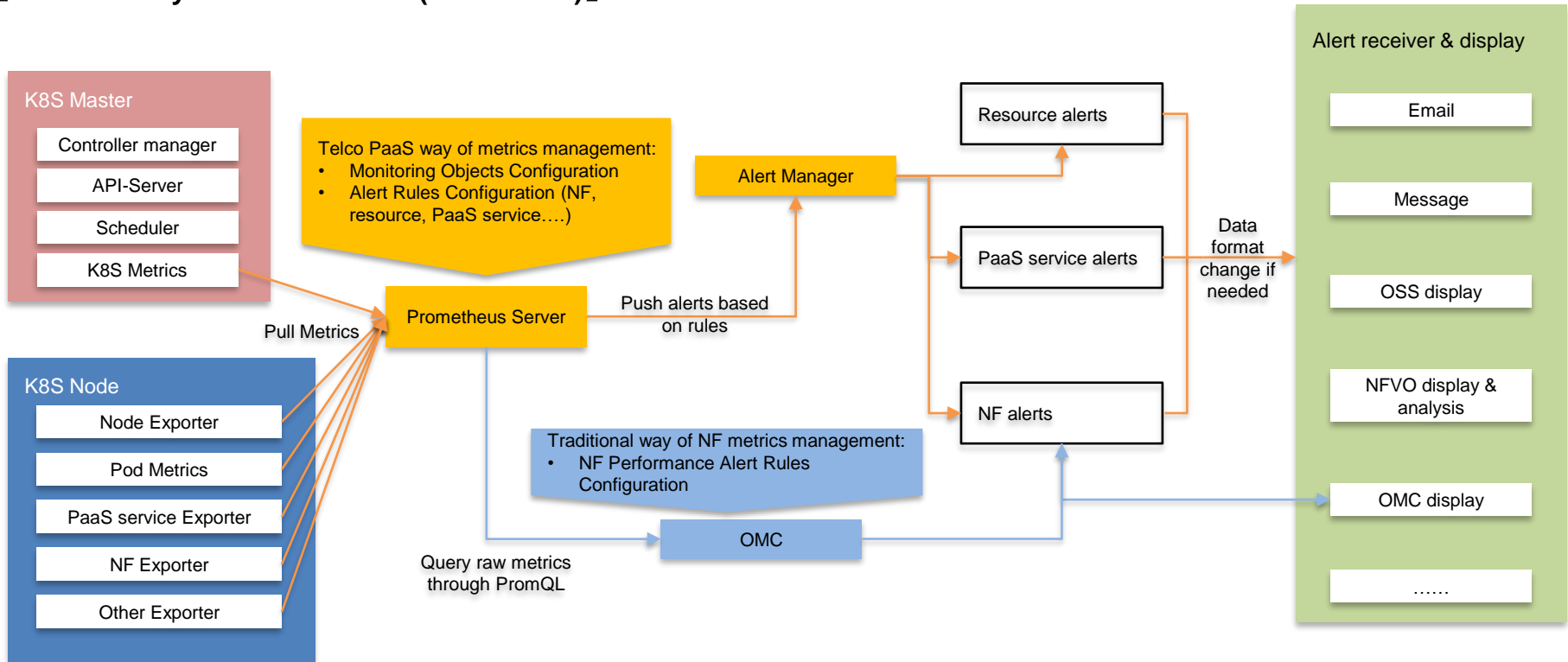
Topology of K8S Resources (get through k8s API)



1. Pod name
2. Service
3. Pod/Service IP (may not be necessary)
4. Container
5. Namespace
6. Network
7. Node
8. Replicate Set info
-

Use Case—5G Core—Observability

【Observability – Metrics & Alert (Telco PaaS)】



Use Case—5G Core—Continue

- **Telco requirements and using methods of other General PaaS/Telco PaaS capabilities (such as DB, tracing, service mesh, CI/CD etc.) will be explored.**



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