ITU-T SG13 standardization progress on cloud native and AI infrastructure

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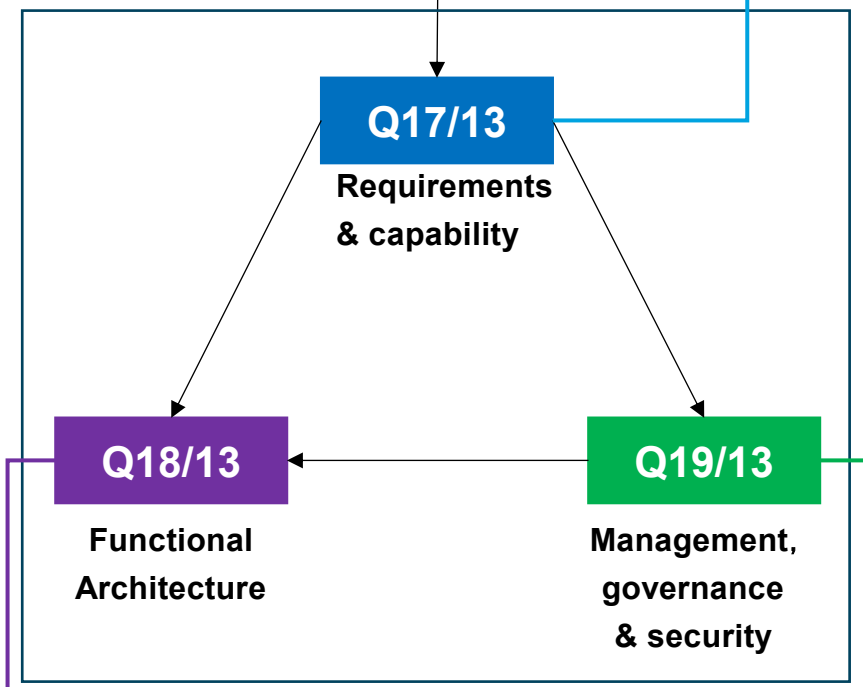
ITU-T SG13 structure

WP	Title	Questions
1	**IMT systems (WP1)**	Q20: International mobile telecommunications (IMT) networks and artificial intelligence/machine learning: Requirements and architecture
		Q21: Network softwarization
		Q23: Fixed, mobile and satellite convergence
2	**Cloud computing & data handling (WP2)**	**Q17: Requirements and capabilities for computing including cloud computing and data handling**
		Q18: Functional architecture for computing including cloud computing and data handling
		Q19: End-to-end management, governance, and security for computing including cloud computing and data handling
3	**Future networks (WP3)**	Q2: Next-generation network (NGN) evolution by adoption of emerging network technologies
		Q7: Network awareness and network intelligence including big data driven networking and human-like networking
		Q22: Enhanced information-centric networking (ICN) and emerging network technologies
4	**Scenarios, deployment and technologies (WP4)**	Q1: Innovative convergence service including service model, scenarios, technical aspects in future network
		Q5: Applying future networks and innovation in developing countries
		Q6: International mobile telecommunications (IMT) networks and quantum communications: Quality of service (QoS) mechanisms
		Q16: Future networks: Trustworthy and quantum enhanced networking and services

Regional Groups	
SG13RG-EECAT	ITU-T SG13 Regional Group for EECAT (SG13 RG-EECAT)
SG13RG-AFR	ITU-T SG13 Regional Group for Africa (SG13RG-AFR)
Focus Group	
FG-AINN	**Focus Group on Artificial Intelligence Native for Telecommunication Networks (FG-AINN)**
Joint Coordination Activities under SG13	
JCA-IMT2020	Joint Coordination Activity on IMT-2020 and Beyond
JCA-AI/ML	Joint Coordination Activity on Artificial Intelligence, including Machine Learning (JCA-AI/ML)

About ITU-T SG13 WP2

To derive Recommendation about a new object



Structure relationship of WP2/SG13

Cloud native & AI infra related recommendations

Y.3513-rev	Cloud computing – Functional requirements of Infrastructure as a Service
Y.3508	Cloud computing - Overview and high-level requirements of distributed cloud
Y.3531-rev	Cloud computing - Functional requirements for machine learning as a service
Y.3532	Cloud computing - Functional requirements of Platform as a Service for cloud native applications
Y.3535	Cloud computing - Functional requirements for a container
Y.AMLM-reqts	Cloud Computing – Functional requirements for adaptation of machine learning model
Y.cna-prince	Cloud Computing – Principles of cloud native application development
Y.MLPaaS	Cloud Computing – Functional requirements of PaaS for machine learning applications
Y.aias-reqts	Cloud Computing – Functional requirements for AI agent as a service
Y.ecsai	Cloud Computing – Functional requirements of edge computing service for AI workload
Y.cra	Cloud computing-Functional requirements of computing resource abstraction
Y.3528	Cloud computing - Framework and requirements of container management in inter-cloud
Y.3554	Cloud computing - Functional framework of Platform as a Service management for cloud native applications
Y.3556	Cloud computing - Framework and functional requirements of microservice monitoring
Y.msg-reqts	Cloud computing - Framework and functional requirements of micro-service governance
Y.smmc-reqts	Cloud computing - Functional requirements of service mesh management in multi-cloud
Y.MLaaS-frame	Cloud computing – Functional requirements and framework of machine learning as a service lifecycle management
Y.cdmp-frame	Cloud computing – Functional requirements and framework for continuous deployment of cloud native applications among multiple cloud service providers
Y.AIObs	Cloud computing–Functional requirements and framework for observability of AI workloads in cloud
Y.3513	Cloud computing - Functional requirements of Infrastructure as a Service
Y.3558	Cloud computing - Functional architecture of container management in inter-cloud
Y.3553	Cloud computing - Distributed cloud functional architecture
Y.3559	Cloud computing - Functional architecture for container and container management
Y.MLaaS-arch	Cloud computing - Functional architecture for machine learning as a service

Cloud Native

- PaaS
- Container
- Microservice
- Cloud native application

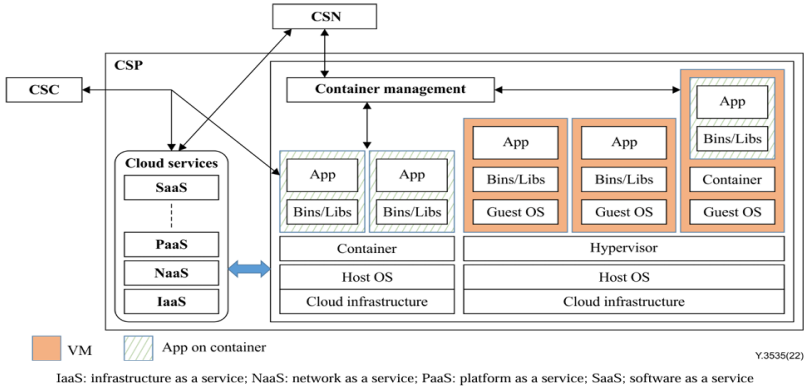
revlant ML/AI

- IaaS
- PaaS
- MLaaS

Cloud native key Recommendations – Container

Container Recommendations: requirements → architecture (complete)

- **ITU-T Y.3535(2021) "Cloud computing – Functional requirements for a container"**

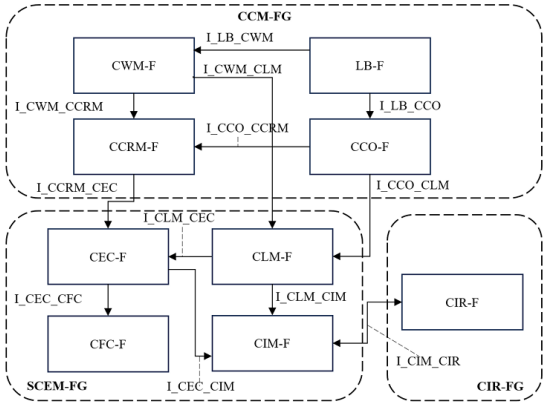


IaaS: infrastructure as a service; NaaS: network as a service; PaaS: platform as a service; SaaS; software as a service

Overview and functional requirements for a container in cloud computing

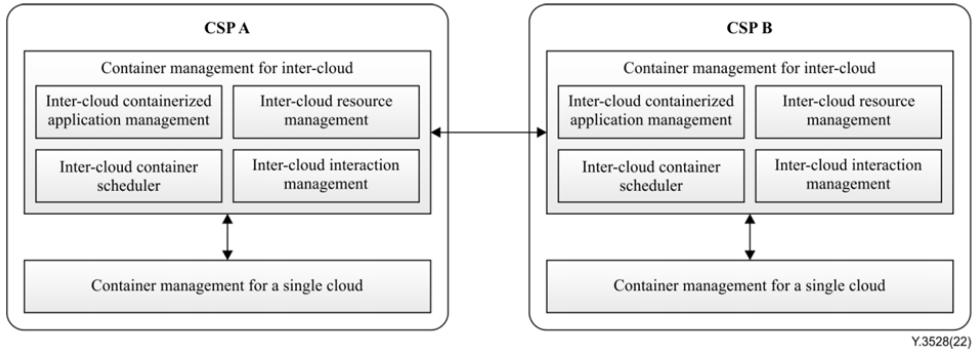
New

- **ITU-T Y.3559 (2026) "Cloud computing - Functional architecture for container and container management "**



Functional architecture and reference points among functions of container and container management

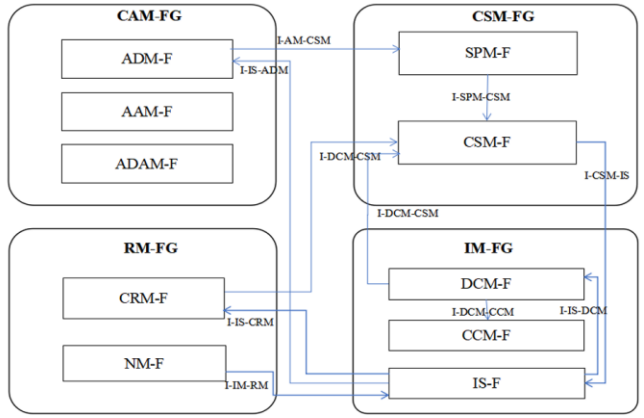
- **ITU-T Y.3528(2022) "Cloud computing – Framework and requirements of container management in inter cloud"**



Overview, framework, functional requirements and use cases of container management in the inter-cloud

New

- **ITU-T Y.3558(2026) "Cloud computing - Functional architecture of container management in inter-cloud"**

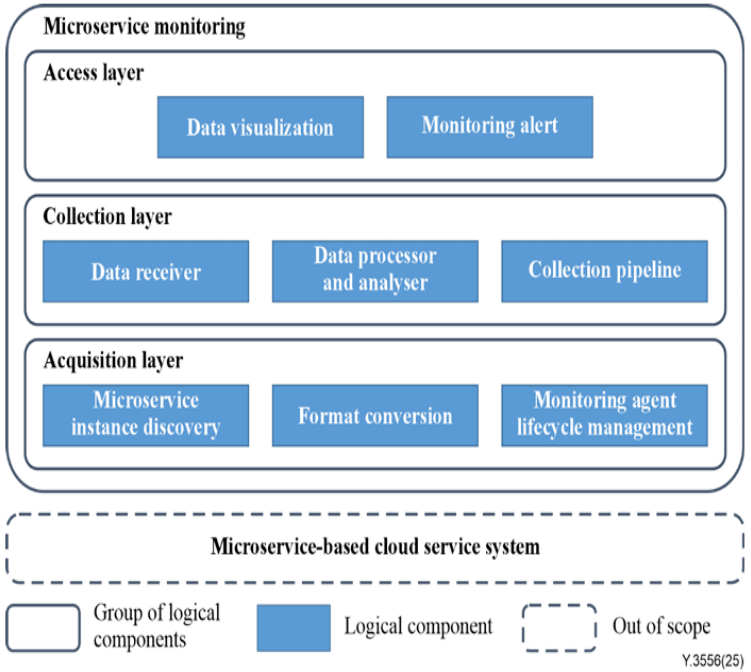


Functional architecture and reference points among functions of container management in inter-cloud based on ITU-T Y.3528

Cloud native key Recommendations – Microservice&FaaS

Microservice monitoring & governance framework + requirement of FaaS

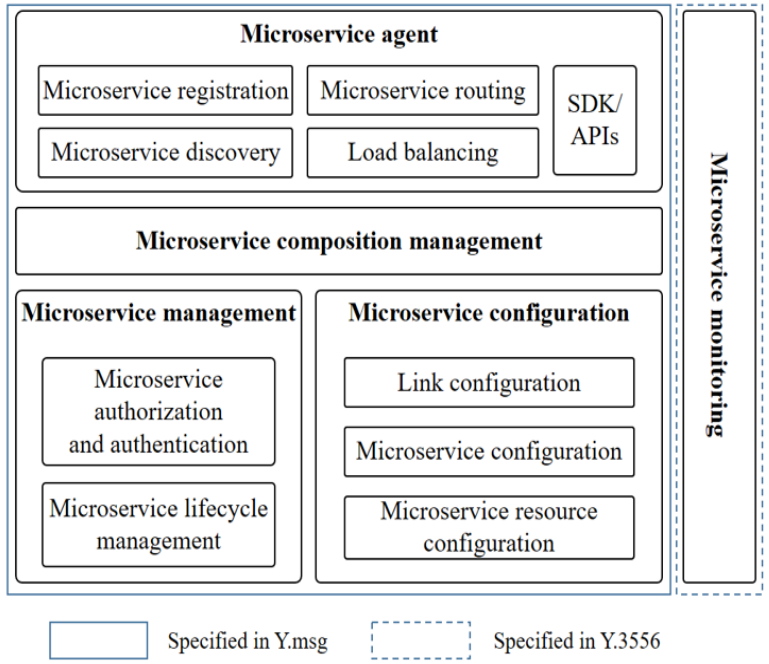
- **ITU-T Y.3556(2025) "Cloud computing – Framework and functional requirements of microservice monitoring "**



Overview of microservice monitoring and its

functional requirements, functional framework

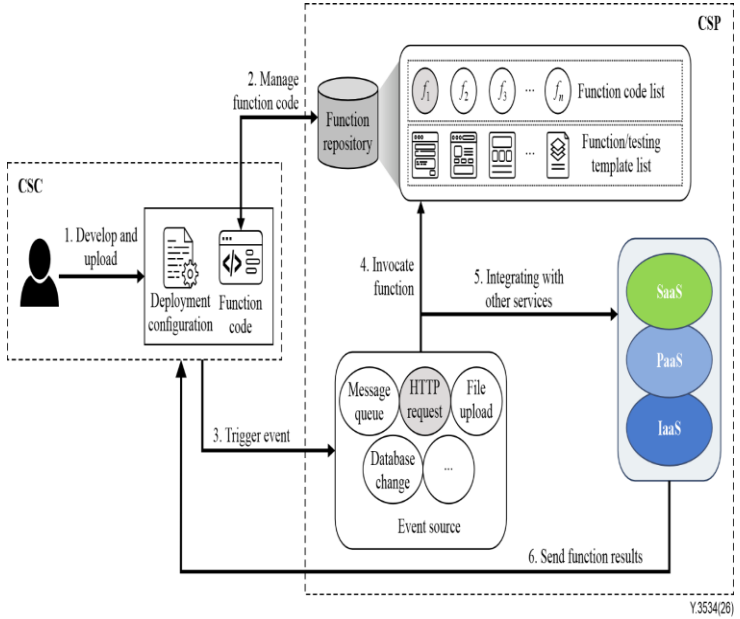
- **ITU-T Y.msg-reqts "Cloud computing - Framework and functional requirements of micro-service governance"**



Framework & functional requirements of microservice governance

- **ITU-T Y.3534(2026) "Cloud computing - Functional requirements of function as a service"**

New

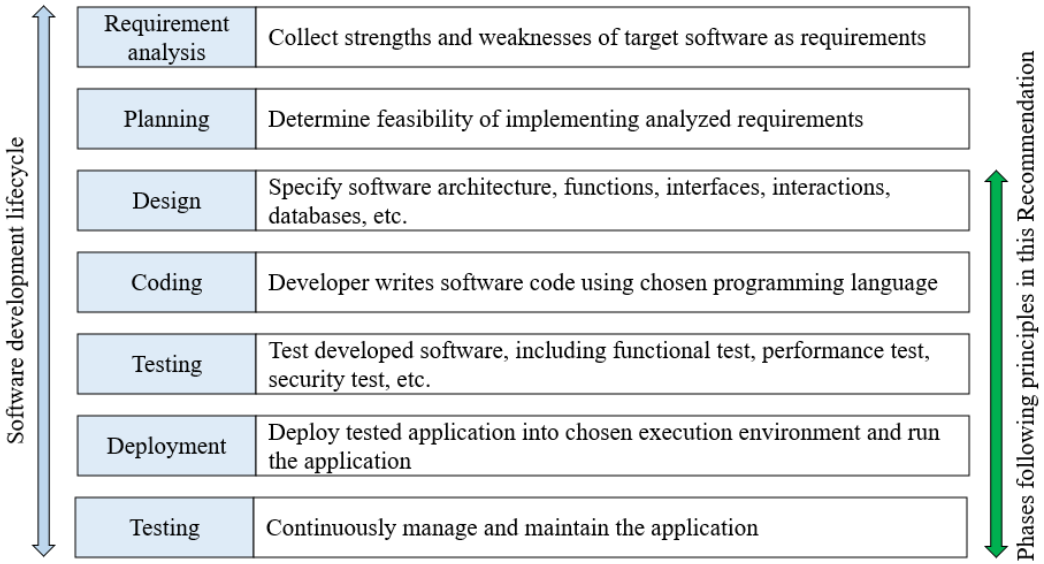


Overview,logical components of FaaS and lifecycle of function in FaaS

Cloud native key Recommendations – Cloud native application

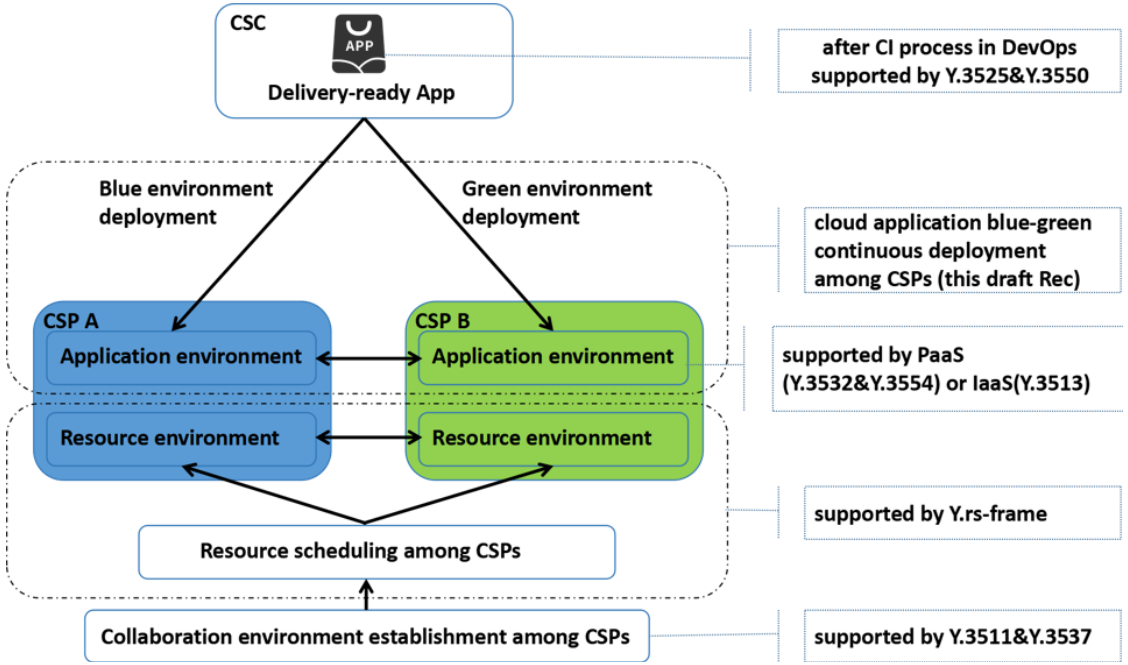
Cloud native application is a type of cloud application that is explicitly designed to run within and to take advantage of capabilities and environment of cloud services

ITU-T Y.cna-prince "Cloud Computing – Principles of cloud native application development"



Principles of cloud native application development that is are followed by CSC, CSN and CSP

ITU-T Y.cdmp-reqts "Cloud computing – Functional requirements and framework for continuous deployment of cloud native applications among multiple cloud service providers"

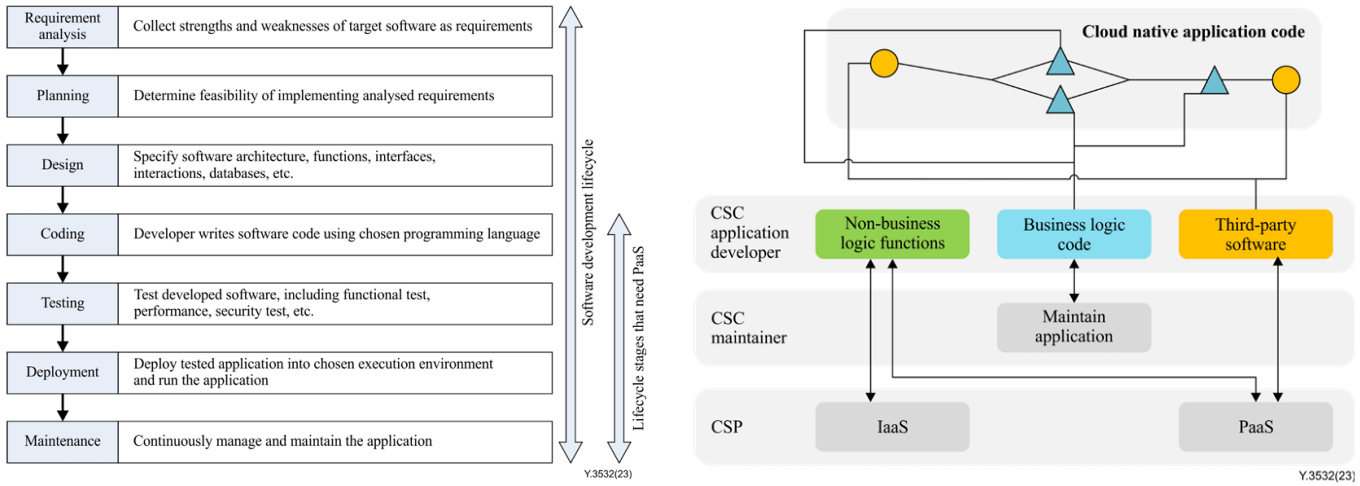


Overview of continuous deployment of cloud native applications among multiple CSPrs and its functional requirements

Cloud native key Recommendations – PaaS for cloud native application

PaaS & PaaS management standards for cloud-native apps → finalized

- **ITU-T Y.3532(2023) "Cloud computing – Functional requirements of Platform as a Service for cloud native applications"**



Comprehensive view and functional requirements of PaaS for cloud native application

- **ITU-T Y.3554(2024) "Cloud computing – Functional framework of Platform as a Service management for cloud native applications"**

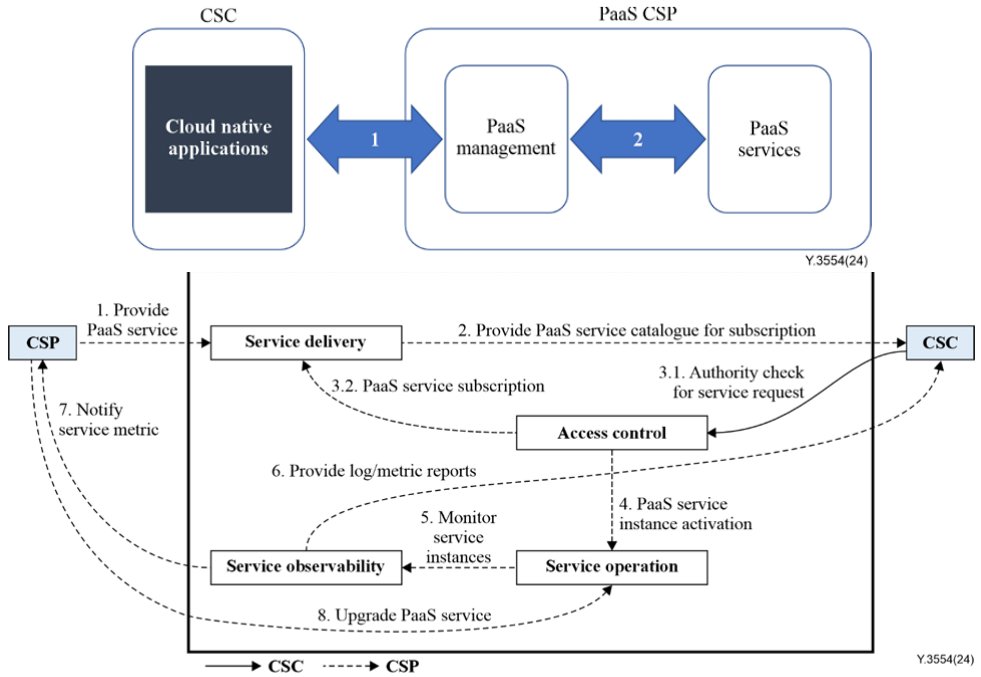


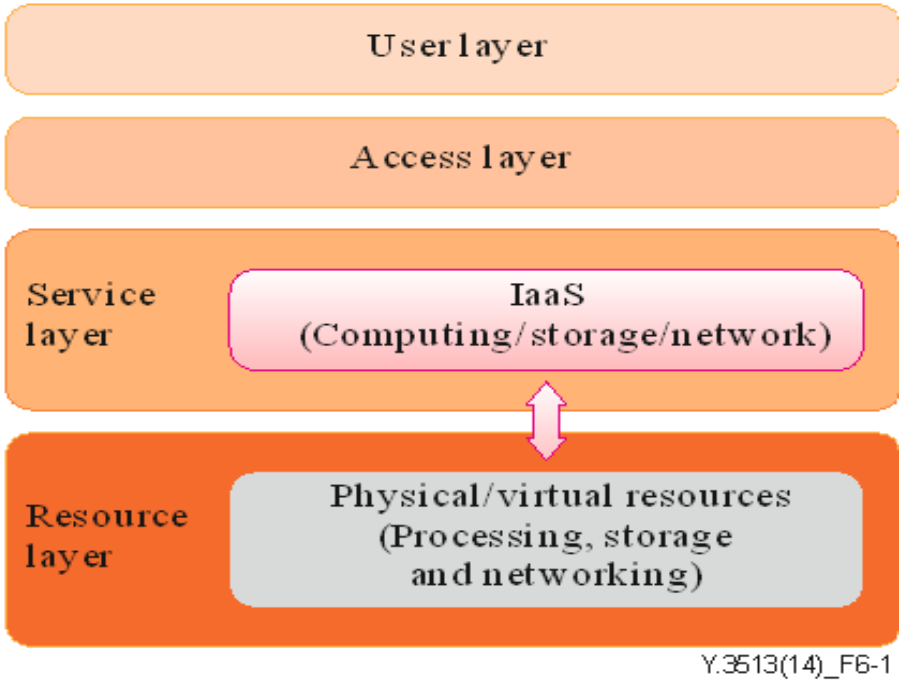
Figure 6-2 – Conceptual information flow of PaaS management

PaaS management logical components functional requirements for cloud native application

AI Infra revlant key Recommendations – IaaS

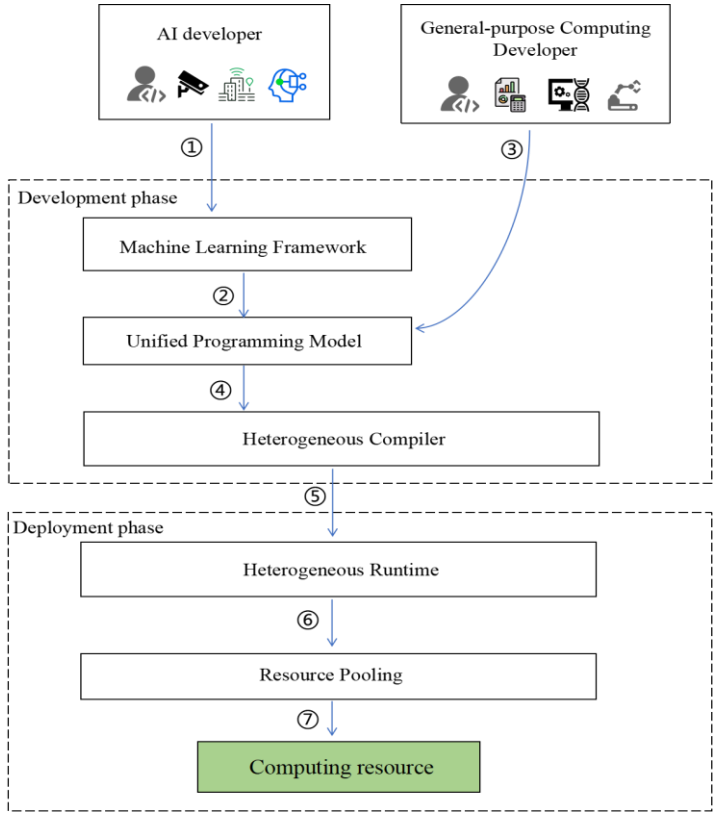
Trend: Heterogeneous IaaS & computing resourcs abstraction for AI infra

ITU-T Y.3513-rev "Cloud computing – Functional requirements of Infrastructure as a Service"



IaaS functional requirements revision: supports heterogeneous resources (e.g.,CPU, GPU, accelerators)

ITU-T Y.cra"Cloud computing-Functional requirements of computing resource abstraction"

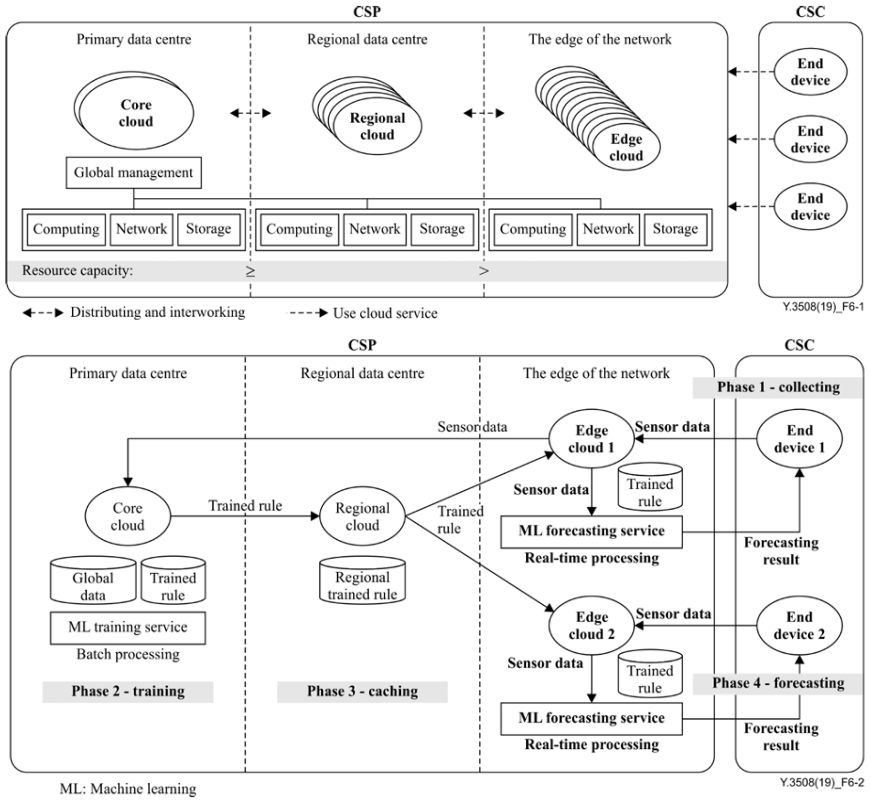


Computing resource abstraction in AI & general computing

AI Infra key Recommendations – Distributed Cloud

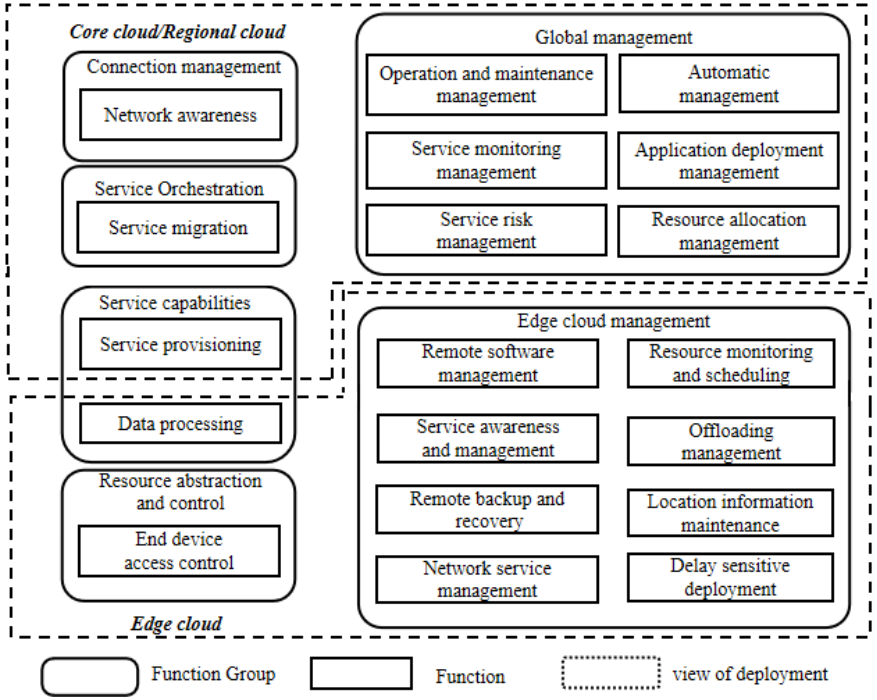
AI workloads demand cloud-edge coordination on distributed cloud; full Recommendations released.

- **ITU-T Y.3508(2019) "Cloud computing – Overview and high-level requirements of distributed cloud"**



Concept, overview, requirements, architecture, API of distributed cloud

- **ITU-T Y.3553(2024) "Cloud computing – Distributed cloud functional architecture"**

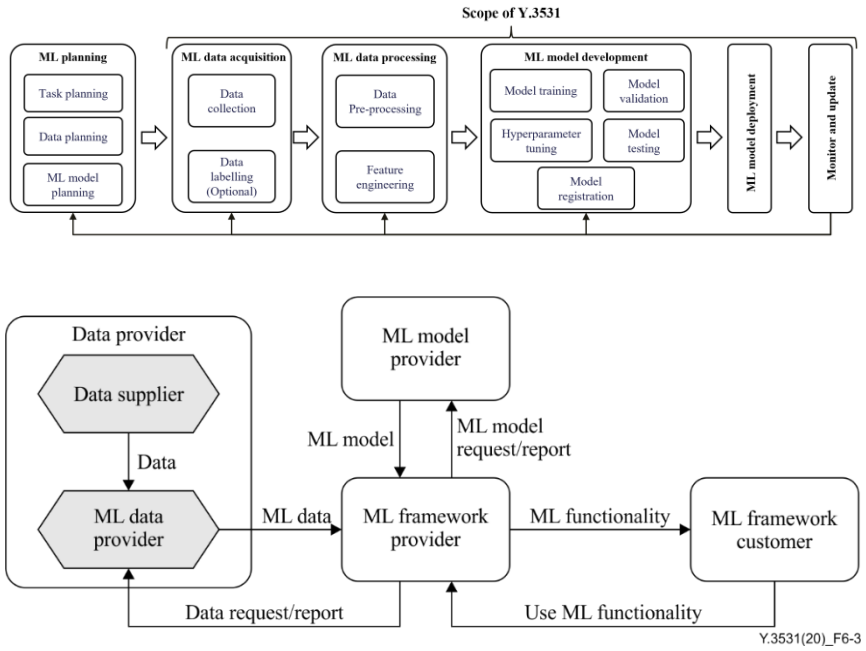


- **ITU-T Y.3538 (2022), Cloud computing - Global management framework of distributed cloud**
- **ITU-T Y.3526 (2021), Cloud computing – Functional requirements of edge cloud management**

AI Infra key Recommendations – MLaaS

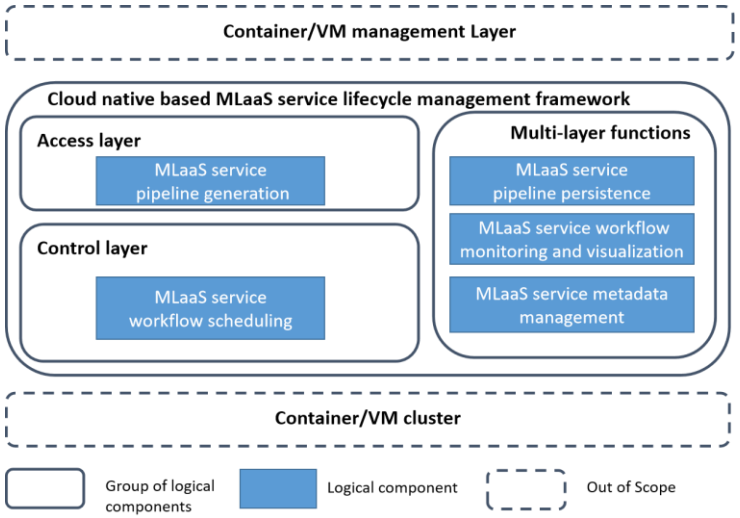
MLaaS (Machine Learning as a Service) Recommendations: requirements → management → architecture (in progress)

- **ITU-T Y.3531-rev "Cloud computing – Functional requirements for machine learning as a service"**



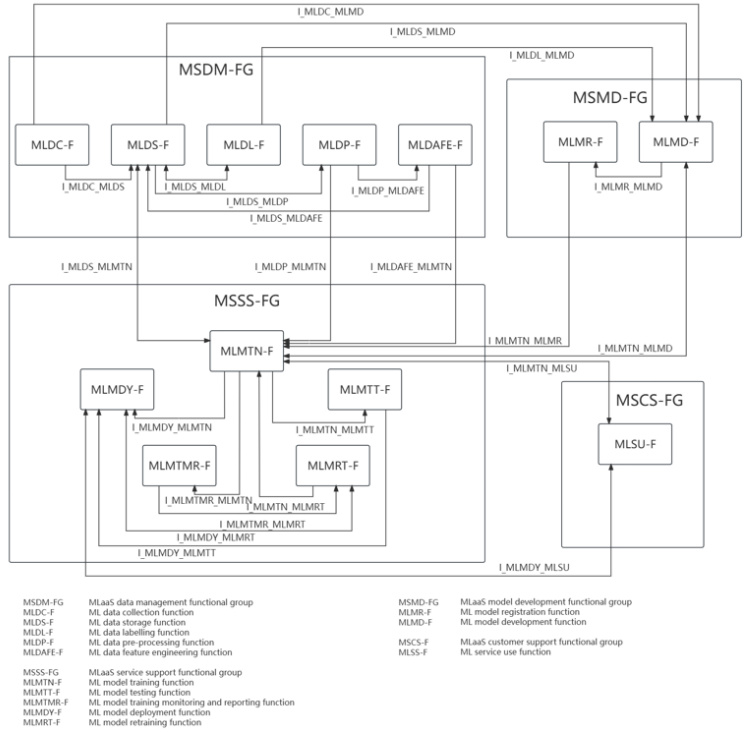
reviesion with category of ML model, ML model repository, and retraining techniques

- **ITU-T Y.MLaaS-frame "Cloud computing – Functional requirements and framework of machine learning as a service lifecycle management"**



Overview of MLaaS lifecycle management and its functional requirements

- **ITU-T Y.MLaaS-arch "Cloud computing – Functional architecture of machine learning as a service"**

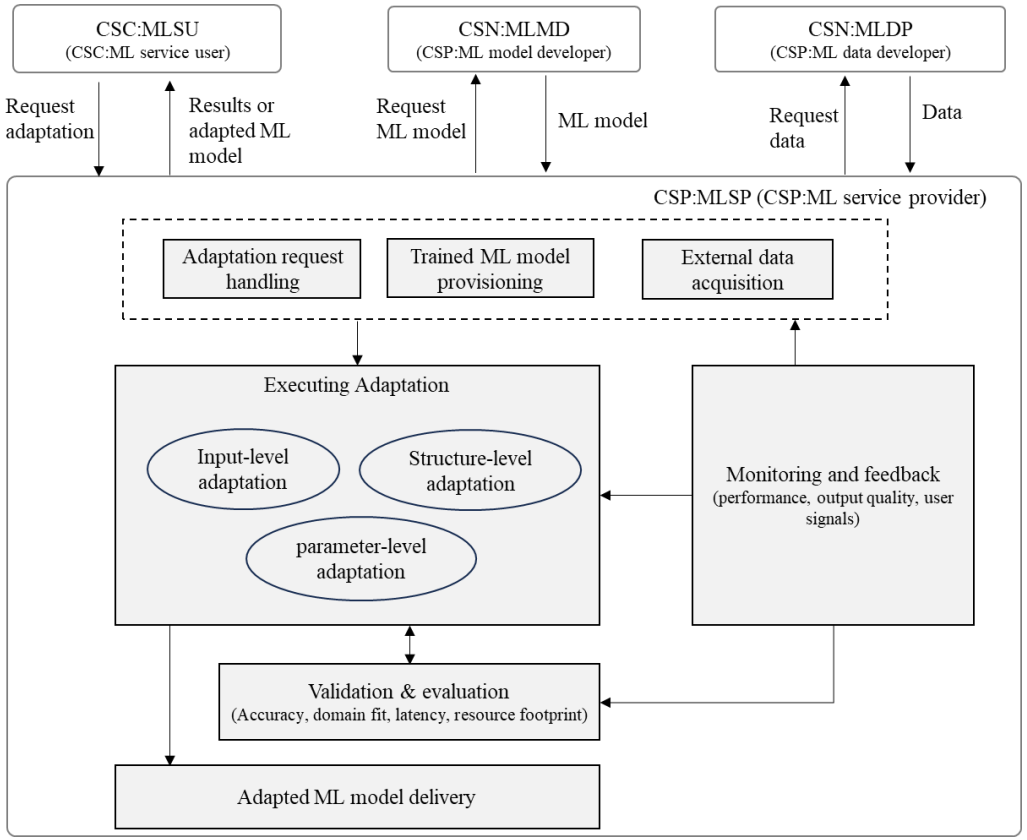


Architecture and reference points of MLaaS

AI Infra key Recommendations – PaaS for ML

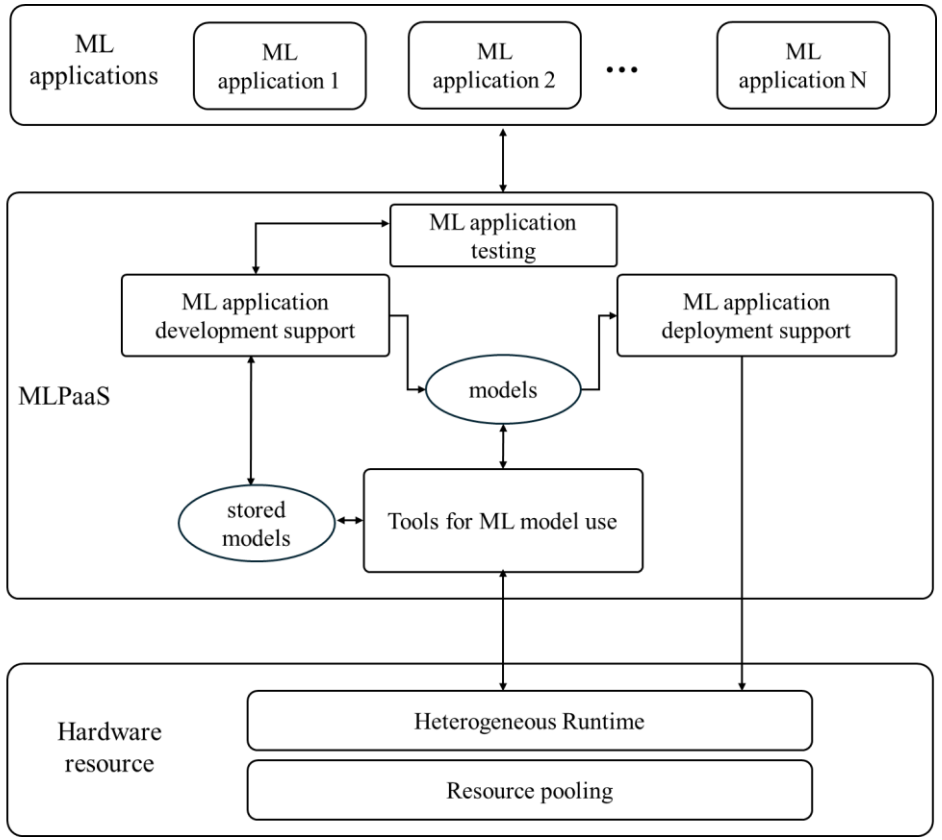
New Recommendations targeting cloud computing PaaS are under development for ML model iterative training, optimization, adaptation and also ML application delivery

☐ ITU-T Y.AMLM-reqts "Cloud computing - Functional requirements for adaptation of machine learning model"



Overview , logical components, functional requirements of adaptation of ML model

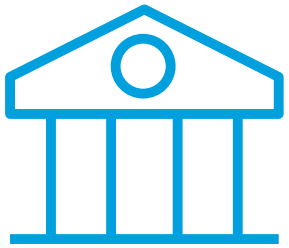
☐ ITU-T Y.MLPaaS-reqts "Cloud Computing – Functional requirements of PaaS for machine learning applications"



Overview , system context, functional requirements of PaaS for machine learning applications

ITU-T SG13 WP2: Main Achievements with cloud native and AI Infra

- **Cloud Native:**
  - Approved key Recommendations on container (Y.3535, Y.3528, Y.3558, Y.3559), covering functional requirements and architecture for container management in inter-cloud environments.
  - Established microservice governance and monitoring standards (Y.3556, Y.msg-reqts), and PaaS standards for cloud native applications (Y.3532, Y.3554), enabling scalable and resilient cloud native deployments.
  - Published principles for cloud native application development (Y.cna-prince) and continuous deployment across multi-cloud providers (Y.cdmp-reqts), guiding CSCs, CSNs, and CSPs in cloud native practices.
- **AI Infra:**
  - Revised IaaS Recommendation (Y.3513-rev) and (Y.cra) to support heterogeneous AI infrastructure resources (CPUs, GPUs, accelerators), and approved distributed cloud standards (Y.3508, Y.3553) for AI workload deployment.
  - Approved PaaS-level AI standards (Y.AMLM-reqts, Y.MLPaaS-reqts) for ML model adaptation and ML application platforms, and advanced MLaaS standardization (Y.3531-rev, Y.MLaaS-frame, Y.MLaaS-arch) covering the full ML lifecycle.
  - Initiated new work items on AI agent as a service (Y.aias-reqts), edge computing for AI workloads (Y.ecsai), and AI workload observability (Y.AIObs).



ITU-T SG13 Collaboration with other SDOs

ETSI

MEC: Edge computing

ENI: AI/ML in Networks

NFV:Telco Cloud Infrastructure

ISO/IEC JCT1 SC38

Cloud computing and distributed platforms

CNCF/OIF

Cloud Native

PyTorch

AI, training, inference

ITU-T SG21

Technologies for multimedia, content delivery and cable television

Workshop

LIAISON STATEMENT(s)

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ITU-T Y.sup.ccos

CG-CC-SG13&SG21

ITU-T SG13: SG13 continues to shape the future from cloud native to AI native

- AI Infra: heterogeneous IaaS, distributed cloud, edge cloud, MLPaaS and MLaaS lifecycle standards enabling AI workloads
- AI data: Standardization of AI data lifecycle, data quality and drift observability, and cross-cloud data sharing frameworks supporting federated and distributed AI training
- AI-driven Autonomous Networks: machine leaning and programmable networking solutions towards autonomous operation
- Ecosystem Collaboration:Active collaboration with opensource communities, ETSI NFV/MEC/ENI and ISO/IEC JTC1 SC38 to align cloud native and AI infra standards,and strengthen cooperation with revlant industrial alliances and organizations(e.g. GTI)

Thank you!

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