ITU-T SG13 STANDARDIZATION PROGRESS ON CLOUD MANAGEMENT

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Organization Structure

ITU-T SG13 (Future networks and emerging network technologies): Key Areas of Work

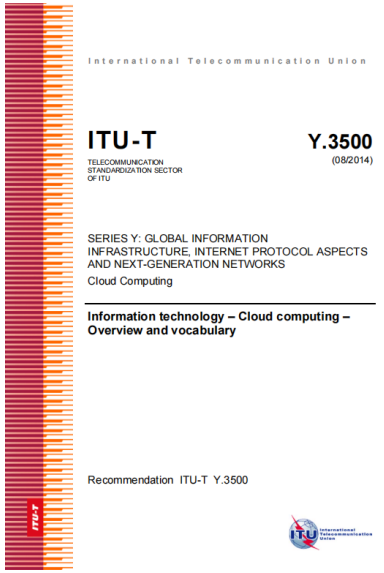
- Quantum Key Distribution Networks (QKDN) and quantum information technologies
- IMT-2020 and beyond
- Deterministic communications
- Fixed, mobile and satellite convergence
- Machine learning and artificial Intelligence in telecommunication networks
- Autonomous networks
- **Cloud computing and data handling**
- Computing and networking coordination
- Computing power networks
- Next generation networks evolution

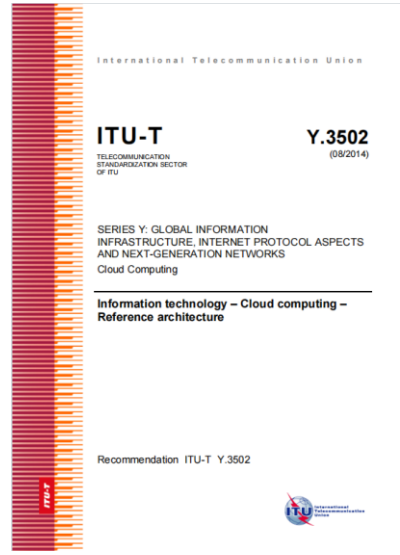
- **Since 2012, Q17, Q18, Q19 under WP2/13 are responsible for the interconnected standardization phases of cloud computing and data handling, from requirements and capabilities, functional architecture, to end-to-end management, governance, and security**
- **The value of this working mechanism has been gradually highlighted over time on**
  - **formating a clear linkage among standards**
  - **promoting the establishment of a standard structure**
  - **positioning standard issues**
  - **coordinating work division and cooperation among Qs**

WP2/13	Cloud computing & data handling
Q17/13	Requirements and capabilities for computing including cloud computing and data handling Continuation of Q17/13
Q18/13	Functional architecture for computing including cloud computing and data handling Continuation of Q18/13
Q19/13	End-to-end management, governance, and security for computing including cloud computing and data handling Continuation of Q19/13

Standard Structure

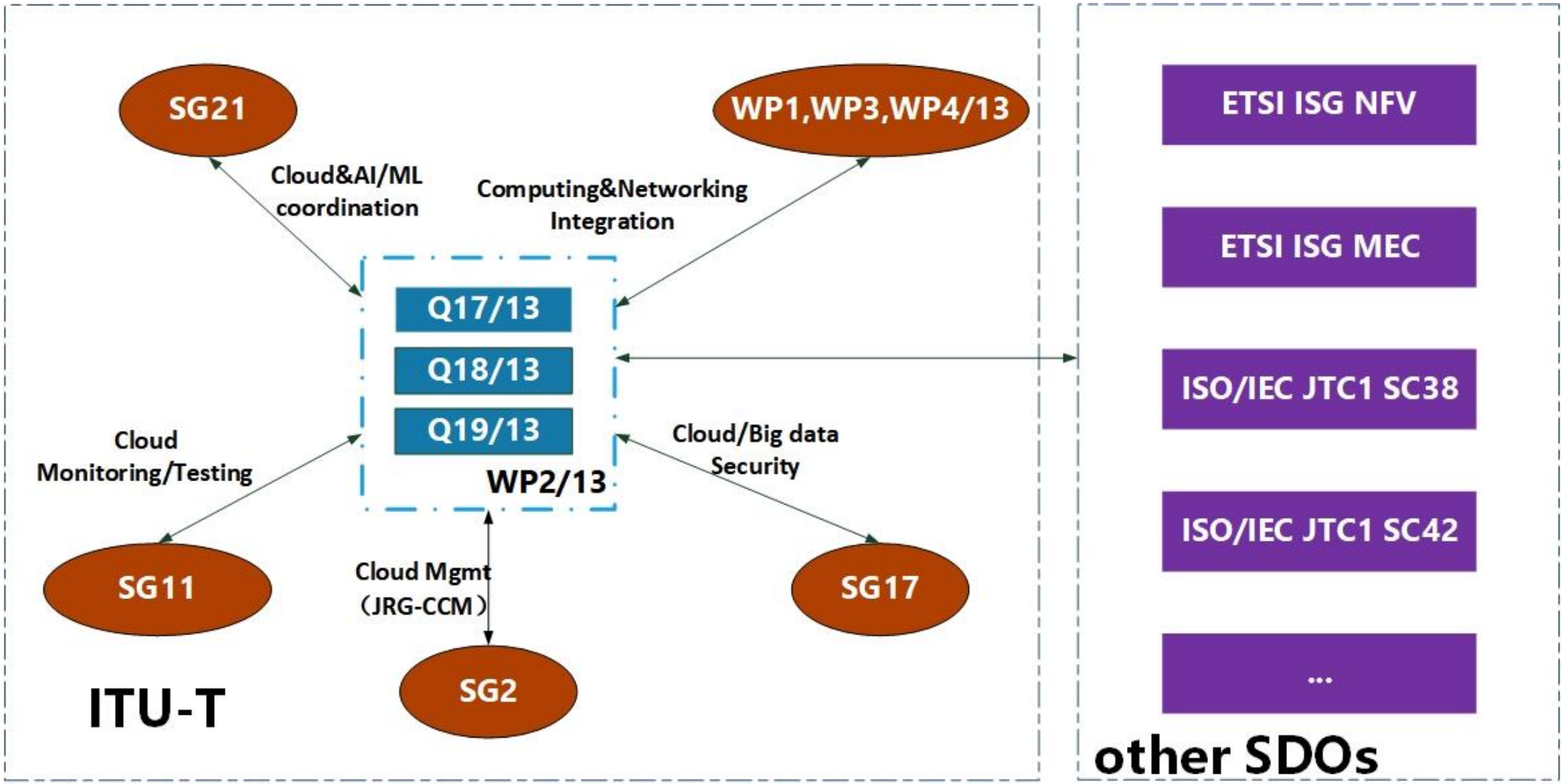
- Y.3500-Y.3599: Cloud Computing
  - Y.3500: Information technology – Cloud computing – Overview and vocabulary
  - Y.3501: Cloud computing – Framework and high-level requirements
  - Y.3502: Information technology — Cloud computing - Reference architecture
  - Y.3503: Requirements for desktop as a service
  - Y.3504: Functional architecture for Desktop as a Service
  - Y.3505: Cloud computing – Overview and functional requirements for data storage federation
  - Y.3506: Cloud computing - Functional requirements for cloud service brokerage
  - Y.3507: Cloud computing - Functional requirements of physical machine
  - Y.3508: Cloud computing - Overview and high-level requirements of distributed cloud
  - Y.3509: Cloud computing - Functional architecture for data storage federation
  - Y.3510: Cloud computing infrastructure requirements
  - Y.3511: Framework of inter-cloud computing
  - Y.3512: Cloud computing - Functional requirements of Network as a Service
  - Y.3513: Cloud computing - Functional requirements of Infrastructure as a Service
  - Y.3514: Cloud computing - Trusted inter-cloud computing framework and requirements
  - Y.3515: Cloud computing – Functional architecture of Network as a Service
  - Y.3516: Cloud computing - Functional architecture of inter-cloud computing
  - Y.3517: Cloud computing - Overview of inter-cloud trust management
  - Y.3518: Cloud computing - functional requirements of inter-cloud data management
  - Y.3519: Cloud computing - Functional architecture of big data as a service
  - Y.3520: Cloud computing framework for end to end resource management
  - Y.3521: Overview of end-to-end cloud computing management
  - Y.3522: End-to-end cloud service lifecycle management requirements
  - Y.3523: Metadata framework for NaaS service lifecycle management
  - Y.3524: Cloud computing maturity requirements and framework
  - Y.3525: Cloud computing – Requirements for cloud service development and operation management
  - Y.3526: Cloud computing - Functional requirements of edge cloud management
  - Y.3527: Cloud computing - End-to-end fault and performance management framework of network services in inter-cloud
  - Y.3528: Cloud computing – Framework and requirements of container management in inter-cloud
  - Y.3529: Cloud computing – Data model framework for NaaS OSS virtualized network function
  - Y.3530: Cloud computing - Functional requirements for blockchain as a service
  - Y.3531: 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.3533: Cloud computing – Functional requirements for robotics as a service
  - Y.3535: Cloud computing – Functional requirements for a container
  - Y.3536: Cloud computing – Functional architecture for cloud service brokerage
  - Y.3537: Cloud computing – Functional requirements of a cloud service partner for multi-cloud
  - Y.3538: Cloud computing - Global management framework of distributed cloud
  - Y.3539: Cloud computing – Framework of risk management
  - Y.3540: Edge computing – Overview and high-level requirements
  - Y.3550: Cloud computing – Requirements for artificial intelligence based cloud service development and operation management
  - Y.3551: Cloud computing – Framework and functional requirements of cloud data mobility management
  - Y.3552: Cloud computing – Functional requirements of edge cloud
  - Y.3553: Cloud computing – Distributed cloud functional architecture
  - Y.3554: Cloud computing – Functional framework of Platform as a Service management for cloud native applications
- Y.3600-Y.3799: Big Data
  - Y.3600: Big data – Cloud computing based requirements and capabilities
  - Y.3601: Big data - framework and requirements for data exchange
  - Y.3602: Big data - Functional requirements for data provenance
  - Y.3603: Big data – Requirements and conceptual model of metadata for data catalogue
  - Y.3604: Big data - Overview and requirements for data preservation
  - Y.3605: Big data - Reference architecture
  - Y.3606: Big data – Deep packet inspection mechanism for big data in network
  - Y.3607: Big data – Functional architecture for data provenance



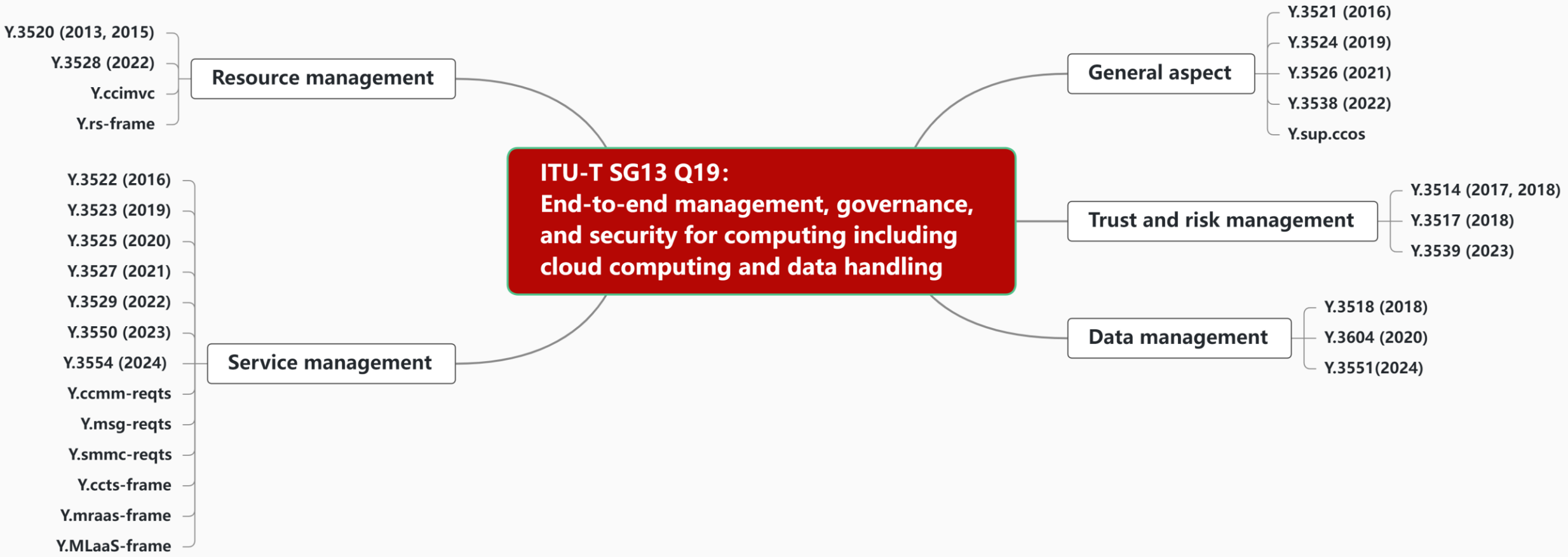


- **As the leading standards of cloud computing series, Rec. Y.3500 (2014) and Rec. Y.3502 (2014) on vocabulary and reference architecture respectively, are the star Recommendations of SG13 as two of top three by downloads (**source: TSAG, as of April 2025**) and the key cooperation achitevements with ISO/IEC JTC1 SC38**

Collaborative Relationship

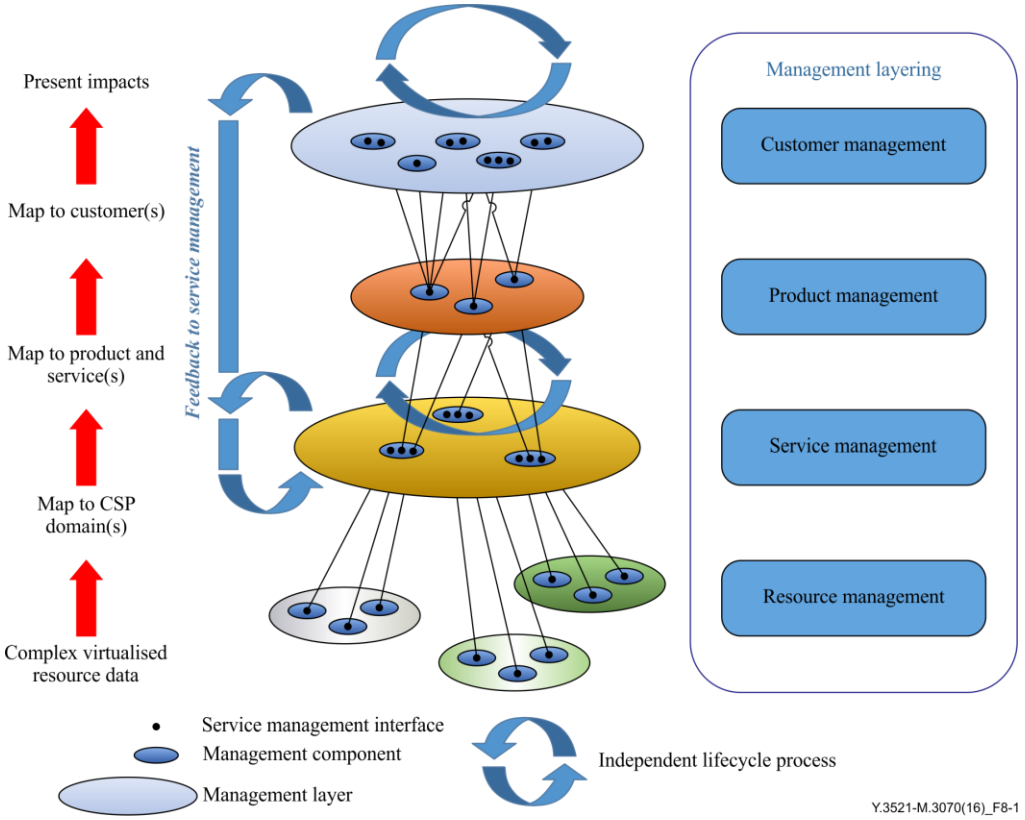


Q19/13 archievements



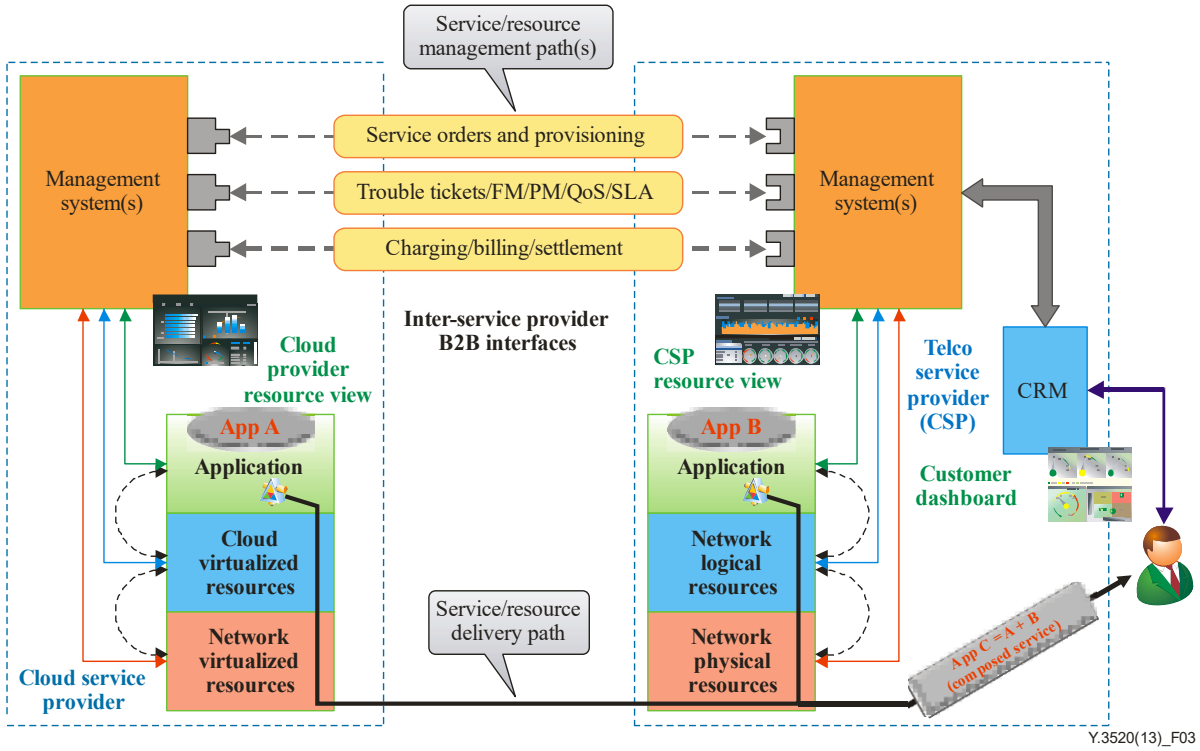
Key Recommendations of Q19/13

- **ITU-T Y.3521 "Overview of end-to-end cloud computing management"**



Comprehensive view of cloud computing management

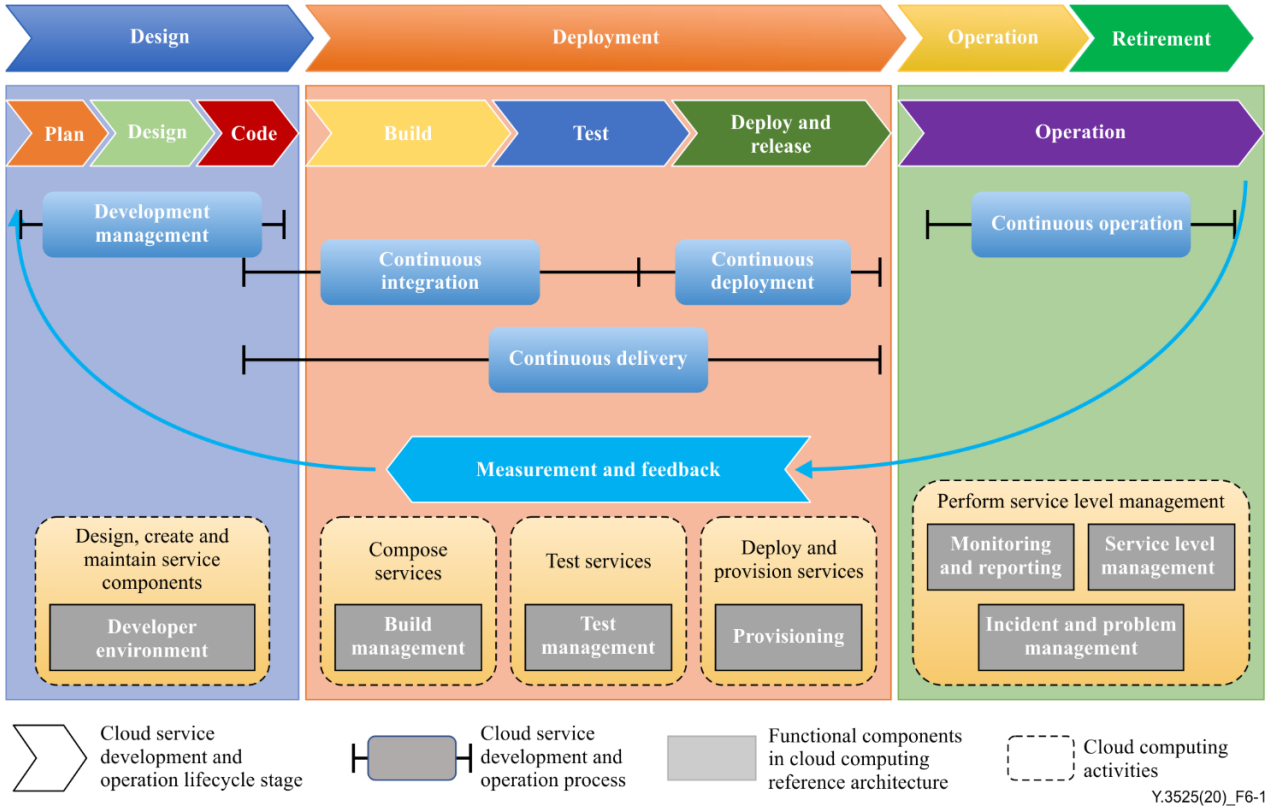
- **ITU-T Y.3520 "Cloud computing framework for end to end resource management"**



End to end management expectations in a multi-cloud scenario

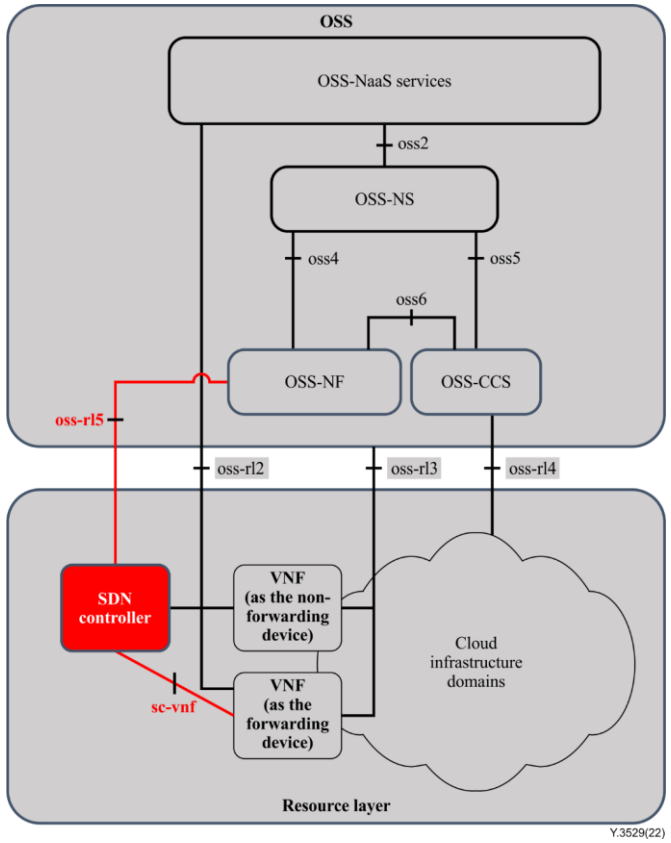
Key Recommendations of Q19/13

- **ITU-T Y.3525 "Cloud computing – Requirements for cloud service development and operation management"**



Cloud service development and operation management framework

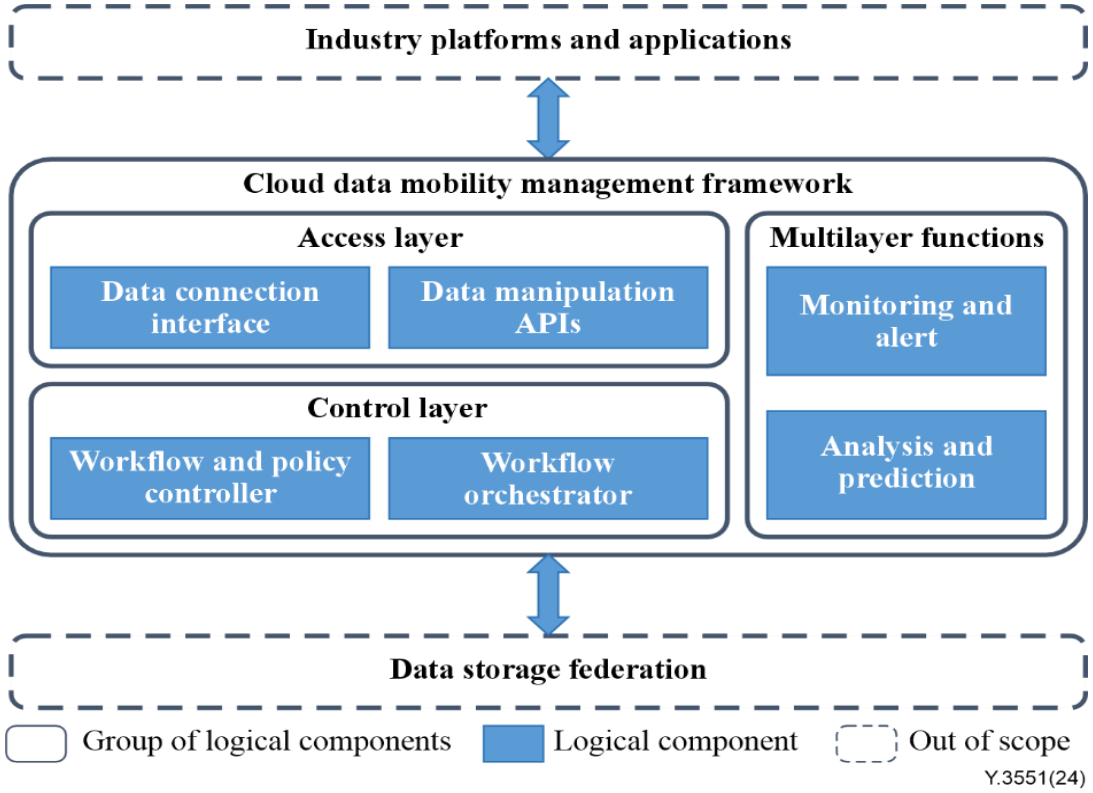
- **ITU-T Y.3529 "Cloud computing – Data model framework for NaaS OSS virtualized network function"**



OSS-NF and its related reference points

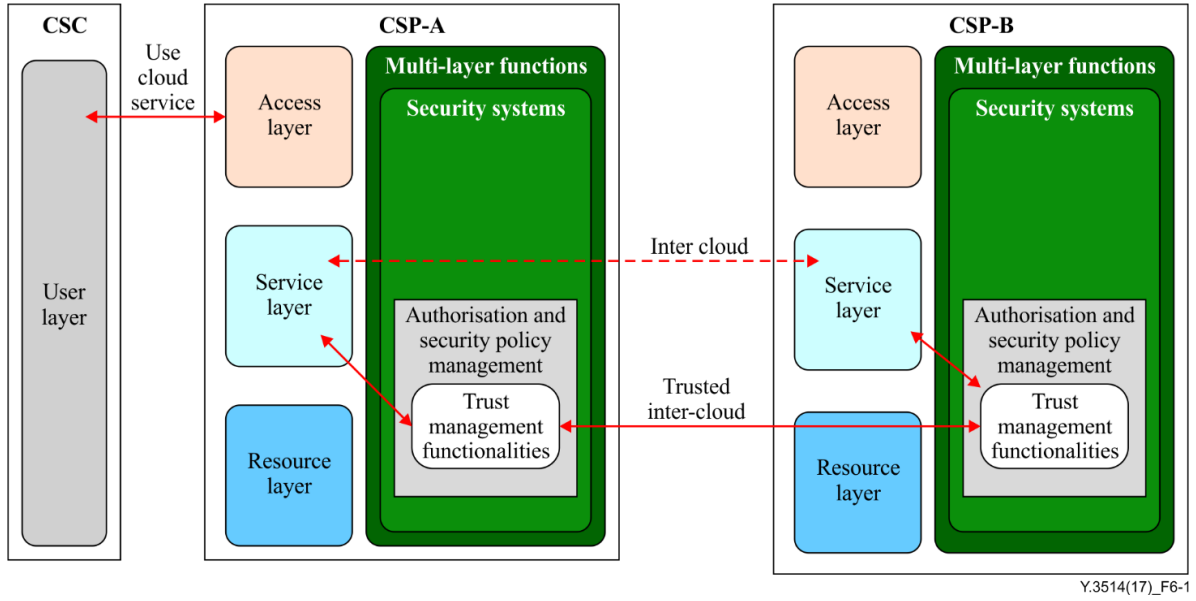
Key Recommendations of Q19/13

- **ITU-T Y.3551 "Cloud computing – Framework and functional requirements of cloud data mobility management"**



Functional framework of cloud data mobility management

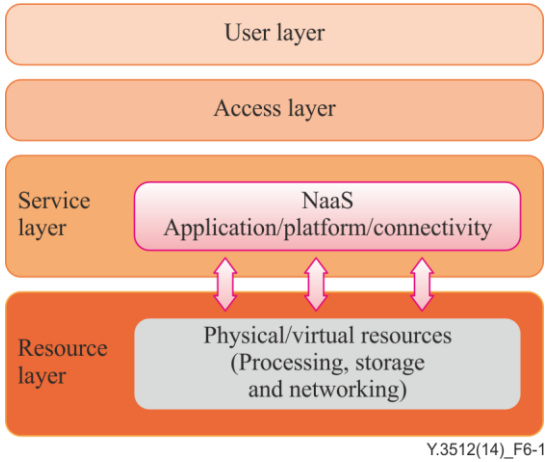
- **ITU-T Y.3514 "Cloud computing – Trusted inter-cloud computing framework and requirements"**



The positioning of trust management functionalities over CSP in inter-cloud

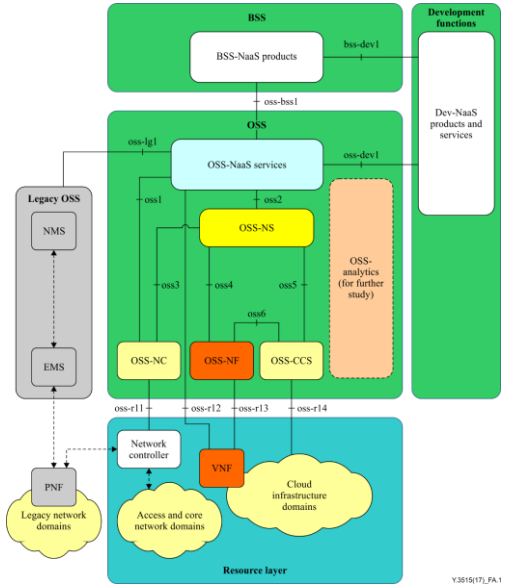
Typical example for series of standards in WP2/13 ——NaaS(Network as a Service) series

- **ITU-T Y.3512 “Cloud computing – Functional requirements of NaaS”**



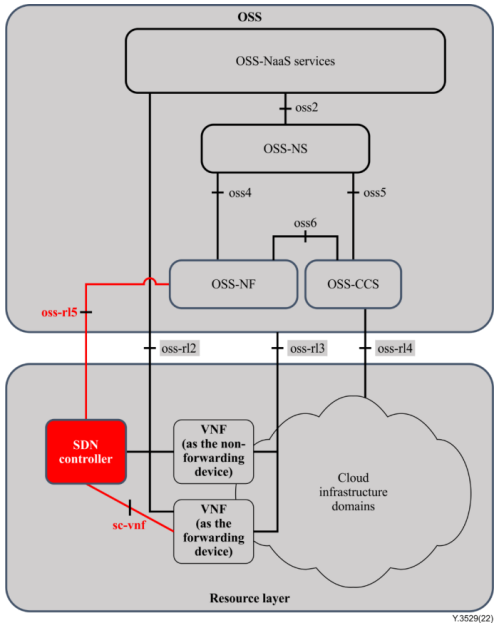
High-level concept of NaaS

- **ITU-T Y.3515 “Cloud computing – Functional architecture of NaaS”**



Reference points of NaaS

- **ITU-T Y.3529 “Cloud computing – Data model framework for NaaS OSS virtualized network function”**



OSS-NF and its related reference points

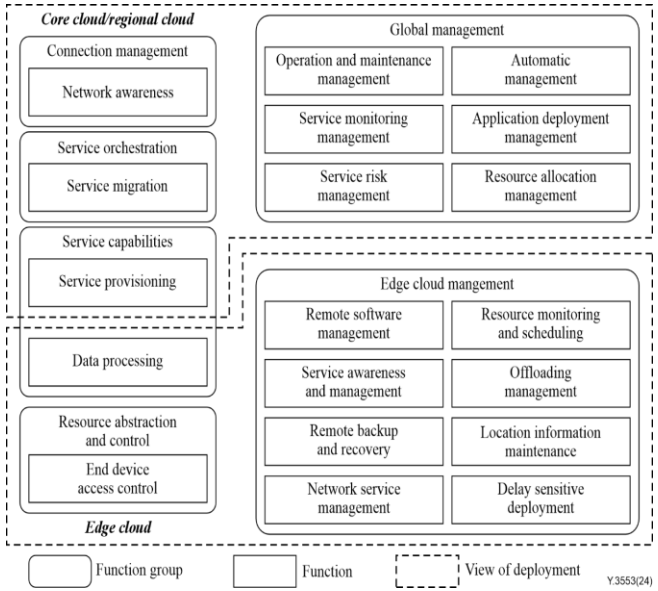
Functional requirements of NaaS

Functional architecture of NaaS

NaaS OSS VNF management

Typical example for series of standards in WP2/13 ——Distributed cloud series

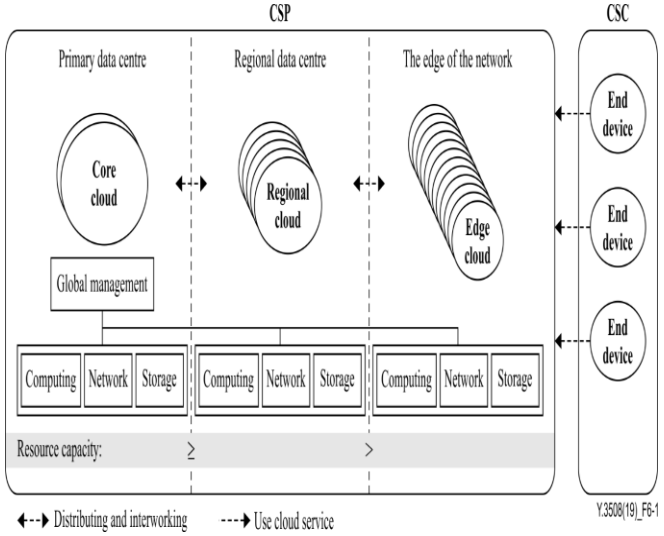
- **ITU-T Y.3553 "Cloud computing – Distributed cloud functional architecture"**



Function groups and functions for distributed cloud

Functional architecture of distributed cloud

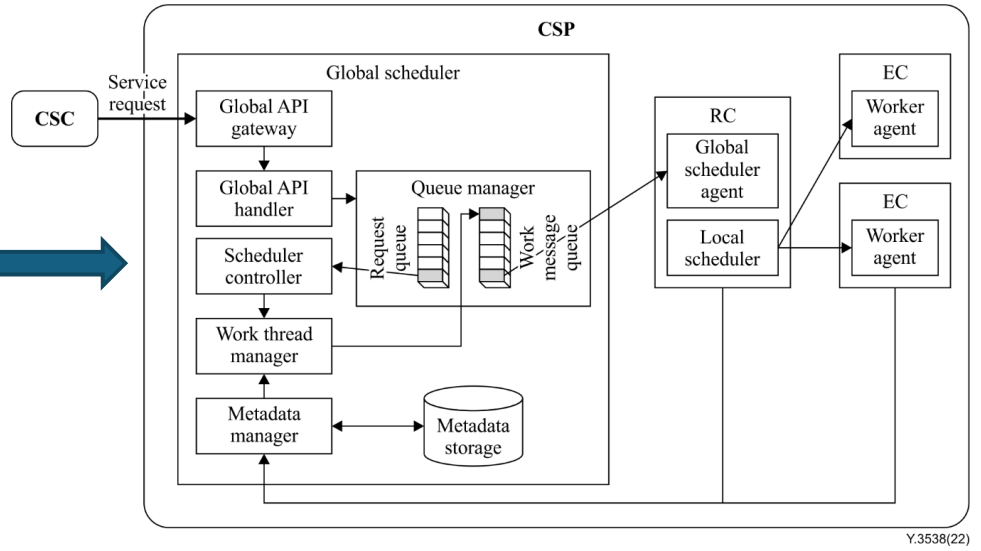
- **ITU-T Y.3508 "Overview and high-level equirements of distributed cloud"**



Concept of distributed cloud

Functional requirements of distributed cloud

- **ITU-T Y.3538 "Cloud computing – Global management framework of distributed cloud"**

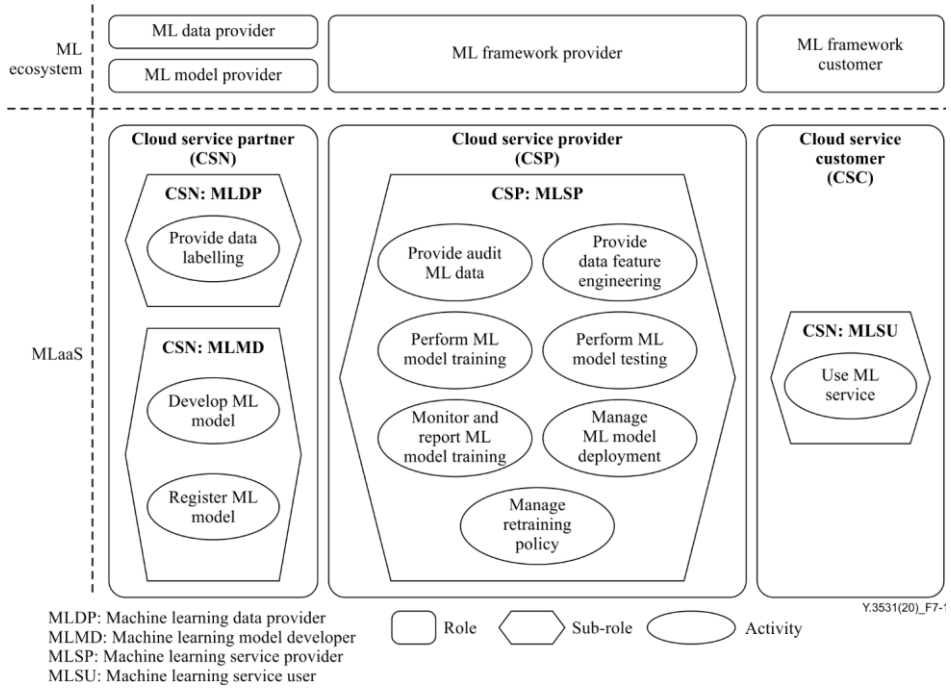


Operation model using global scheduling for distributed cloud

Distributed cloud management

Typical example for series of standards in WP2/13 ——MLaaS(Machine Learning as a Service) series

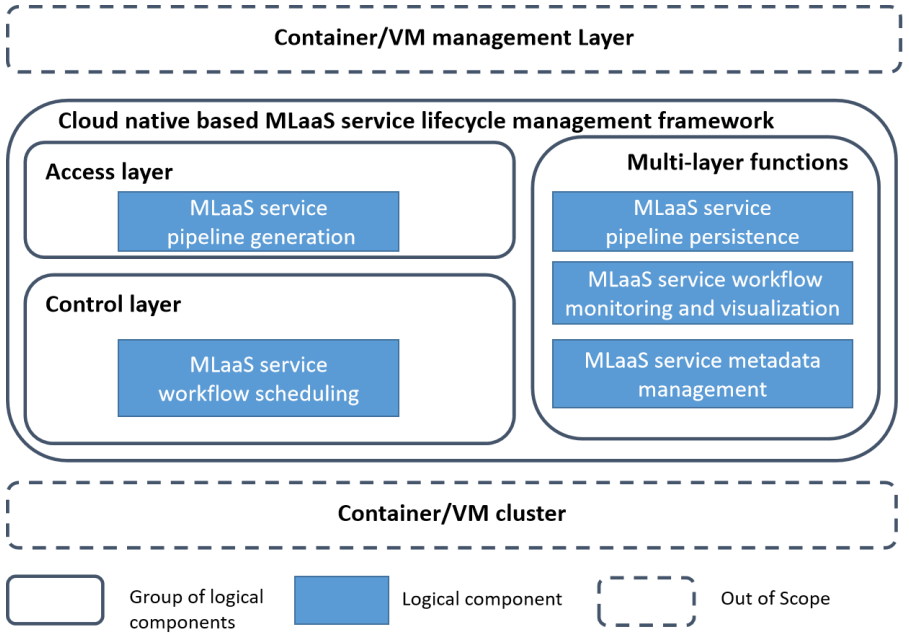
- **ITU-T Y.3531 "Cloud computing - Functional requirements for MLaaS"**



MLaaS system context

Functional requirements of MLaaS

- **ITU-T Y.MLaaS-frame "Cloud computing - Functional requirements and framework of MLaaS lifecycle management"**



Framework of MLaaS lifecycle management

MLaaS management

THANKS FOR YOUR ATTENTION!

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