ITU-T SG13
Cloud Computing & Big Data activities

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Agenda

- Overview of cloud computing standard activities in ITU-T SG13
- Overview of big data standard activities in ITU-T SG13

Some History of CC standard activities in ITU-T SG13

- 2010, February:
  - Establishment of the FG Cloud by TSAG
    - In operation 2/2010 – 12/2011
    - Delivered 7 Technical Reports
- 2012, January:
  - TSAG entrusted the lead SG responsibility for cloud computing to SG13
  - TSAG established JCA-Cloud with SG13 as parent
- 2012, February:
  - Extraordinary SG13 meeting focused on cloud computing work organization
  - France, China Telecom, China Unicom and ZTE proposed to start new Questions on cloud computing in SG13
  - Proposal to set up a dedicated WP in SG13 to concentrate on the cloud computing work
  - First meeting of JCA-Cloud
- 2012, April:
  - First meetings of cloud computing Questions of SG13 (in Geneva)

Study Group 13, structures for Cloud Computing

WP2/13 as a center of CC study (Q17, 18, 19/13)

- Collaborative Teams with ISO/IEC JTC1 SC38
  CT-CCVOCAB (terminated in July 2014)
  CT-CCRA (terminated in July 2014)
- Q17: Requirements, ecosystem, and general capabilities for cloud computing and big data
- Q18: Functional architecture for cloud computing and big data
- Q19: End-to-end cloud computing management, cloud security and big data governance
- WP2/13 co-chairman： Yoshinori GOTO from NTT
  Fidelis ONAH from Nigerian Communications Commission

Published recommendations since 2013

- Y.3500: Cloud computing - Overview and Vocabulary*
- Y.3501: Cloud computing framework and high-level requirements(Second edition)
- Y.3502: Cloud computing - Reference architecture*
- Y.3503: Requirements for Desktop as a Service
- Y.3504: Functional architecture for Desktop as a Service
- Y.3510: Cloud Computing Infrastructure Requirements requirement (Second edition)
- Y.3511: Framework of inter-cloud computing
- Y.3512: Cloud computing - Functional requirements of NaaS
- Y.3513: Cloud Computing - Functional requirements of IaaS
- 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.3520: CC framework for e-2-e resource management (Second edition)
- Y.3521: Overview of end-to-end cloud computing management
- Y.3522: End-to-end cloud service lifecycle management requirements
- Y.3600: Big data – Cloud computing based requirements and capabilities

* **Common text with ISO/IEC JTC1 SC38/WG3**

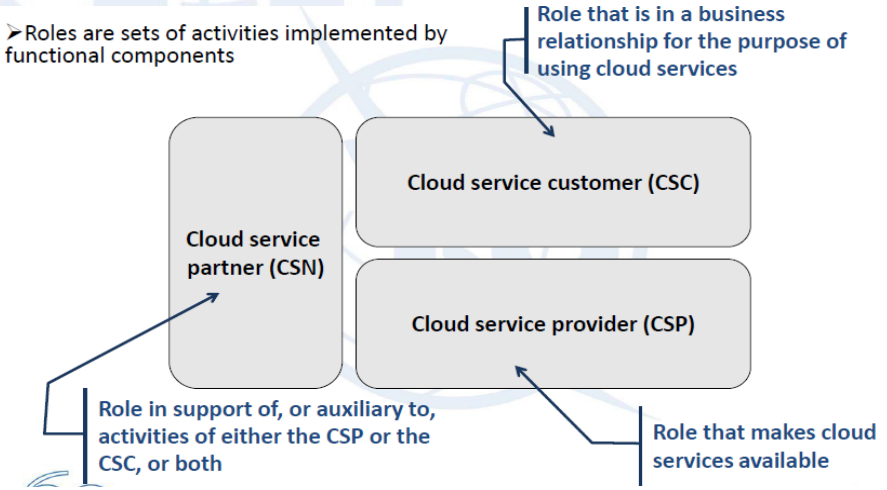
Y.3500: Overview and Vocabulary

"Paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand"

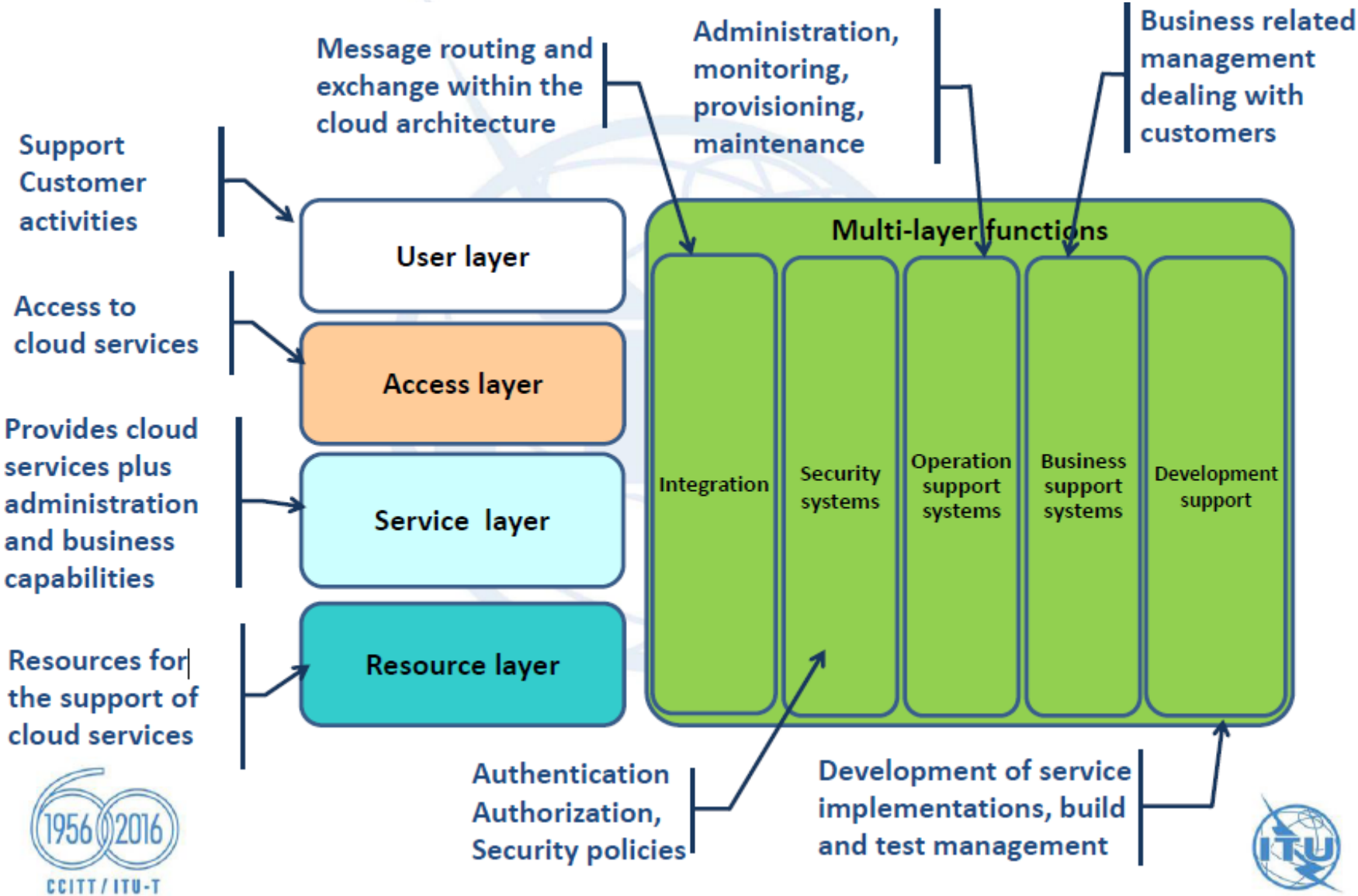
NOTE – Examples of resources include servers, operating systems, networks, software, applications, and storage equipment.

6 Characteristics: Broad network access; Measured Service; Multi-tenancy; On-demand self-service; Rapid elasticity and scalability; Resource pooling

3 Main Cloud Computing Roles: Customer, Provider and Partner



Y.3502: Functional architecture



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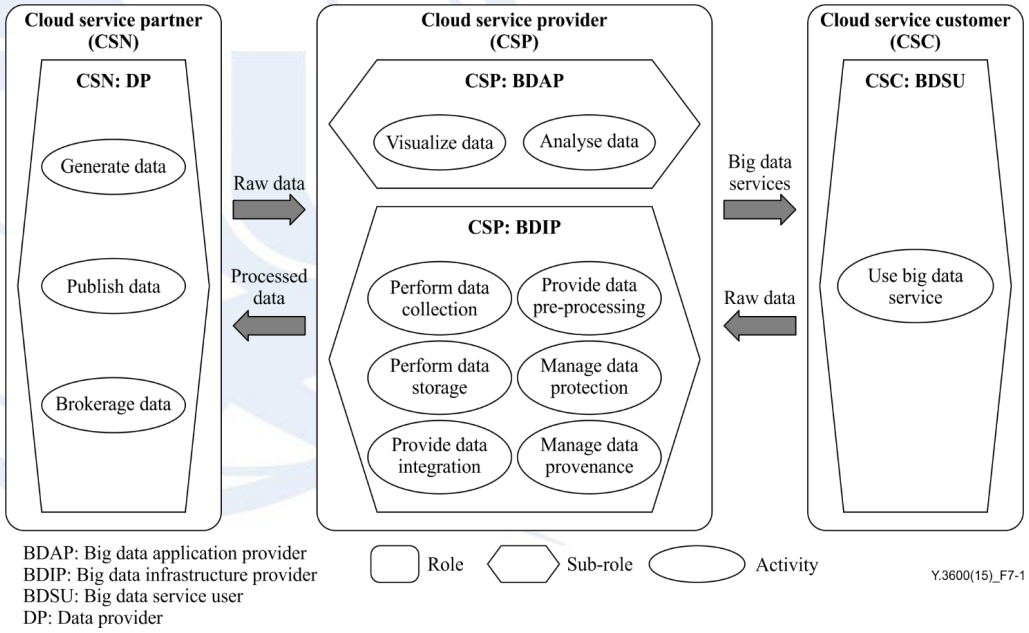
Y.3600: Cloud computing based big data

BDaaS: A cloud service category in which the capabilities provided to the cloud service customer are the ability to collect, store, analyse, visualize and manage data using big data

- Overview of big data;
- Cloud computing based big data system context and benefits
- Cloud computing based big data requirements
- Cloud computing based big data capabilities



Y.3501: Cloud computing framework and high-level requirements (Second edition)

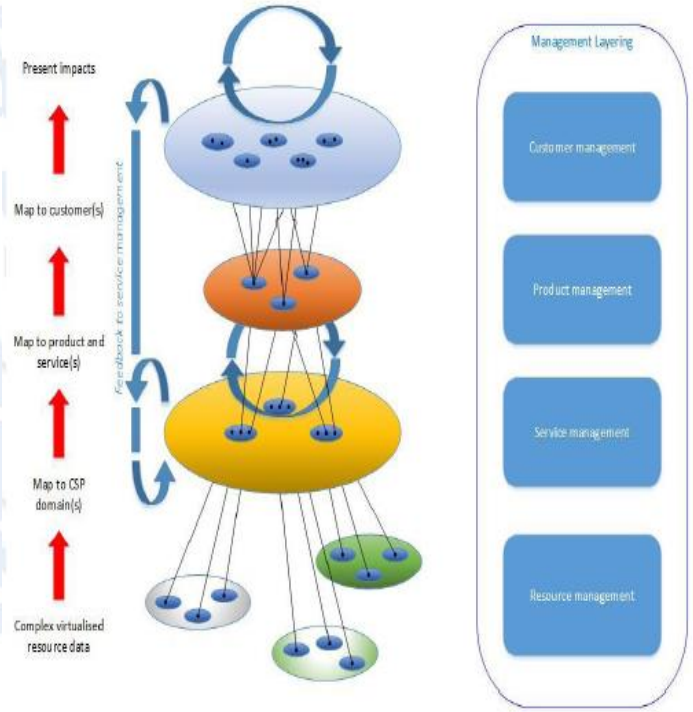
General requirements and use cases of cloud computing:

- Cloud computing;
- Infrastructure as a service (IaaS), network as a service (NaaS), desktop as a service (DaaS), platform as a service (PaaS), communication as a service (CaaS) and big data as a service (BDaaS);
- Inter-cloud computing, end-to-end cloud computing management, trusted cloud service, and cloud infrastructure.

Y.3521/M.3070: Overview of end-to-end cloud computing management

End to End common Model management functionalities

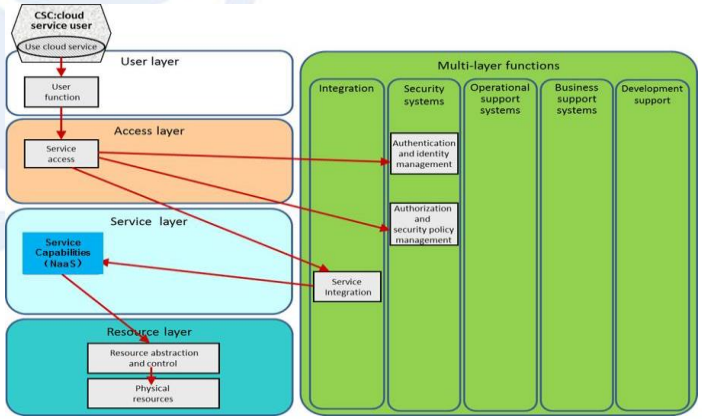
- Functionalities for cloud customer management
- Functionalities for cloud **product management**
- Functionalities for cloud **service management**
- Functionalities for cloud computing **resource management**



Y.3515: Functional Architecture of NaaS

- Functionalities for NaaS
- Functionalities for NaaS service instantiation
- Functionalities for NaaS service orchestration
- Functionalities for network analytics
- Autonomic functionalities
- Policy related functionalities
- Functionalities for resource abstraction and control
- Functionalities for an evolved real-time OSS
- Functionalities for NaaS product and NaaS service development
- NaaS business related functionalities

- NaaS functional components
- NaaS service instantiation
- NaaS service orchestration
- Mapping between physical and virtualised networks
- OSS
- NaaS development support
- NaaS products



Y.3514: Trusted inter-cloud computing framework and requirements

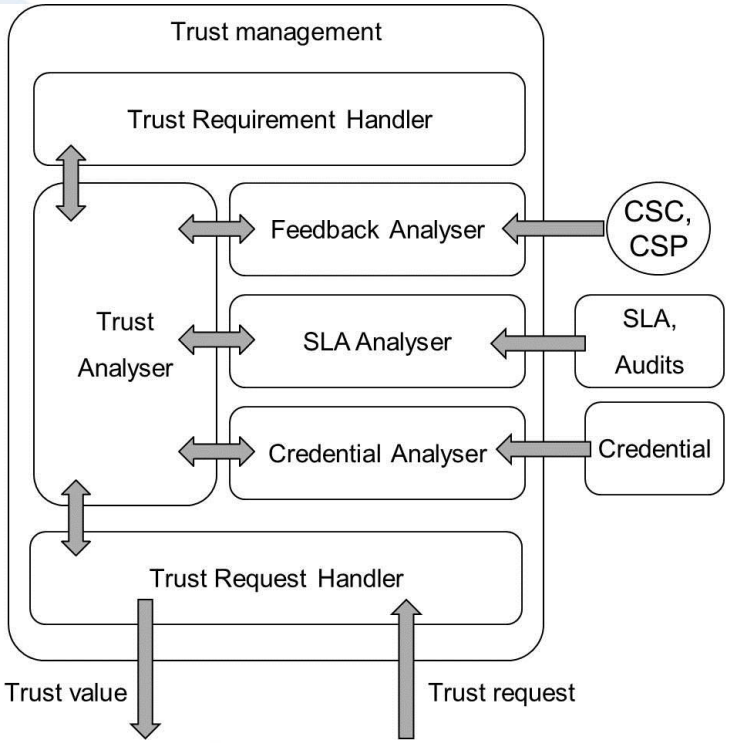
General requirements for trusted inter-cloud

- **Data separation**
- **Data annotation**
- **Confidentiality of data**
- **Operational statistics**
- **Interoperability and dependability**
- **Master service agreement**

Requirements for governance of TIC

Requirements for management of TIC

Requirements for resiliency of TIC



CC related Recommendations under Development(1)

- **Q17 : Requirements, ecosystem, and general capabilities for cloud computing and big data**
  - Cloud computing - Functional requirements for blockchain as a service
  - Cloud Computing - Requirements for Containers and Micro-services
  - Distributed cloud overview and high-level requirements
  - Cloud computing - Functional requirements of physical machine
  - Cloud Computing Requirements for Cloud Service Brokerage
  - Requirements and capabilities for Data Storage Federation
  - Cloud computing - Functional requirements for machine learning as a service
  - Supplement on Cloud Computing Standardization Roadmap

CC related Recommendations under Development(2)

- **Q18 : Functional architecture for cloud computing and big data**
  - Cloud computing - Functional architecture of Big Data as a Service
  - Cloud computing maturity requirements and framework
- **Q19: End-to-end cloud computing management, cloud security and big data governance**
  - Cloud Computing - Requirements for Inter-Cloud Data Management
  - Cloud Computing - Overview of Inter-Cloud Trust Management
  - Metadata framework for cloud service lifecycle management

Agenda

- Overview of cloud computing standard activities in ITU-T SG13
- Overview of big data standard activities in ITU-T SG13

Questions for Big Data in SG13

- **Q17/13** deals **requirements, ecosystem, and general capabilities** for big data. The primary focus of this question is to provide the necessary overall frameworks, definitions, and ecosystems including requirements, capabilities related to the integration or support of the cloud computing, big data model and technologies in telecommunication ecosystem [ToR] [Work Program]
- **Q18/13** deals with **functional architecture** for big data based on preceding study in Q17/13. Main focus of this question on big data is to provide big data functional architectures [ToR] [Work Program]
- **Q19/13** is deals with big **data governance** including data management, data preservation as well as lifecycle management of big data to provide the necessary overall **frameworks**, **definitions**, and ecosystems including **requirements**, capabilities [ToR] [Work Program]
- **Q7/13** has been studying big data driven networking (bDDN) and deep packet inspection (DPI). In terms of **big data application**, bDDN is one of good example meanwhile DPI has been playing an important role in collecting data from network and pre-processing the data. [ToR] [Work Program]

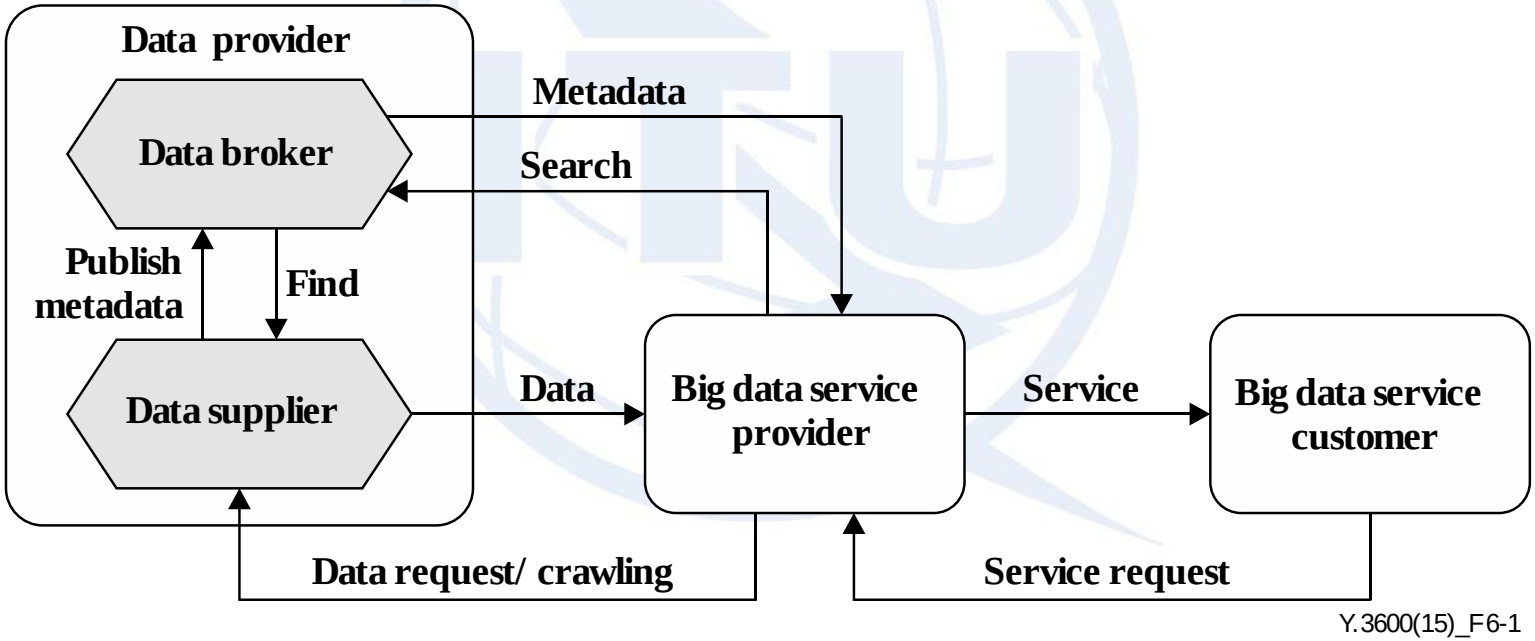
Big Data definitions – Y.3600

3.2.1 big data: A paradigm for enabling the collection, storage, management, analysis and visualization, potentially under real-time constraints, of extensive datasets with heterogeneous characteristics.

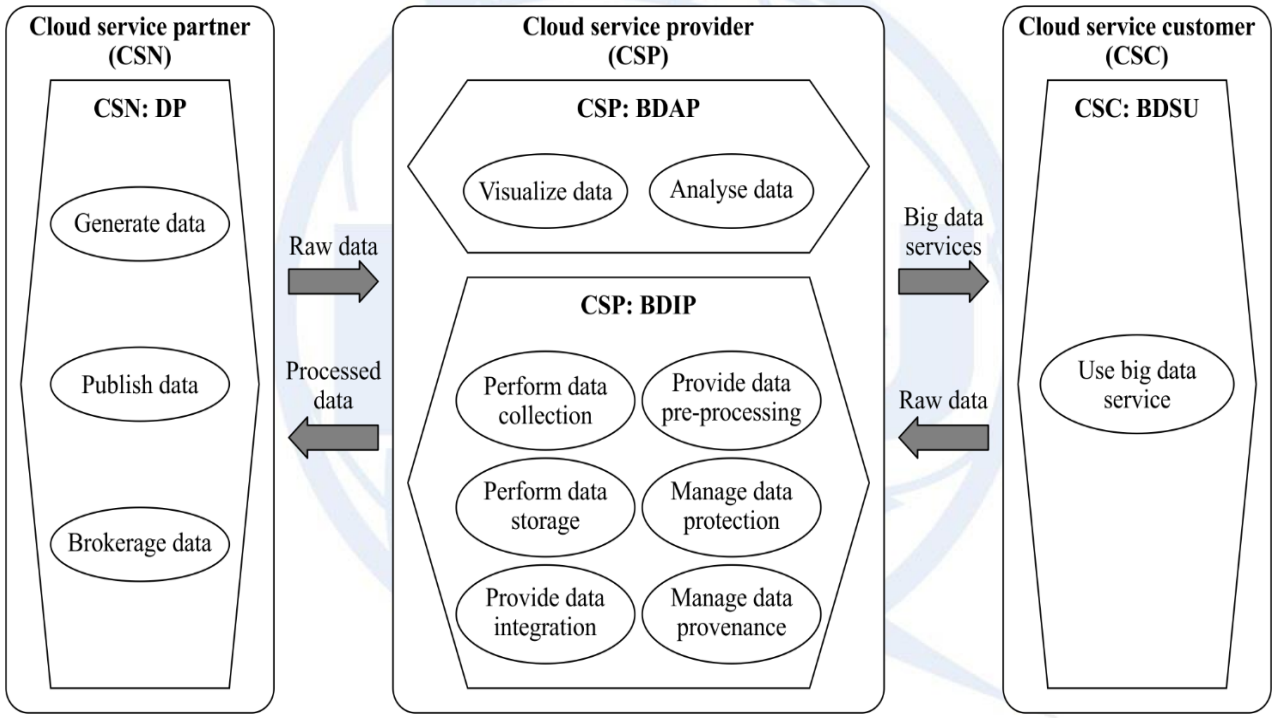
NOTE – Examples of datasets characteristics include high-volume, high-velocity, high-variety, etc.

3.2.2 big data as a service (BDaaS): A cloud service category in which the capabilities provided to the cloud service customer are the ability to collect, store, analyse, visualize and manage data using big data.

Big Data Ecosystem – Y.3600



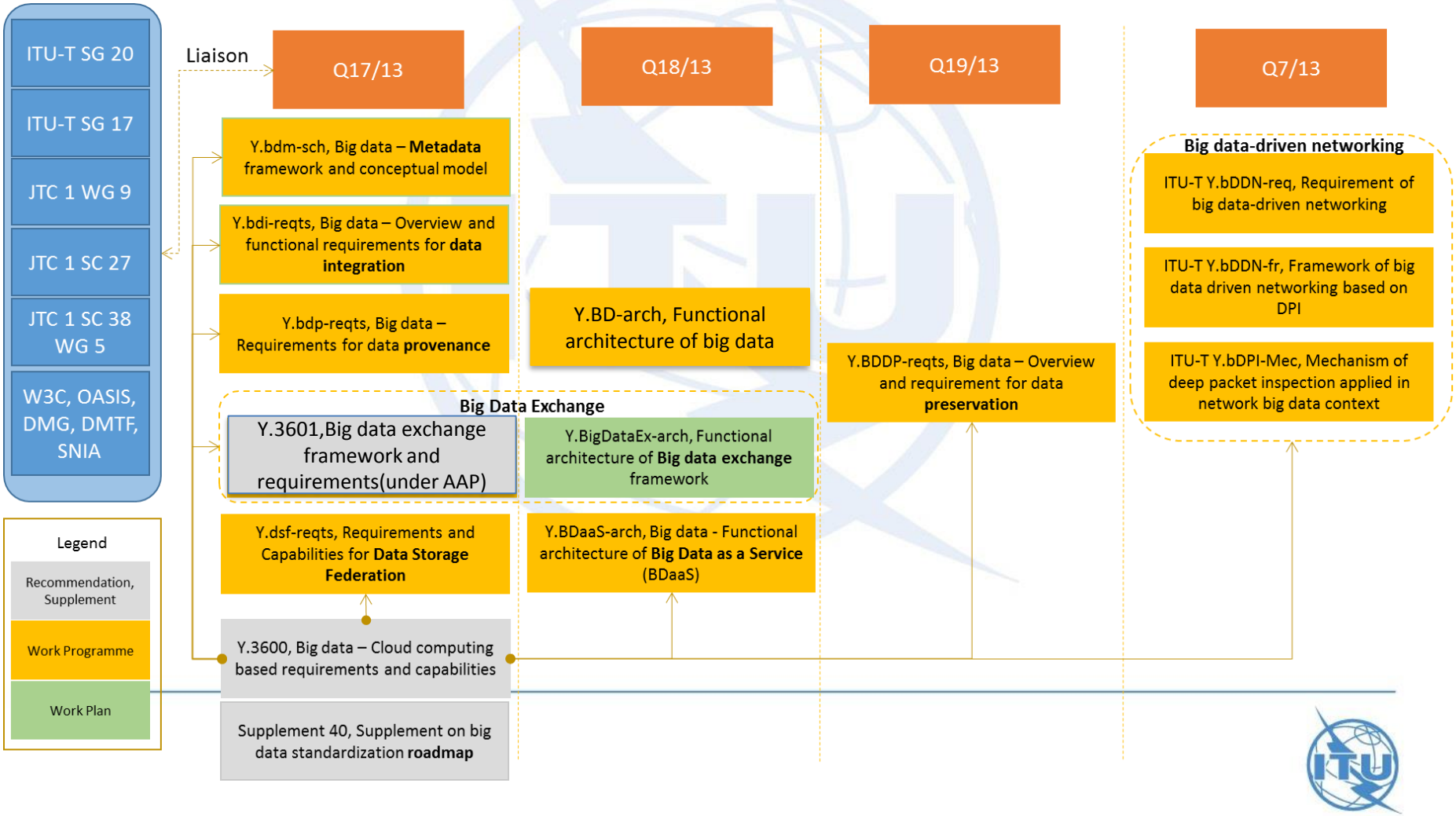
Cloud computing based big data system context – Y.3600



Gap Analysis - Standardization matrix of big data

	General/ Definition	Common requirement/ Use case	Architecture	API, Interface and its profile	Data model, format, schema	Others (e.g., guideline)
Fundamental	ITU-T Y.3600 ISO/IEC 20546 ISO/IEC 20547-1		ITU-T Y.BDaaS-arch ITU-T Y.BD-arch ISO/IEC 20547-3			
Data exchange		ITU-T Y. 3601 (Y.BigDataEX-reqts)			OASIS AMQP 1.0 OASIS MQTT 3.1.1	
Data integration					W3C DCAT W3C JSON-LD 1.0 W3C LDP 1.0 W3C RDF 1.1 W3C OO	
Analysis /Visualization					DMG PMML 4.2.1	TMF BDAG
Data Provenance /Metadata		ITU-T Y.bdp-reats			W3C MVTD W3C MTDMW	
Security /Privacy	ITU-T X.1601 ISO/IEC 27000 IEO/IEC 29100	ISO/IEC 20547-4			ISO/IEC 27002 ISO/IEC 27018	ITU-T X. 1641(X.CSCDataSec) ISO/IEC 27001
Others	ITU-T Y.bDPI-Mec ITU-T Y.bDDN-fr	ITU-T Y.4114 ITU-T Y.dsf-reqts ITU-T Y.bDDN-req ISO/IEC 20547-2	ITU-T Y.3302 (Y.SDN-ARCH)			ISO/IEC 19944 ISO/IEC 20547-5

Big Data Development Roadmap in SG13



Recommendation and Supplement for big data developed in ITU-T SG13

Title of deliverable	Current status	Starting date	Publishing date
ITU-T Y.3600, Big data – Cloud computing based requirements and capabilities	Recommendation	2013-06-28	2015-11-06
ITU-T Y.3601, Big data - Big data exchange framework and requirements	Recommendation(Under AAP)	2015-05-01	2017-11-17(consent time)
ITU-T Y Sup 40, Big data standardization roadmap	Supplement	2015-05-01	2016-07-08

Current work programs on big data in ITU-T SG13

Title of deliverable	Status	Starting date	Questions
ITU-T Y.BDaaS-arch, Cloud computing - Functional architecture of Big Data as a Service	Draft Recommendation	2015-05-01	Q18/13
ITU-T Y.BD-arch, Functional architecture of big data	Draft Recommendation	2011-11-17	Q18/13
ITU-T Y.bDDN-fr, Framework of big data driven networking based on DPI	Draft Recommendation	2015-07-25	Q7/13
ITU-T Y.dsf-reqts, Requirements and Capabilities for Data Storage Federation	Draft Recommendation	2016-04-29	Q17/13
ITU-T Y.bDPI-Mec, Mechanism of deep packet inspection applied in network big data context	Draft Recommendation	2016-04-29	Q7/13
ITU-T Y.bDDN-req, Requirement of big data-driven networking	Draft Recommendation	2016-04-29	Q7/13
ITU-T Y.bdp-reqts, Big data – Requirements for data provenance	Draft Recommendation	2016-07-08	Q17/13
ITU-T Y.bdi- reqts, Big data – Overview and functional requirements for data integration	Draft Recommendation	2017-02-17	Q17/13
ITU-T Y.bdm-sch, Big data – Metadata framework and conceptual model	Draft Recommendation	2017-02-17	Q17/13
ITU-T Y.BDDP-reqts, Big data – Overview and requirement for data preservation	Draft Recommendation	2017-02-17	Q19/13

Thank you