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| **Telecommunication Standardization Bureau** |  |
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Geneva, 1 March 2012

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| - To Administrations of Member States  of the Union  **Copy:**  - To ITU-T Sector Members;  - To ITU-T Associates;  - To ITU-T Academia;  To the Chairman and Vice-Chairmen  of Study Group 13;  - To the Director of the Telecommunication Development Bureau;  - To the Director of the Radiocommunication Bureau |

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| Subject: | **Approval of new Questions 26, 27 and 28/13** |

Dear Sir/Madam,

1 At the request of the Chairman of Study Group 13, *Future networks including mobile and NGN*, I have the honour to inform you that, in accordance with the procedure described in Resolution 1, Section 7, § 7.2.2, of WTSA (Johannesburg, 2008), Member States and Sector Members present at the last meeting of this Study Group which was held in Geneva on 6 February 2012, agreed by reaching consensus to approve the following new Questions:

*Question 26/13 -* *Cloud computing ecosystem, inter-cloud and general requirements* (see Annex 1)

*Question 27/13 -* *Cloud functional architecture, infrastructure and networking* (see Annex 2)

*Question 28/13 -* *Cloud computing resource management and virtualization* (see Annex 3)

2 **Questions 26, 27 and 28/13 are therefore approved.**

3 The resulting Recommendations are assumed to fall under the Alternative approval process (AAP**) apart from those** assigned to any cloud computing deliverable with regulatory implications, which will fall under the TAP (Traditional approval process).

4 The new Questions are allocated to the new Working Party 6/13 *“Cloud Computing”.*

Yours faithfully,

Malcolm Johnson  
Director of the Telecommunication  
Standardization Bureau

**Annexes:** 3

ANNEX 1  
(to TSB Circular 262)

Text of Question 26/13

**QUESTION 26/13 – Cloud computing ecosystem, inter-cloud and general requirements**

(New Question)

### 1 Motivation

Cloud computing is a model for enabling service user’s ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services), that can be rapidly provisioned and released with minimal management effort or service provider interaction. The cloud computing model is composed of five essential characteristics (on-demand, delivery over a broad network access, resource pooling, rapid elasticity, self and measured services), five cloud computing service categories, i.e., Software as a Service (SaaS), Communication as a Service (CaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS) and Network as a Service (NaaS), and different deployment models (public, private, hybrid…).

Cloud computing was considered for several years as information technology service-centric and controlled by Internet players. However telecommunication players have an important role to play in the emerging cloud computing market and ecosystem. The telecommunication network is a central part for multi-tenant cloud computing architecture delivering multi-services for multi-users with high QoS and optimal resource allocation.

According to the recommendations of the Focus Group on cloud computing, the cloud computing ecosystem and the inter-cloud are considered important study items. The primary focus of this Question is to provide the necessary overall cloud computing framework and requirements related to the integration and support of the cloud computing model and technologies in telecommunication ecosystems.

This Question is intended to develop new Recommendations for:

1. cloud computing definitions, ecosystem and use cases;
2. cloud computing high-level requirements and general capabilities;
3. inter-cloud requirements for interoperability and data portability.

### 2 Question

Study items to be considered include:

1. What new Recommendations should be developed for cloud definitions, ecosystem, use cases and cloud benefits from telecommunication perspectives?
2. What new Recommendations should be developed for Cloud high-level requirements and general capabilities?
3. What new Recommendations should be developed for requirements for cloud interoperability and data portability between Cloud Service provider that are appropriate and achievable for inter-cloud use cases?
4. What collaboration is necessary to minimize duplication of efforts with other SDOs?

### 3 Tasks

Tasks include:

1. Developing Recommendations for cloud definitions, ecosystem, use cases, business roles and cloud benefits from telecommunication perspectives
2. Developing Recommendations for cloud high-level requirements and general capabilities
3. Developing Recommendations for Inter-cloud including use cases and requirements for interoperability, data portability and Desktop as a Service (DaaS) requirements and architecture aspects.

* Providing the necessary collaboration for the work in the ITU-T and related Cloud Computing work in SDOs, consortia and forums related to cloud computing.

Note: Output documents of the Focus Group on Cloud Computing will be considered as a main input for study items developed in the question.

### 4 Relationships

Recommendations: Y-series and all future network related Recommendations

Questions: All NGN and future network related Questions

Study Groups: ITU-T Study Groups 5, 16 and 17

Standardization bodies:

* ISO/IEC JTC 1/SC 38, SC 32 and SC 27
* National Institutes of Standards and Technology (NIST)
* Global Inter-Cloud Technology Forum (GICTF)
* Distributed Management Task Force (DMTF)
* Cloud Security Alliance (CSA)

ANNEX 2  
(to TSB Circular 262)

**Text of Question 27/13**

**QUESTION 27/13 – Cloud functional architecture, infrastructure and networking**

(New Question)

### 1 Motivation

Cloud computing is a model for enabling service user’s ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services), that can be rapidly provisioned and released with minimal management effort or service provider interaction. The cloud computing model is composed of five essential characteristics (on-demand, delivery over a broad network access, resource pooling, rapid elasticity, self and measured services), five cloud computing service categories, i.e., Software as a Service (SaaS), Communication as a Service (CaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS) and Network as a Service (NaaS), and different deployment models (public, private, hybrid…).

Cloud computing was considered for several years as information technology service-centric and controlled by Internet players. However telecommunication players have an important role to play in the emerging cloud computing market and ecosystem. The telecommunication network is a central part for multi-tenant cloud computing architecture delivering multi-services for multi-users with high QoS and optimal resource allocation.

According to the recommendations of the Focus Group on cloud computing, cloud computing architecture, cloud computing infrastructure and cloud networking are considered important study items.

The definition of a cloud computing reference architecture is necessary to allow for design, build and run of cloud services and resources, and to avoid vertical vendor solutions lock-in (services, platform and infrastructure).

A cloud computing infrastructure includes servers, storages, networks, and other hardware appliances. It is the basis of a "cloud", which provides computing capability, storage capability and network capability, and provides relevant cross layer supporting functions to support the upper layer cloud computing services as well.

Cloud networking aspects are also important to be considered in order to support elastic resource allocation for different cloud computing deployment models (e.g., flexible bandwidth, Layer 2 and Layer 3 virtual private networks, end-to-end QoS), to provide network services (Layer 4 to Layer 7) to meet on demand cloud computing services as well as virtualization-aware cloud computing networks to guarantee flexible network configurations for better service quality.

The primary focus of this Question is to provide the overall cloud computing architecture, cloud computing infrastructure and cloud networking views related to the integration and support of the cloud computing model and technologies in telecommunication ecosystems.

This Question is intended to develop new Recommendations for:

1. cloud computing functional reference architecture;
2. cloud computing infrastructure including cloud networking aspects.

### 2 Question

Study items to be considered include:

1. What new Recommendations should be developed regarding the cloud computing reference architecture, including the specification of corresponding functional requirements, and the definition of functions and their inter relations? (This will cover the inter-cloud and Desktop as a Service (DaaS) architecture aspects.)
2. What new Recommendations should be developed regarding the infrastructure and networking aspects of cloud computing?
3. What collaboration is necessary to minimize duplication of efforts with other SDOs?

### 3 Tasks

Tasks include:

1. Developing Recommendations for cloud computing reference architecture (including inter-cloud and DaaS), covering the identification of architectural requirements, functions, and their inter-relation required to provide cloud services.
2. Developing Recommendations for cloud computing infrastructure and networking aspects, covering the identification of functional requirements and functions for computing, storage and networking (intra-cloud network, inter-cloud network and core transport) capabilities.

* Providing the necessary collaboration with external SDOs, consortia and forums working on cloud computing architectures and infrastructures, such as ISO/IEC JTC 1/SC 38, NIST, DMTF and GICTF.

### 4 Relationships

Questions: All cloud computing related SG 13 Questions (Q.26/13, Q.28/13…)

Study groups: SG 17 for cloud computing security, SG 16 for DaaS

Standardization bodies, forums and consortia:

* ISO/IEC JTC 1/SC 38
* IETF
* IEEE
* ETSI
* ATIS
* Distributed Management Task Force (DMTF)
* Storage Networking Industry Association (SNIA)
* Global Inter-Cloud Technology Forum (GICTF)

ANNEX 3  
(to TSB Circular 262)

**Text of Question 28/13**

**QUESTION 28/13 – Cloud computing resource management and virtualization**

(New Question)

### 1 Motivation

Cloud computing is a model for enabling service user’s ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services), that can be rapidly provisioned and released with minimal management effort or service provider interaction. The cloud computing model is composed of five essential characteristics (on-demand, delivery over a broad network access, resource pooling, rapid elasticity, self and measured services), five cloud computing service categories, i.e., Software as a Service (SaaS), Communication as a Service (CaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS) and Network as a Service (NaaS), and different deployment models (public, private, hybrid…).

Cloud computing was considered for several years as information technology service-centric and controlled by Internet players. However telecommunication players have an important role to play in the emerging cloud computing market and ecosystem. The telecommunication network is a central part for multi-tenant cloud computing architecture delivering multi-services for multi-users with high QoS and optimal resource allocation.

According to the recommendations of the Focus Group on cloud computing, cloud computing resource management, virtual application/multi-tenancy and network virtualization are considered important study items.

The primary focus of this Question is to provide specifications for cloud computing resource management, and the use of virtualization techniques for cloud applications and networks.

This Question is intended to develop new Recommendations for:

* cloud computing resource management;
* virtual application and multi-tenancy;
* network virtualization for cloud computing.

### 2 Question

Study items to be considered include:

1. What new Recommendations should be developed regarding the management of cloud computing resources?
2. What new Recommendations should be developed regarding the application virtualization, multi-tenancy and the use of network virtualization in cloud computing?
3. What collaboration is necessary to minimize duplication of efforts with other SDOs?

### 3 Tasks

Tasks include:

1. Developing Recommendations for cloud computing resources management.
2. Developing Recommendations for application virtualization and cloud-computing-based full network virtualization.

* Providing the necessary collaboration with external SDOs, consortia and forums working on cloud computing architectures and infrastructures, such as ISO/IEC JTC 1/SC 38, DMTF, and SNIA.

### 4 Relationships

Questions: All cloud computing related SG 13 Questions (Q.26/13, Q.27/13, Q.4/13 and Q.21/13)

Study groups: SG 17 for cloud computing security

Standardization bodies, forums and consortia:

* ISO/IEC JTC 1/SC 38
* Distributed Management Task Force (DMTF)
* Storage Networking Industry Association (SNIA)

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