

# ITU Workshop on “Cloud Computing”

(Tunis, Tunisia, 18-19 June 2012)

## Cloud Computing Standards: Overview and ITU-T positioning



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# Outline

1. Understanding Cloud Computing
2. France Telecom Orange Business Services Portfolio
3. FG Cloud Computing:
  1. Cloud Standard Cloud definitions Ecosystem and interoperability
  2. Cloud Functional Reference Architecture
  3. Cloud Security & Privacy
4. Cloud Standards and ITU-T positioning

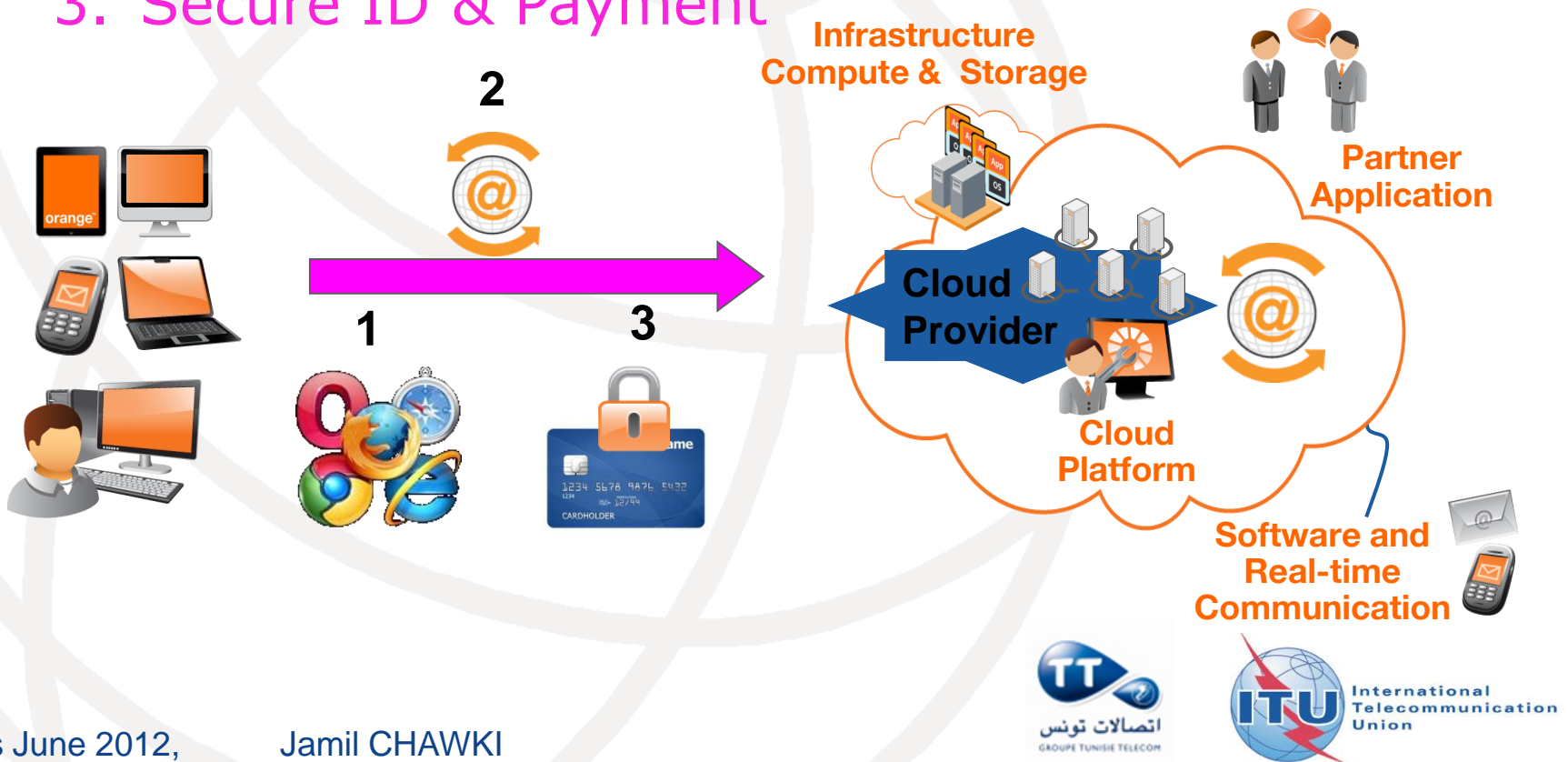
# 1

# Understanding Cloud Computing

# A simple way to understand Cloud

Access a Web based Application from Any connected devices using:

1. Web Browser
2. Internet /VPN network connectivity
3. Secure ID & Payment

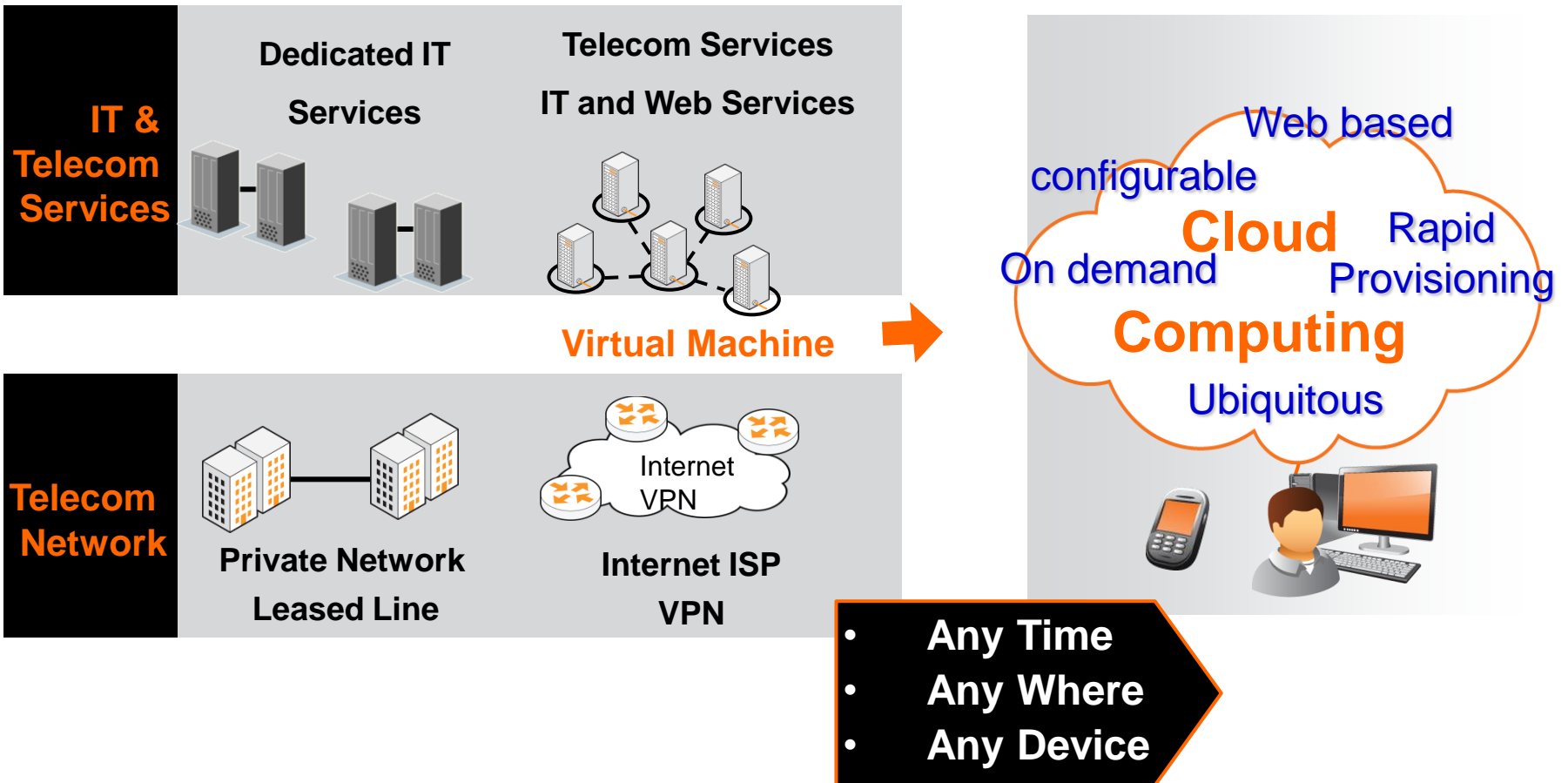


# From Internet Service Provider ISP to Application Services Provider ASP and Cloud Computing

1980,1990

2000  
ISP-ASP

2008...  
Cloud

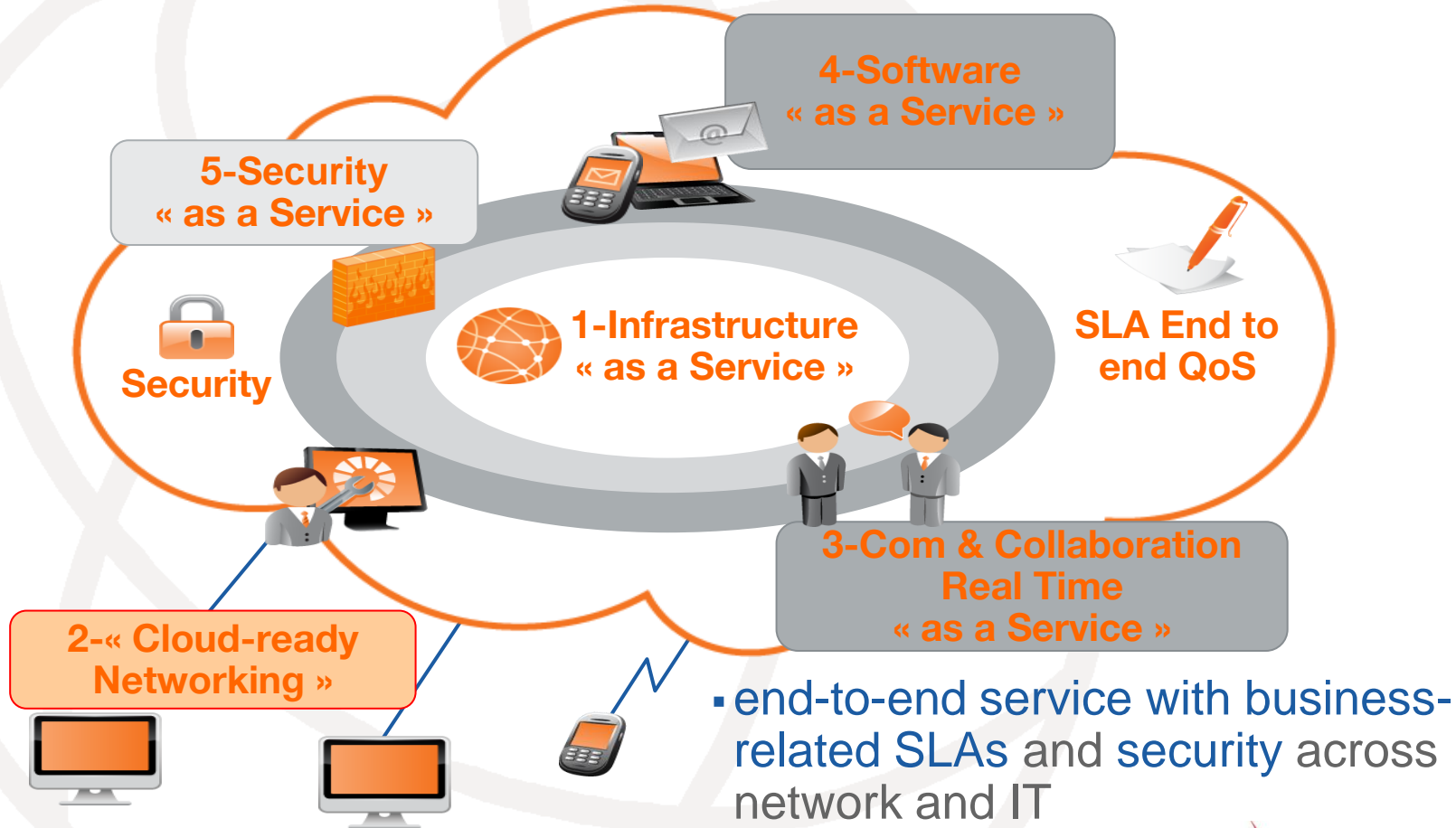


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# An example of Telecom Operator view

# France Telecom / Orange Business Services Cloud services:

a complete catalogue to simplify access to solutions delivered “as a service” with security and end-to-end SLAs



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# ITU-T FG Cloud Computing



# Focus Group Cloud Computing (June 2010-Dec 2011)

- **Focus Group on Cloud Computing** has completed its study into cloud computing's and has released its **Technical Report** in Seven Parts:
  - 1) Introduction to the cloud ecosystem: **definitions, taxonomies, use cases and high-level requirements**
  - 2) Functional requirements and **reference architecture**
  - 3) Requirements and framework architecture of cloud **infrastructure**
  - 4) Cloud resource **management** gap analysis
  - 5) Cloud **security**
  - 6) Overview of **SDOs** involved in cloud computing
  - 7) Cloud computing **benefits from telecommunication** and ICT perspectives

<http://www.itu.int/en/ITU-T/focusgroups/cloud/Documents/FG-coud-technical-report.zip>

# Cloud Definitions, Ecosystem and Interoperability

# ITU-T FG Cloud Definition



## ■ ITU-T FG Cloud Computing (2011)

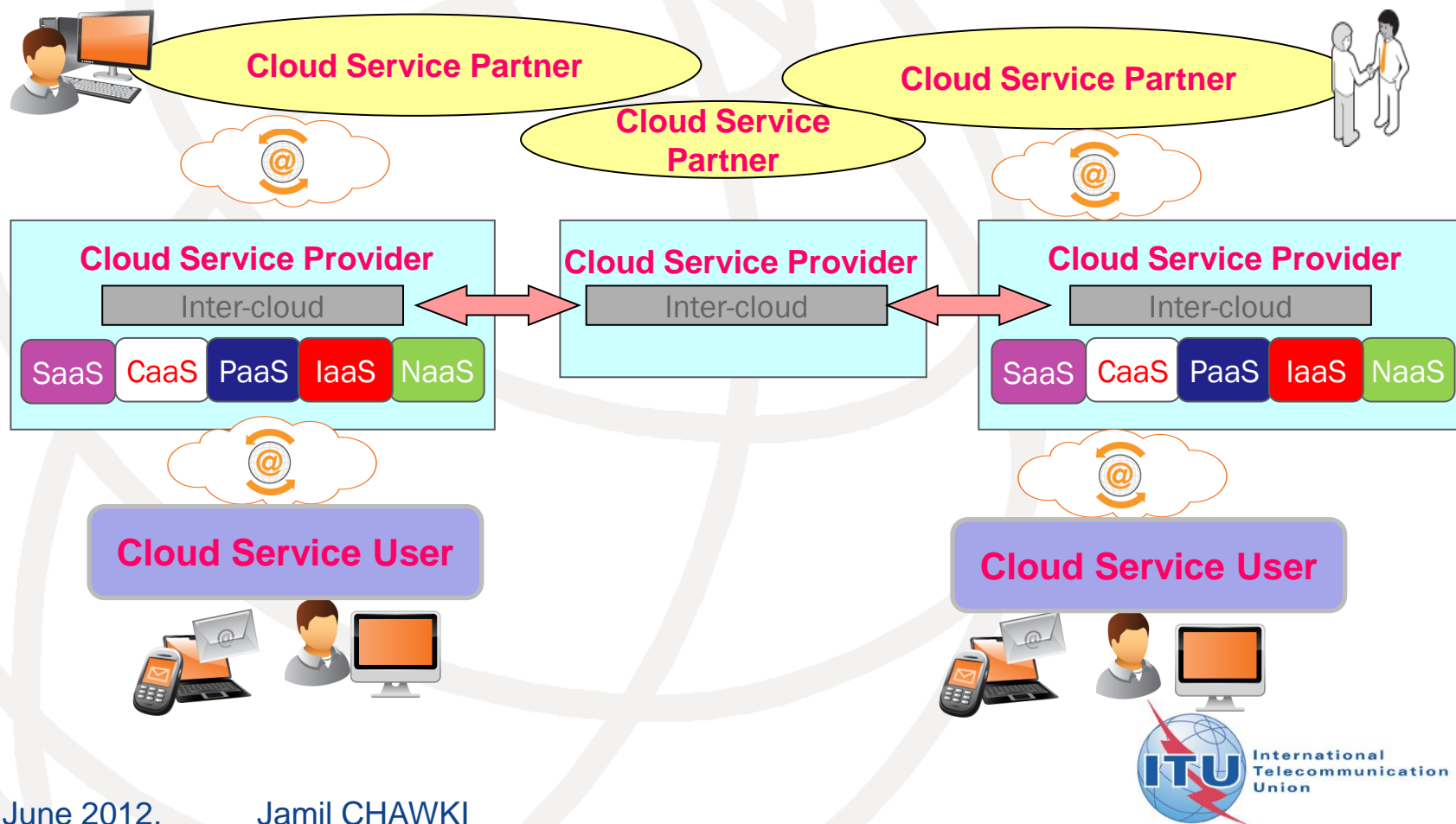
- **Cloud Services**: Products and solutions that are delivered and consumed on demand (utilizing IT Resources & capabilities of Platform) at **any time**, through **any access network** (fixed & mobile) using **any connected devices** and cloud computing technologies.
- **5 Cloud service categories (SaaS, CaaS, PaaS, IaaS, Naas)**
- **Cloud Computing\***: an emerging IT development, deployment and delivery model, enabling service users to have ubiquitous, convenient and 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. **Cloud computing enables cloud services.**

\* Partially based on NIST cloud definition

# Cloud Ecosystem

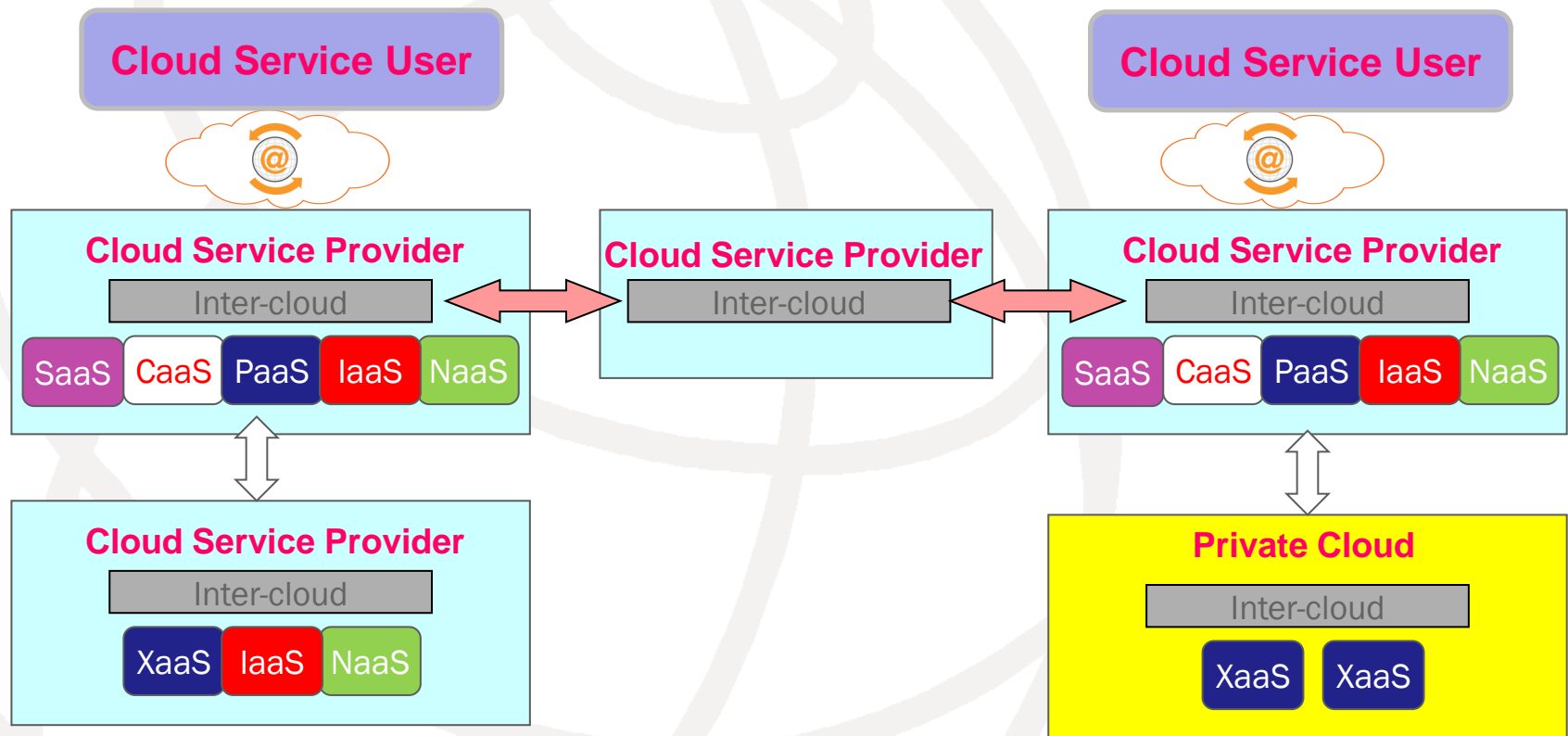
Three **actors** playing different **roles**:

1. Cloud **Service Provider** CSP: XaaS Provider, Inter-Cloud...
2. Cloud **Service User** CSU: Consumer, Enterprise...
3. Cloud **Service Partner** CSN: Application Developer, Integrator...



# Cloud interoperability: use cases

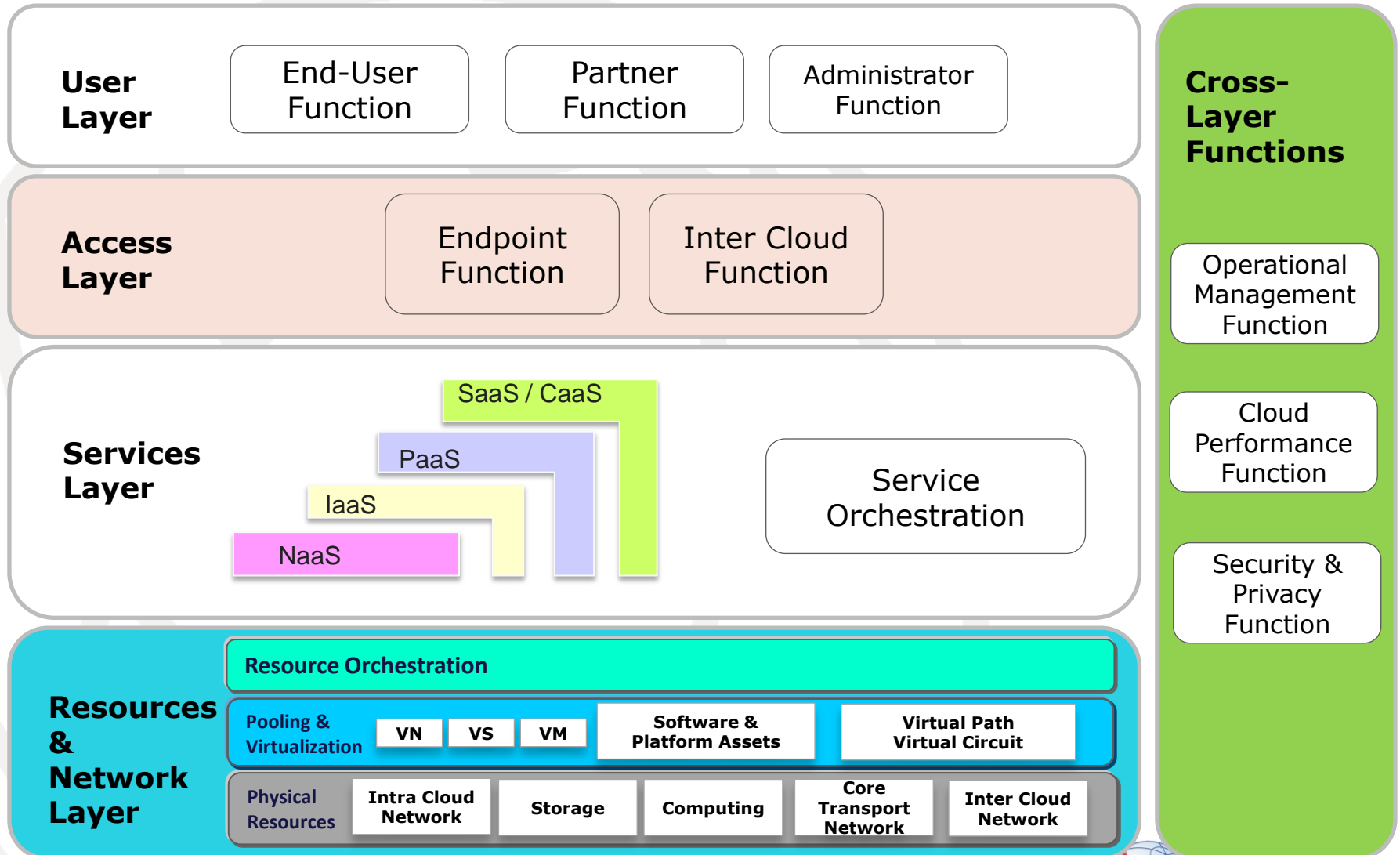
1. Service cooperation between Cloud providers
2. Cloud interoperability between **private & public** clouds
3. Mutual **backup** and recovery from a disaster



# Cloud Functional Reference Architecture

# Cloud Functional Architecture

## First Cloud ICT architecture



# Main Cloud Layers and functions

- Access layer:
  - **Endpoint** : controls cloud traffic and improves cloud service delivery
  - **Inter Cloud**: addresses delivering any cloud service across two or more CSPs
- Services layer:
  - **Service Orchestration**: is the process of deploying and managing “Cloud Services”
  - Cloud **Services**: provides **instances** (and composition) of CaaS, SaaS, PaaS, IaaS & NaaS
- Resources & Network Layer:
  - **Resource orchestration**
  - Pooling **Virtualization**: compute, storage, network, software & platform assets
  - **Physical** resources



# Cloud Security & Privacy

# Cloud Security & data Privacy

- **Threats for cloud users:**

- **Lack of security Information** (data location, backup system, disaster recovery...)
- **Data loss and leakage** (encryption, authentication key...)
- **Loss of Account/Service management ID** (Attack phishing, fraud..)

- **Requirements For cloud Services provider**

- **Method to trust cloud providers'** security level shall be provided
- **Confidentiality/integrity of data** against loss or leakage shall be required
- **Proper account/identity management** against account/service hijacking shall be provided.
- **Data Portability**, The capability to change Cloud Service Provider shall be provided

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## ITU-T Positioning in cloud Standards

# Organizations active in cloud standards

## Management API, Inter-cloud and security



- DMTF – Distributed Management Task Force

} APIs for managing cloud resources



- SNIA - Storage Networking Industry Association

} API for Cloud Storage



- OGF – Open Grid Forum

} Inter-Cloud



- GICTF - Global Inter-Cloud Technology Forum

} Cloud Services E2E SLA



- TM Forum – TeleManagement Forum

} Identity in the Cloud



- OASIS

} Security aspects



- Cloud Security Alliance

## Definition, Ecosystem , Network, Access & Architectures



- ISO IEC-JTC 1; SC 38: Distributed Application Platforms and Services (SOA, WS, Cloud)



- ITU-T - Cloud Computing Focus Group , *SG 13 and SG 17*



- NIST - National Institute of Standards and Technology



- W3C – activities on HTML-5 (offline mode, multi-device...)



- IETF - Network & Real Time Communication protocols



Portability, Inter-Cloud, Marketplace, Private cloud...



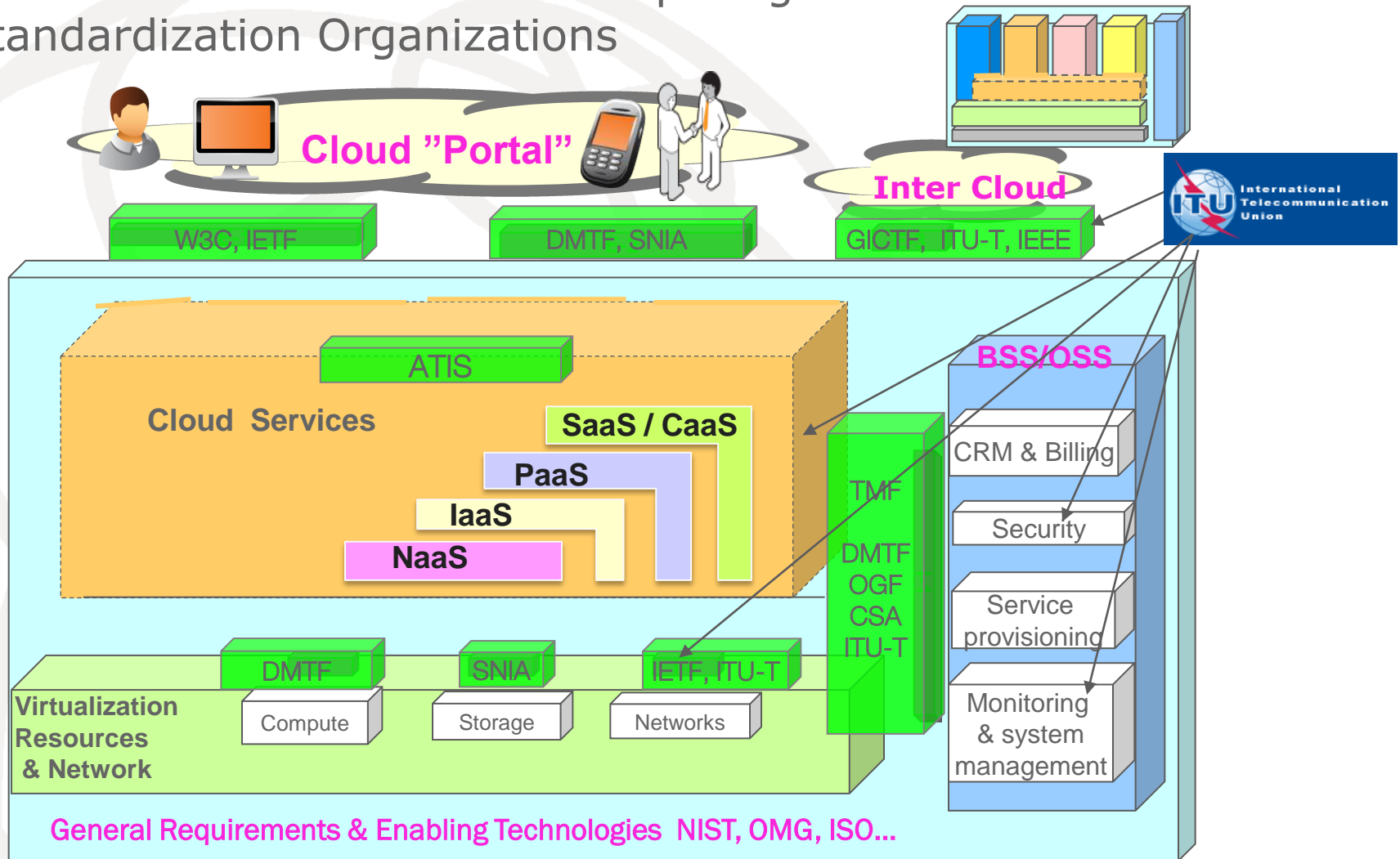
# Creation of new **Cloud WP-6** in **SG 13**

## Future Networks (Feb 2012)

- **Question 26/13** :Cloud computing ecosystem, inter-cloud and general requirements"
- **Question 27/13** :Cloud functional architecture, infrastructure and networking
- **Question 28/13** :Cloud computing resource management and virtualization
- **New Recommendations:** (Next meeting October 2012)
  - Definition and vocabulary
  - Ecosystem , use cases and general requirements
  - Reference Architecture of cloud computing
  - Infrastructure functional requirements
  - ... Resource Management, DaaS and InterCloud ...
- A Collaborative Team is under consideration between ITU-T SG13 and ISO IEC SC 38 for definition and architecture

# ITU-T Positioning in cloud standards

A **JCA-Cloud** (Joint Coordination Activity) is created to coordinate the ITU-T cloud computing work with Other standardization Organizations





# Thank You

# Network Model for cloud infrastructure

