

# **ITU-TRCSL Symposium on Cloud Computing**

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## **Introduction to Cloud Computing Technologies**



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# Outline

1. Understanding Cloud Computing
2. Examples of Cloud Computing
3. Cloud Standards and Achievements  
in ITU-T



**1**

# **Understanding Cloud Computing**

# Cloud Computing

## Definition per ITU-T Y.3500

**“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”**

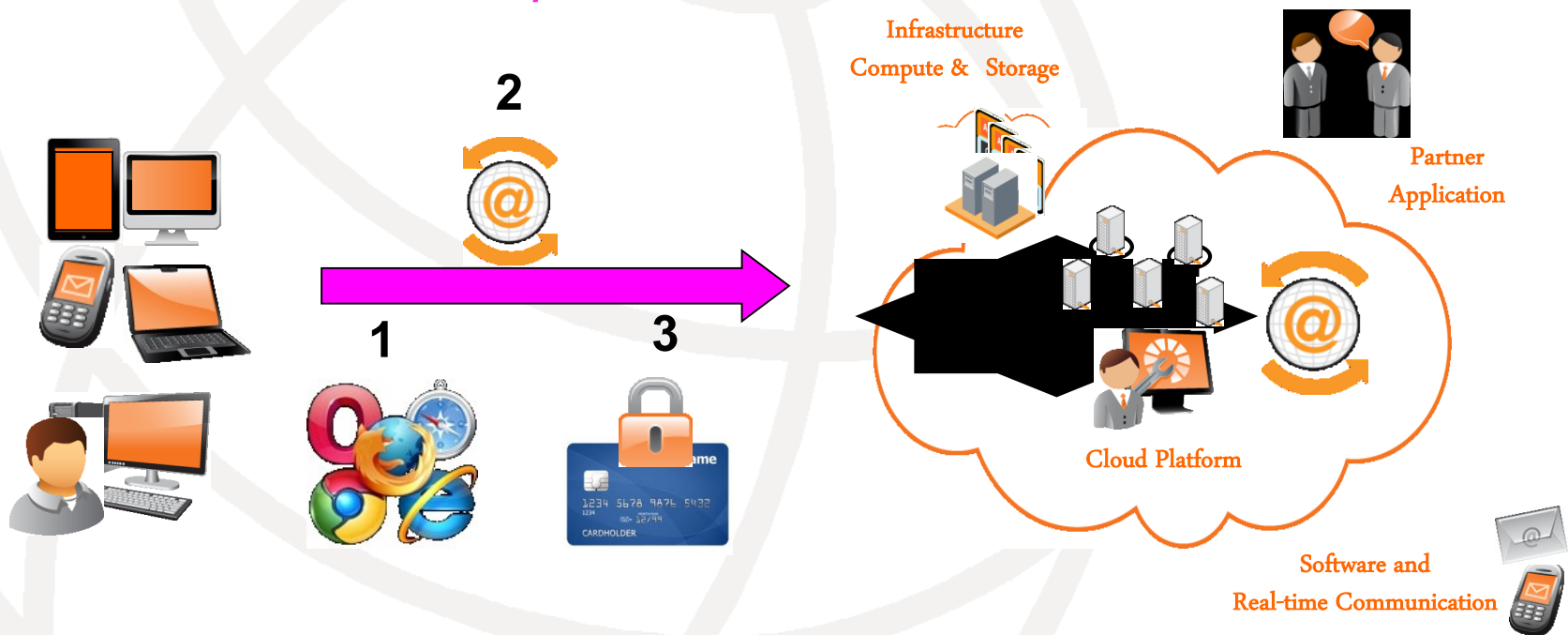
NOTE – Examples of resources include servers, operating systems, networks, software, applications, and storage equipment.

[Source: ISO/IEC 17788 | Recommendation ITU-T Y.3500 “Information technology - Cloud computing - Overview and vocabulary”, approved on 13 August 2014]

# 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

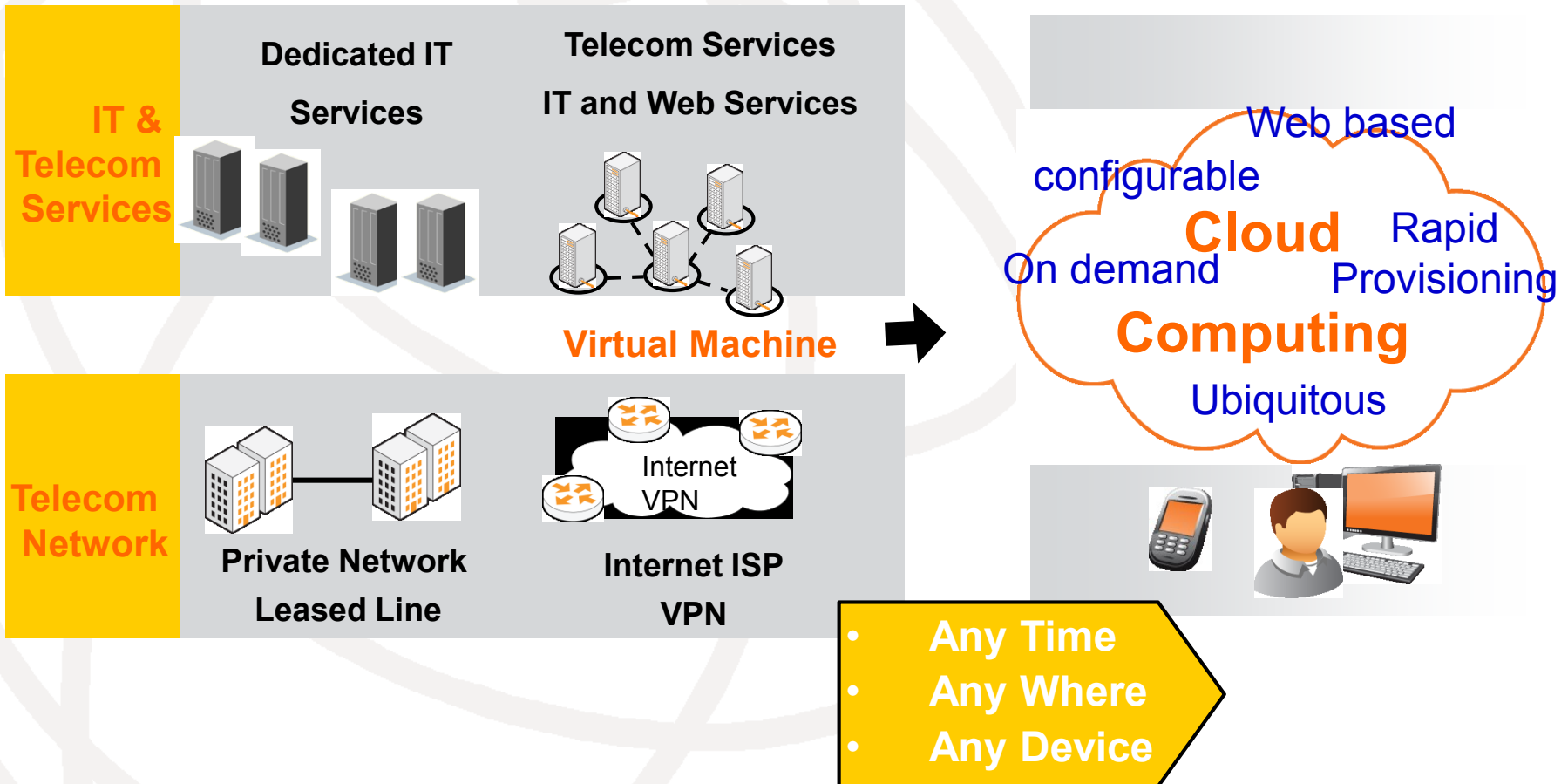


# From ISP to ASP and Cloud Computing

1980,1990

2000  
ISP-ASP

2005...  
SaaS & Cloud



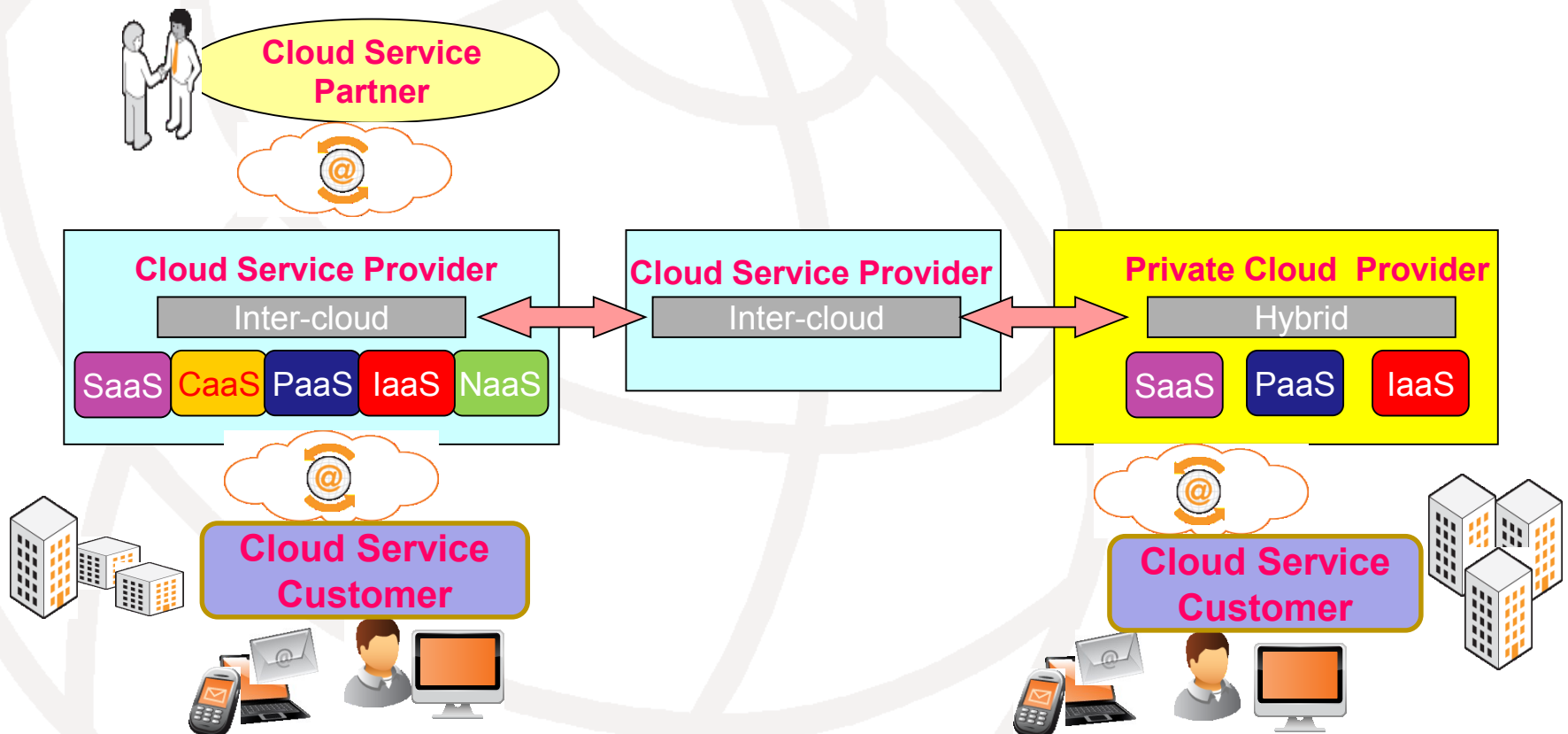
# Cloud Computing Definition & Services

- **Cloud computing:** paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with on-demand self-service provisioning and administration  
NOTE – Examples or resources include servers, operating systems, networking, software, and storage equipment.
- **Cloud services:**
  - **Software as a Service (SaaS):**
  - **Infrastructure as a Service (IaaS):**
  - **Platform as a Service (PaaS):**
  - **Communications as a Service (CaaS):** real time com
  - **Compute as a Service (CompaaS):**
  - **Data Storage as a Service (DSaaS):**
  - **Network as a Service (NaaS)**

# Cloud Ecosystem

## Three main roles:

1. Cloud **Service Provider**: XaaS Provider, Inter-Cloud...
2. Cloud **Service Customer**: Consumer, Enterprise...
3. Cloud **Service Partner**: Application Developer, Integrator...





# Cloud Deployment Models & Characteristics

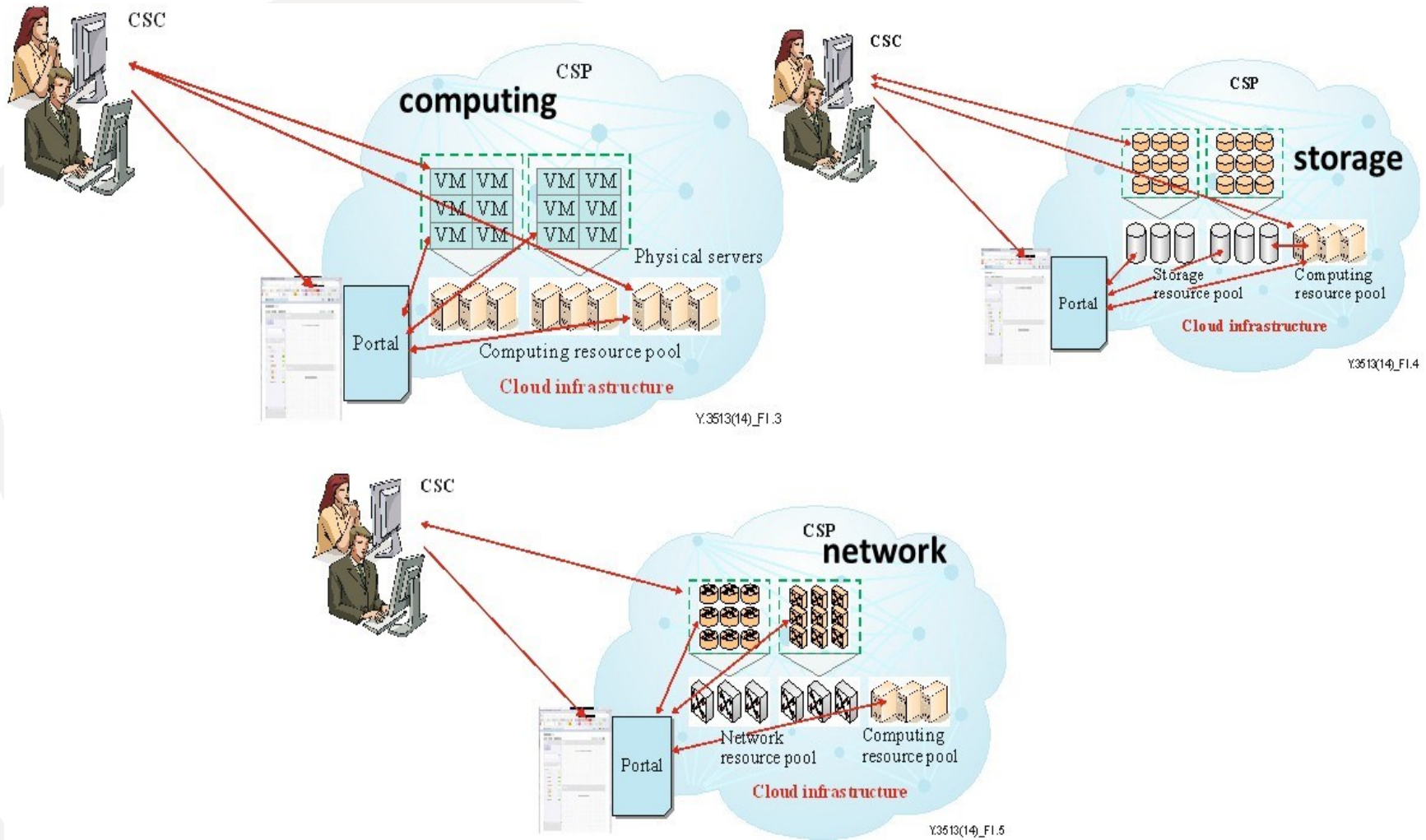
- **Deployment Model:** way in which **cloud computing** can be organized based on control of physical or virtual resources and how those resources are shared
  - **public cloud**
  - **private cloud**
  - **community cloud**
  - **hybrid cloud**
- **Main Characteristics**
  - **On-demand self-service**
  - **Broad network access**
  - **Multi-tenancy** (multiple **tenants** with an isolated computations and data resources)
  - **Resource pooling**
  - **Rapid elasticity and scalability**
  - **Measured Service** (usage based)



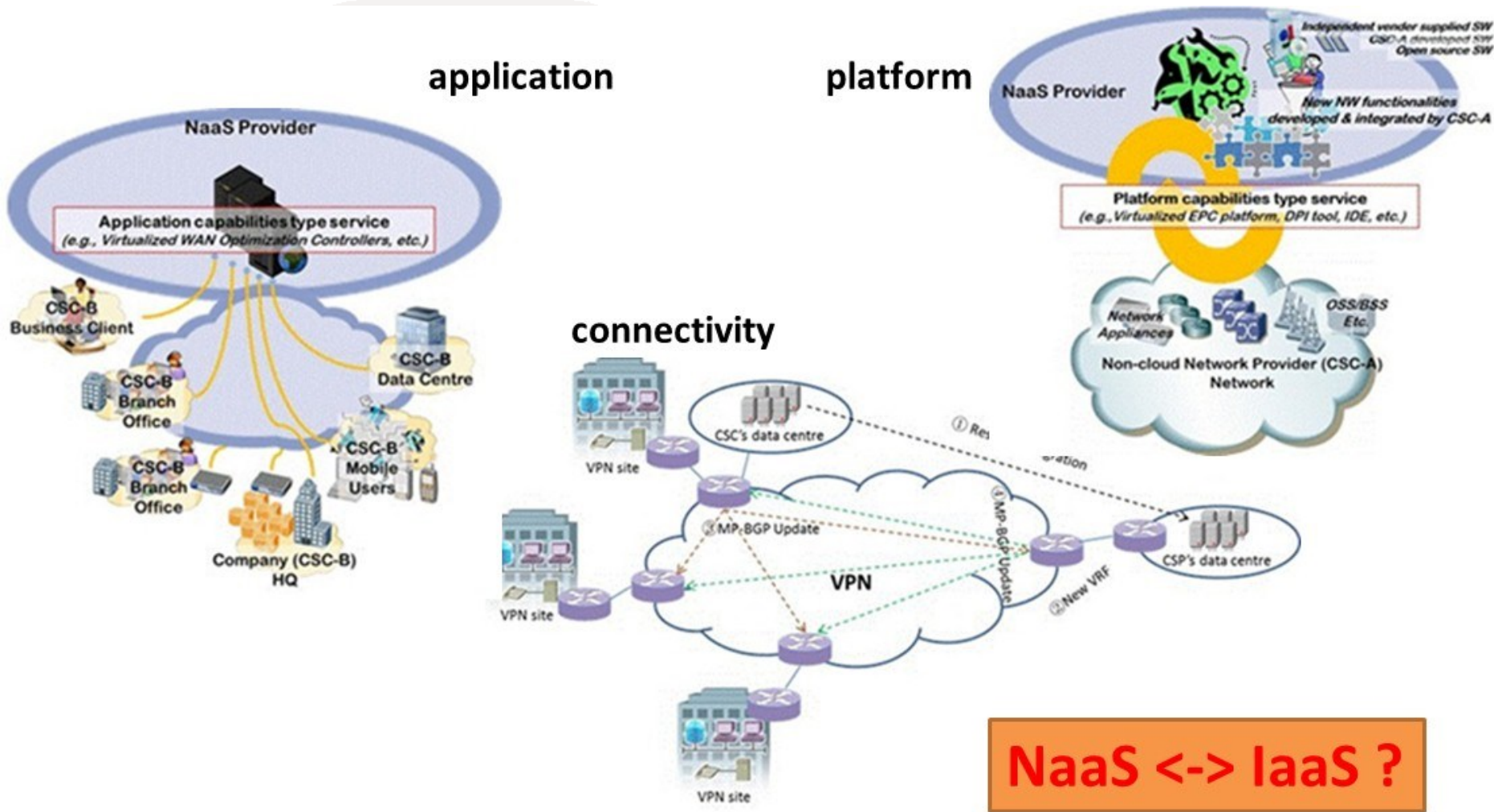
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# Examples of Cloud Computing

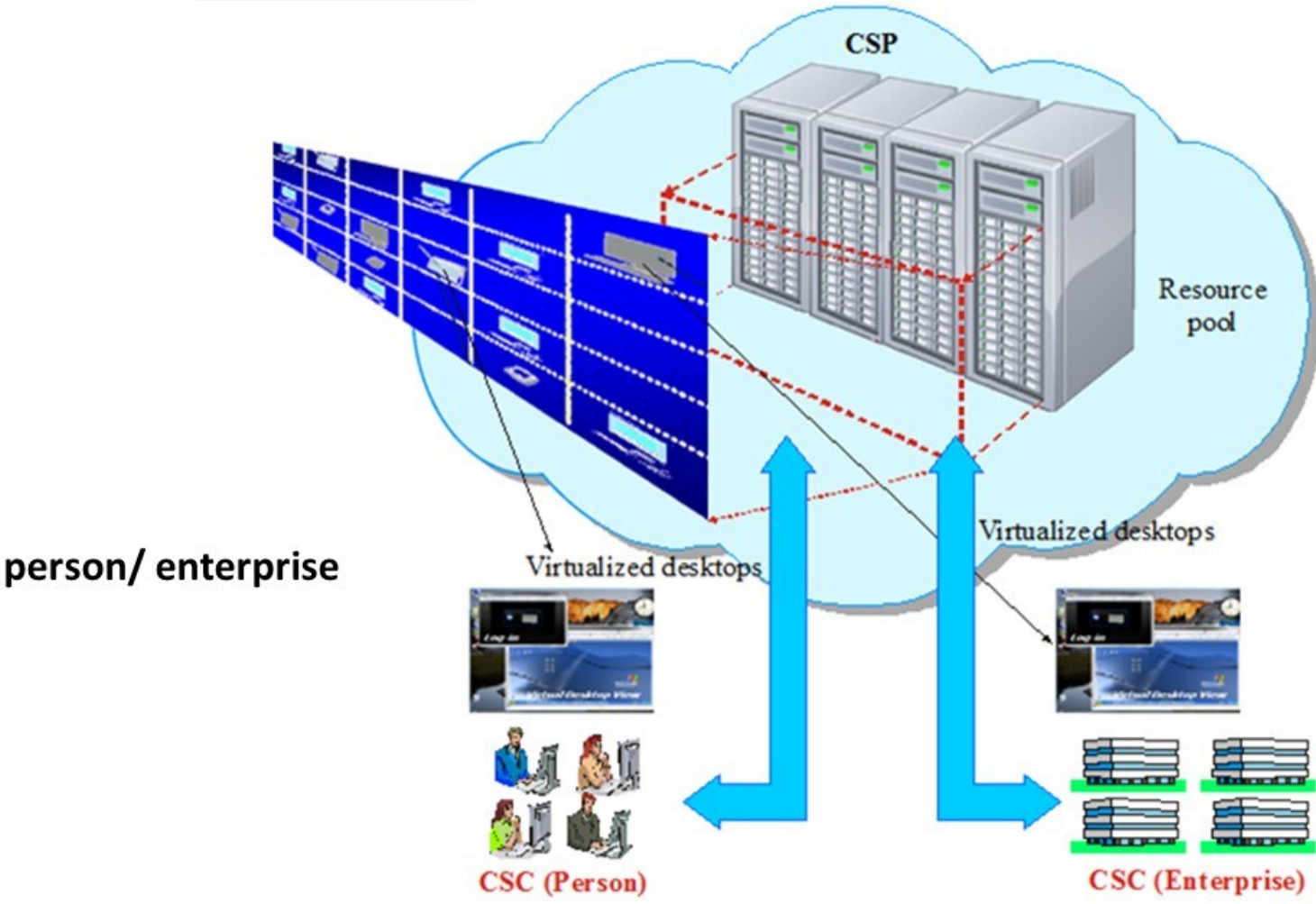
# Infrastructure as a service (cont.)



# Network as a service (cont.)



# Desktop as a service (Y.3503)

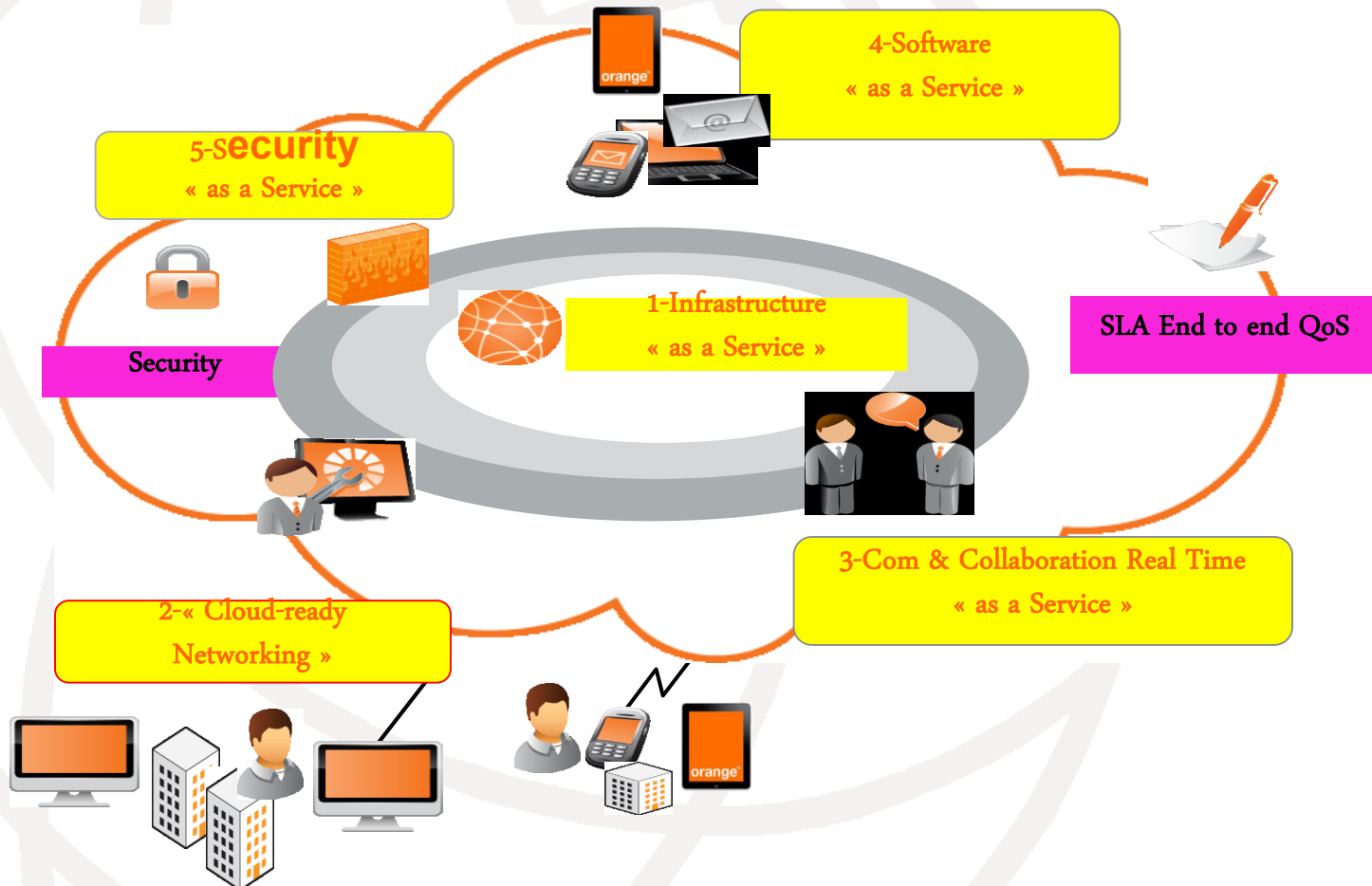


Y.3501(13)\_F04



# Orange Business Services Cloud services:

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





# 3

## **Cloud Standards and Achievements in ITU-T**

# Some History

- 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, Orange, CT, China Unicom and ZTE proposed to create a dedicated Working Party with 3 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 Working Party led by Jamil Chawki (in Geneva)



# SG 13, structures for Cloud Computing

- WP2/13 as a center of CC study (Q.17, 18, 19/13)
  - ➔ Collaborative Teams with ISO/IEC JTC1 SC38 (Established in June 2012 and terminated in July 2014):
    - CT-CCVOCAB : cloud overview and vocabulary
    - CT-CCRA: cloud reference architecture
  - ➔ JCA-Cloud
  - ➔ JRG-CCM: Joint Rapporteur Group on cloud computing management (with ITU-T SG2)
  - ➔ SG13 RG-AFR (Regional Group for Africa)

# WP2/13- Cloud Computing

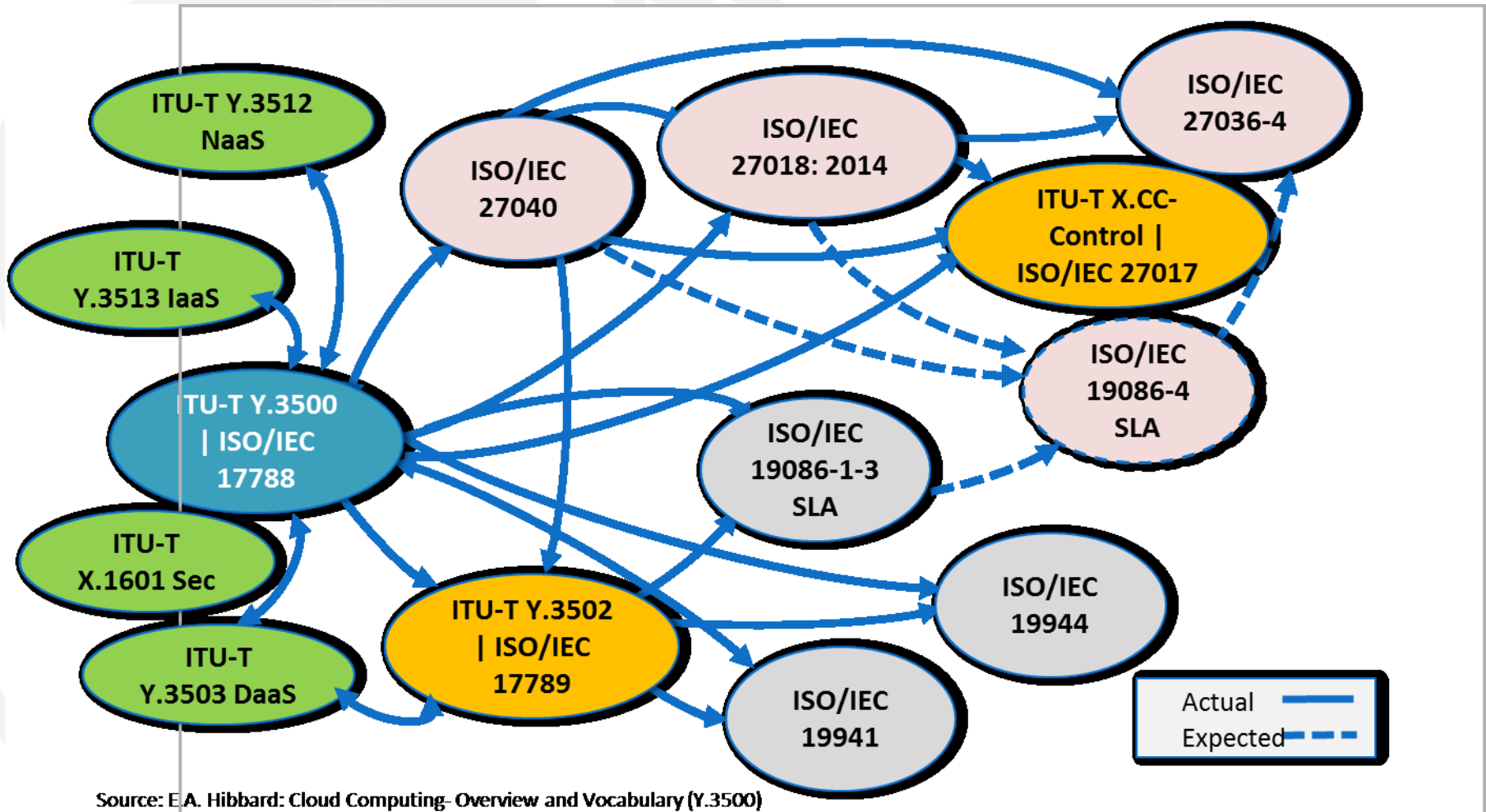
- Q17: Cloud computing ecosystem, general requirements, and capabilities
- Q18: Cloud functional architecture, infrastructure and networking
- Q19: End-to-end Cloud computing service and resource management

# Published recommendations

- Y.3500: Cloud computing - Overview and Vocabulary\*
- Y.3501: Cloud computing framework and high-level requirements
- Y.3502: Cloud computing - Reference architecture\*
- Y.3503: Requirements for Desktop as a Service
- Y.3510: Cloud Computing Infrastructure Requirements
- Y.3511: Framework of inter-cloud computing
- Y.3512: Cloud computing - Functional requirements of NaaS
- Y.3513: Cloud Computing - Functional requirements of IaaS
- Y.3520: CC framework for e-2-e resource management
- \* Common text with ISO/IEC JTC1 SC38/WG3

# Use of Y.3500 in ISO/IEC and ITU-T

Architecture, DaaS, NaaS, IaaS, Privacy, Security, SLA, Interoperability ■ ■ ■



# Thank you!

