Cloud Computing Ecosystem

April, 2012

TTC

NEC Corporation

Cloud Computing in TTC

Cloud Deployment Waves

Success Factors

Summary
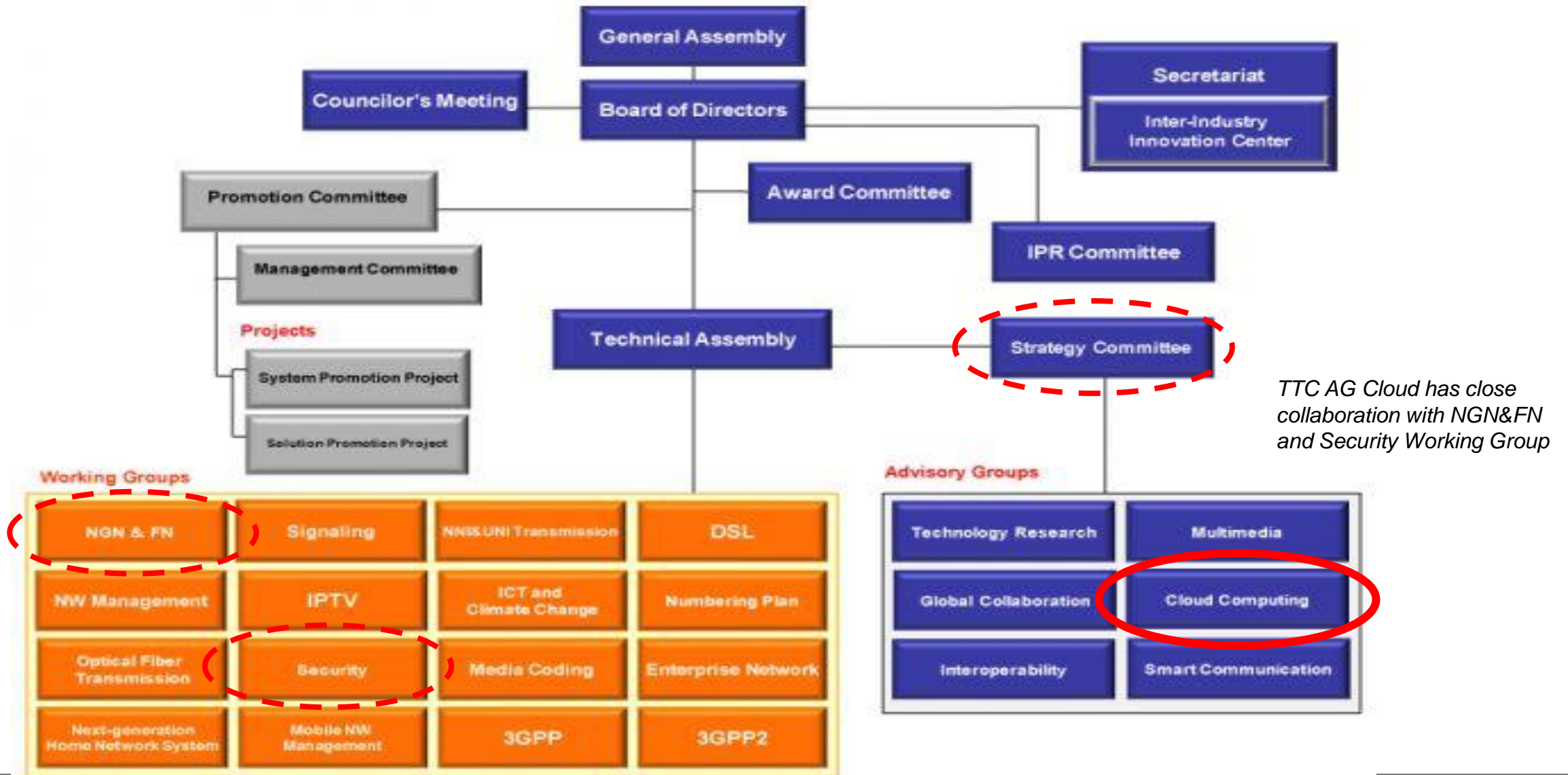
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CLOUD COMPUTING IN TTC

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TTC and Cloud Computing AG

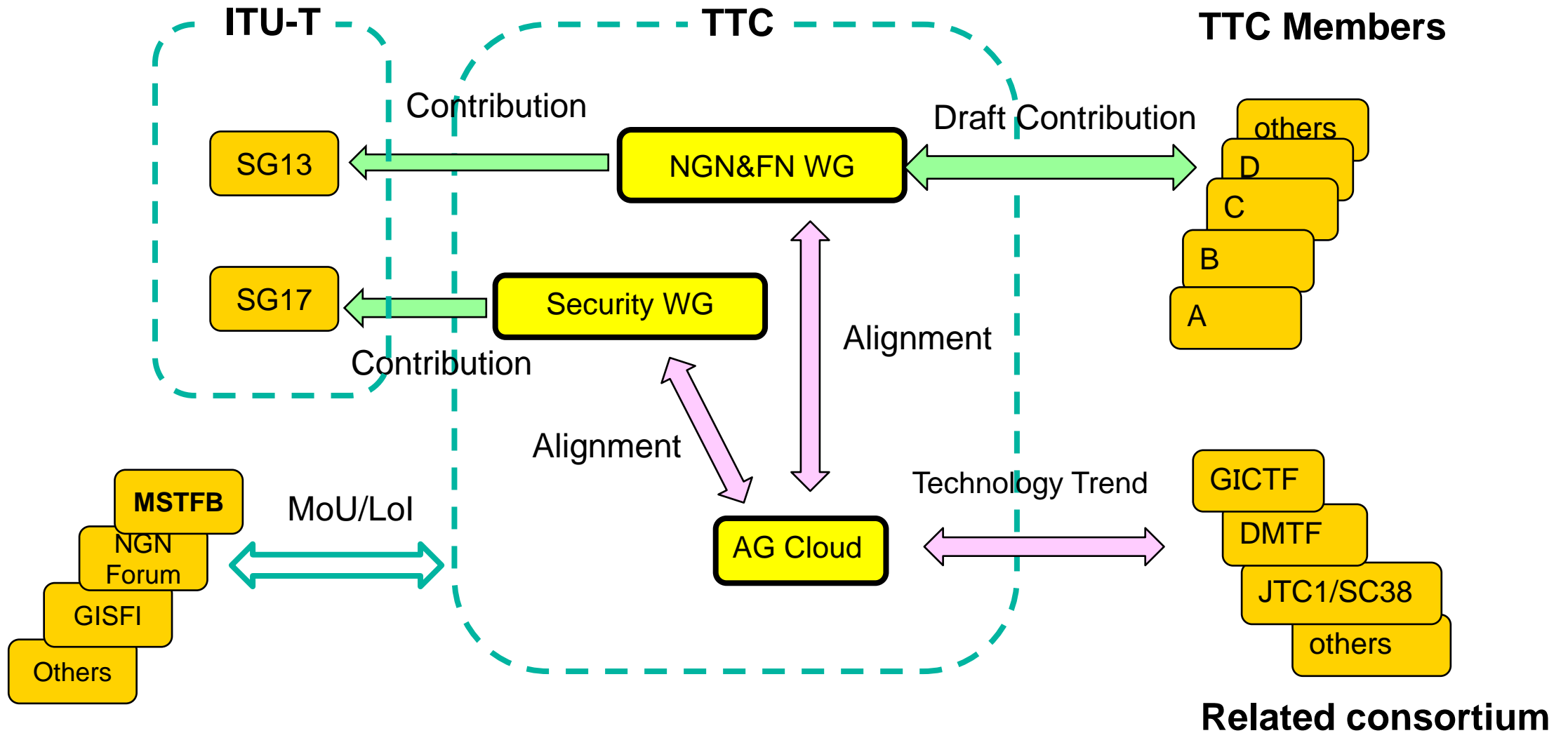**TTC (Telecommunication Technology Committee)**

- Established in 1985
- This committee will:
  - (1) develop protocols and standards for telecommunications networks
  - (2) conduct studies and research on protocols and standards for telecommunications networks
  - (3) disseminate protocols and standards for telecommunications networks
  - (4) engage in activities accompanied by the above items, and
  - (5) engage in other business activities necessary to achieve the purpose of the committee
- Signed MoU (Memorandum of Understanding) with MSTFB in October, 2011

Cloud Computing Advisory Group ("AG Cloud") was established in 2011 within TTC, has started surveying the global trends of standardization on the cloud-related technologies and discussing how to identify and standardize the items necessary for the domestic specifications.

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Organization Chart

TTC AG Cloud has close collaboration with NGN&FN and Security Working Group

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Relationship with other consortiums

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Development of Inter-Cloud use case, requirement, API interface

Four white papers produced in 2011-2012

1. Use cases and functional requirements for inter-cloud computing, 2011.

    • Six use cases and requirements

2. Network and technical requirements in support of inter-cloud, Dec. 2011.

    • Detailed study on required network functionalities in three timeframes

3. Inter-cloud interface specification on protocols, Feb. 2012.

    • Information flows between two cloud operators

4. Inter-cloud interface specification on resources data model for network control, Feb. 2012.

    • Data semantics between two cloud operators   http://www.gictf.jp/index_e.html

CLOUD DEPLOYMENT WAVES

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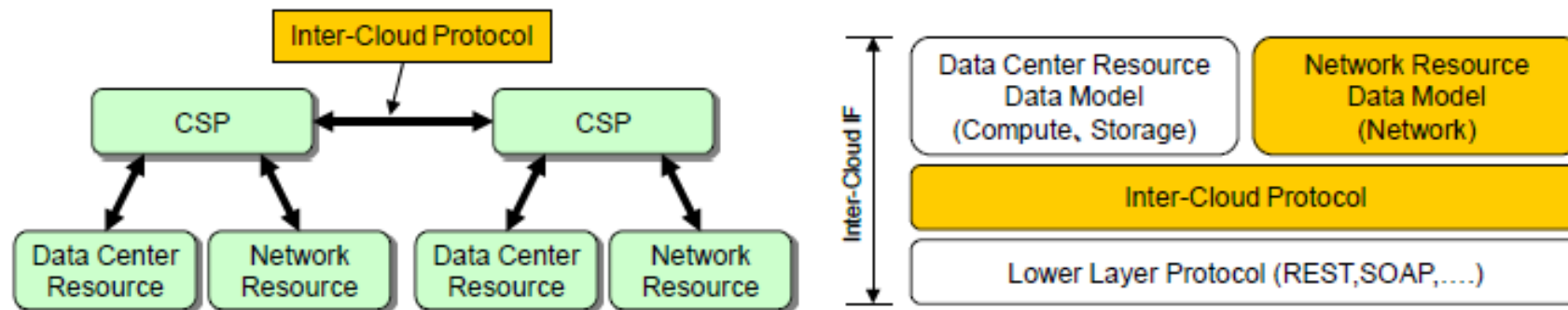
Ref. "Cloud Computing" definition by NIST

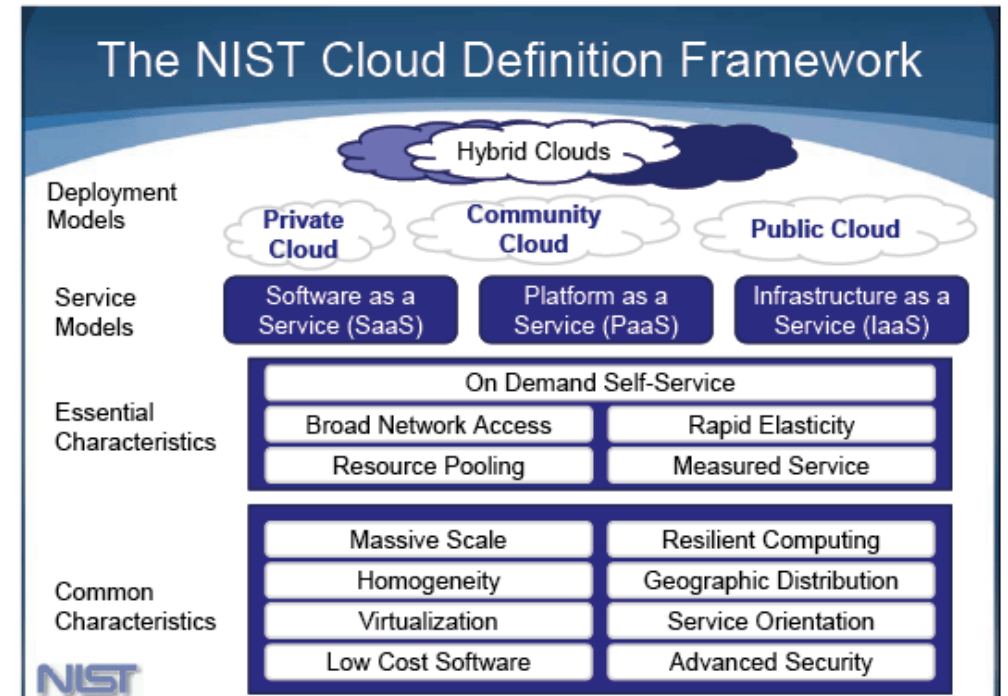## 5 essential characteristics

- service-based
- scalable and elastic
- shared
- metered by use
- Internet technologies

## 3 services

- SaaS
- PaaS
- IaaS

4 delivery models

- Private
- Public
- Hybrid
- Community

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

The NIST Cloud Definition Framework

NIST : National Institute of Standards and Technology

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1st Wave – Accommodate Workload Variance

An ideal service for users whose demand changes drastically or unpredictably, such as Game Developers, new start-up companies

Well supported by cloud service providers with a huge scale or abundant capacity
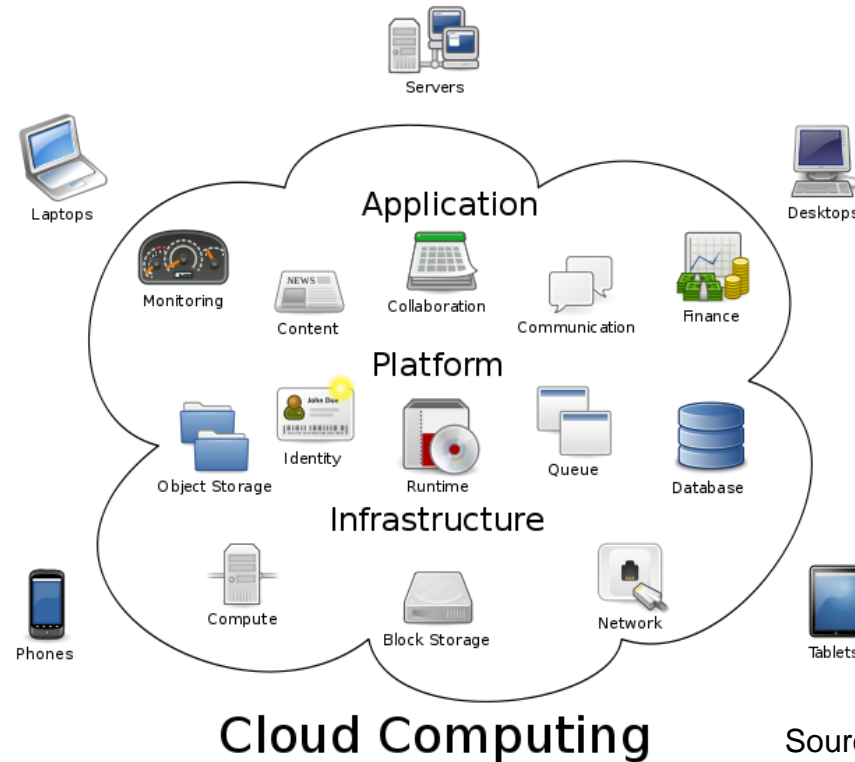
Source : http://en.wikipedia.org/wiki/Cloud_computing

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Public Cloud and Private Cloud

Consumers are happy with Internet-based Cloud

Large enterprise has an option to build its own Cloud

How about the others ?

Public Cloud

Google UK

The Internet

Private Cloud

Inside the Enterprise

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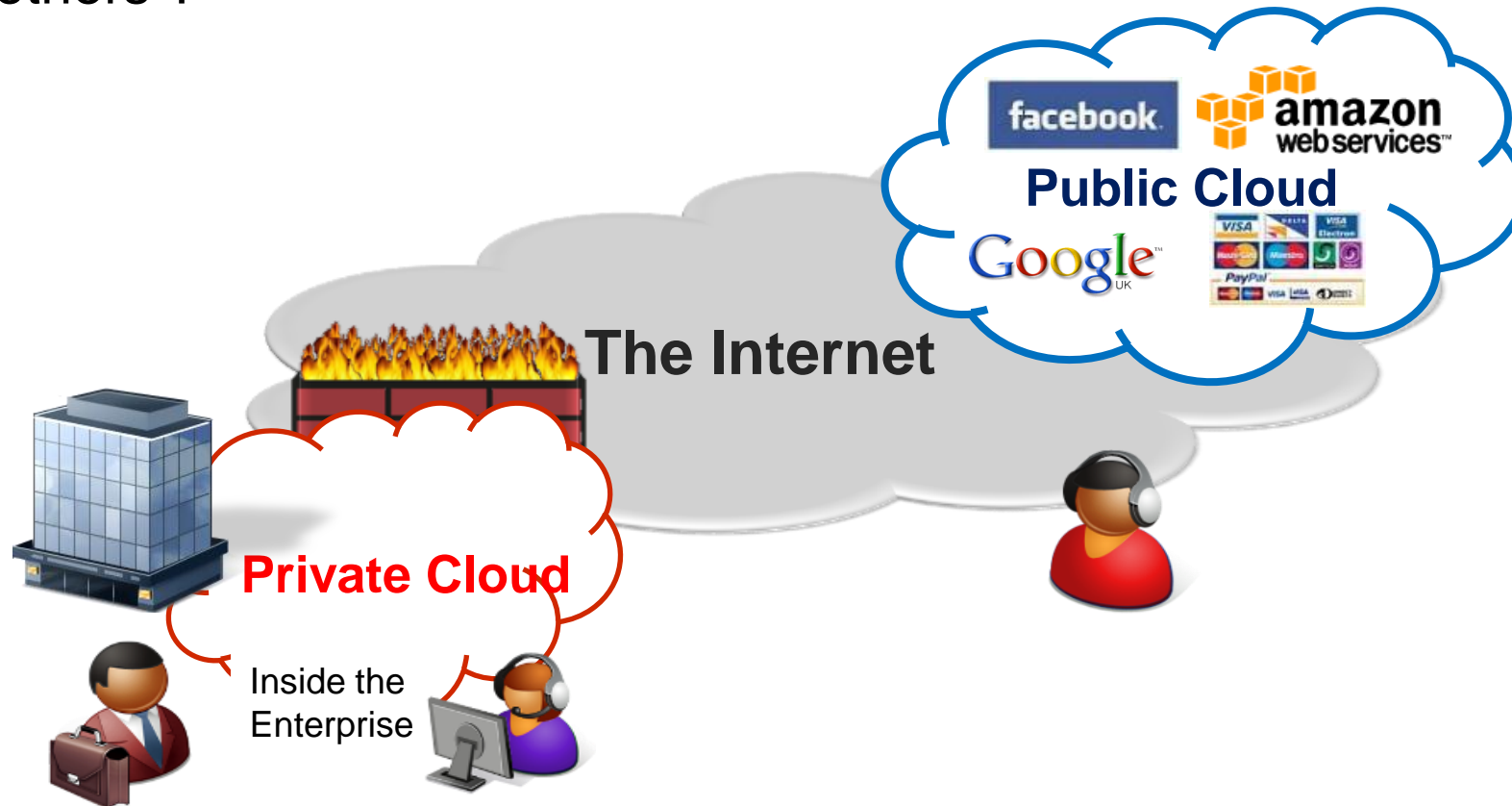
2nd Wave – General Application/Resource for SME

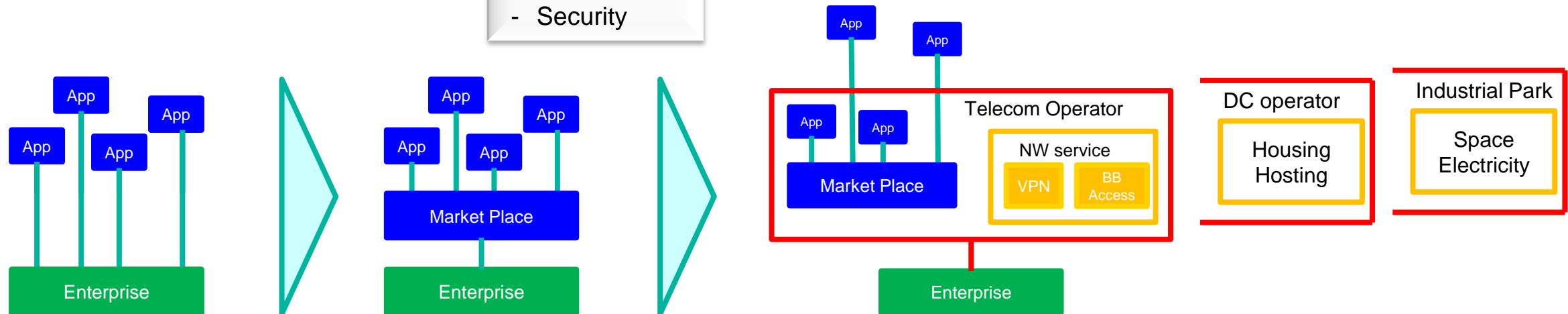**IT Outsourcing Trend by Enterprises**

- Hardware : Server, Storage
- Software : Application

It is the Value in Aggregation that is Significant

- For SME
- For local, small ISVs

- Identity
- Billing
- Access
- Performance
- Security

NEC "Carrier Cloud" Proposition

Telecom Operator

NW service — VPN, BB Access

Market Place

App · App

Enterprise

DC operator — Housing Hosting

Industrial Park — Space Electricity

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Successful Project Records

NEC has proven records, carriers select NEC as a partner for carrier cloud business. Now the number of marketplace is expanding.

Australia

Spain

Argentina

Thailand

Thailand

Russia/CIS

Under commercial implementation for several Tire-1 carriers

Under trial or planning for commercial in many carriers

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3rd Wave – Verticalization of Cloud Services

Vertical applications were implemented as a system integration job for the few top companies in each industry

Cloud computing potentially creates a new market, namely "Cloudified Vertical Applications"

"Vertical Application for SME"
- Typical SME is not equipped with sophisticated IT expertise
- Employees are professional in their own subject, not in IT

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The Sweet Spot

For Carriers the "sweetest opportunities" will be close to home:
- Build from current customer base, namely network customers
- Build links across industry / Synergies, e.g.;
  - Construction workers to architects
  - Insurance company to healthcare institute
  - Moving along the supply chain, production to distribution to retail
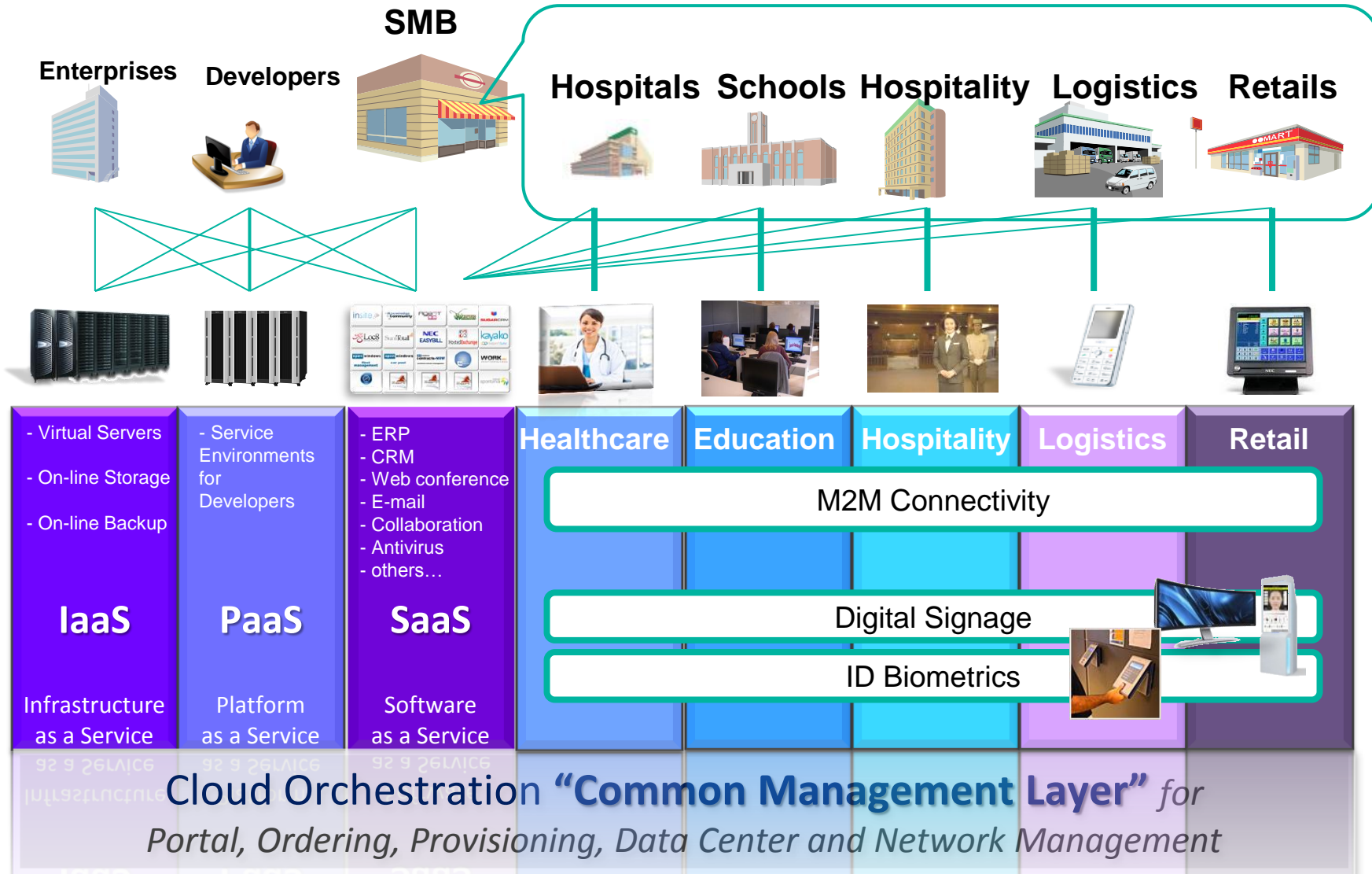
Taking Vertical Cloud to different industries will mean:
- Building new relations with new customers
- Building new skills
- Building new marketing and distribution channels

Choose a role in the ecosystem
- Making build-buy-partner decisions

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Wider Cloud with NEC

SMB

Enterprises   **Developers**

Hospitals Schools Hospitality Logistics Retails

IaaS	PaaS	SaaS	Healthcare	Education	Hospitality	Logistics	Retail
- Virtual Servers - On-line Storage - On-line Backup	- Service Environments for Developers	- ERP - CRM - Web conference - E-mail - Collaboration - Antivirus - others…	M2M Connectivity				
Infrastructure as a Service	Platform as a Service	Software as a Service	Digital Signage				
			ID Biometrics				

Expanding …

Cloud Orchestration **"Common Management Layer"** *for*
Portal, Ordering, Provisioning, Data Center and Network Management

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SUCCESS FACTORS

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Carrier side : Focus on the "3 Business Rules"

1 **Churn reduction**
By adding real "Carrier Value" to the Carrier Subscription

2 **ARPU increase**
Monthly Recurrent Revenue

3 **OPEX control**
Outsourced services, Carrier infrastructures for Carrier Service

Google :
37.9 B$ Revenue (2011)
96% from Advertising

Amazon :
34.2 B$ Revenue (2010)
44% from Media
54% from other merchandise

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Carrier side : "Carrier Cloud" vs IT Cloud

Think about "Real Service" you can sell

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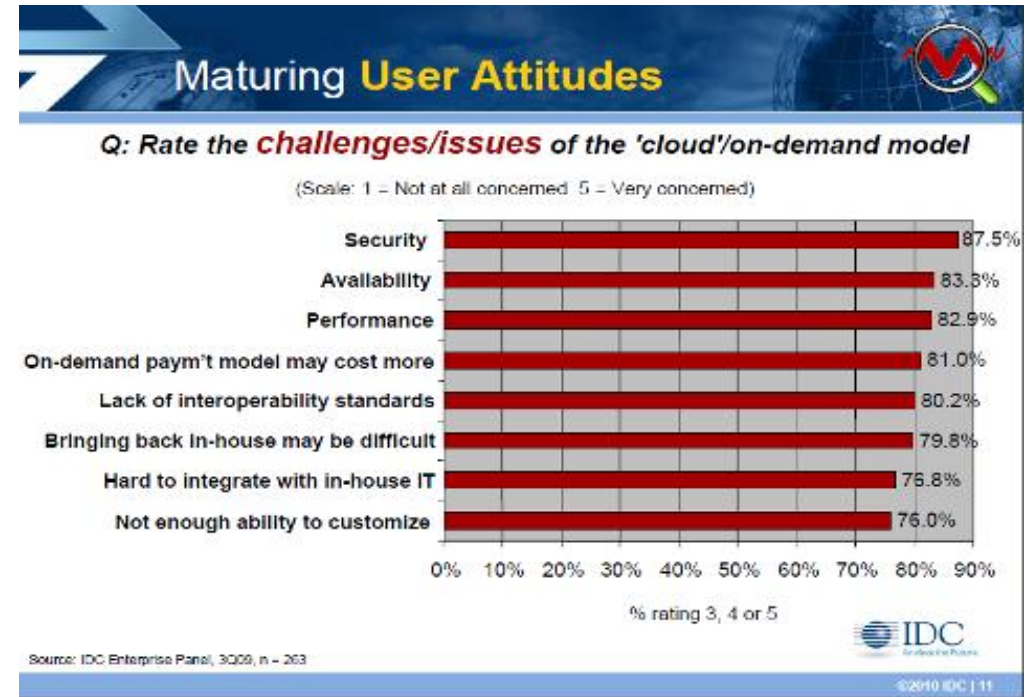# User side : Cloud Computing Readiness

Infrastructure
- Broadband, consistent connectivity
- Stable electricity
- PC penetration
- Technical expertise

Perception
- Security concern
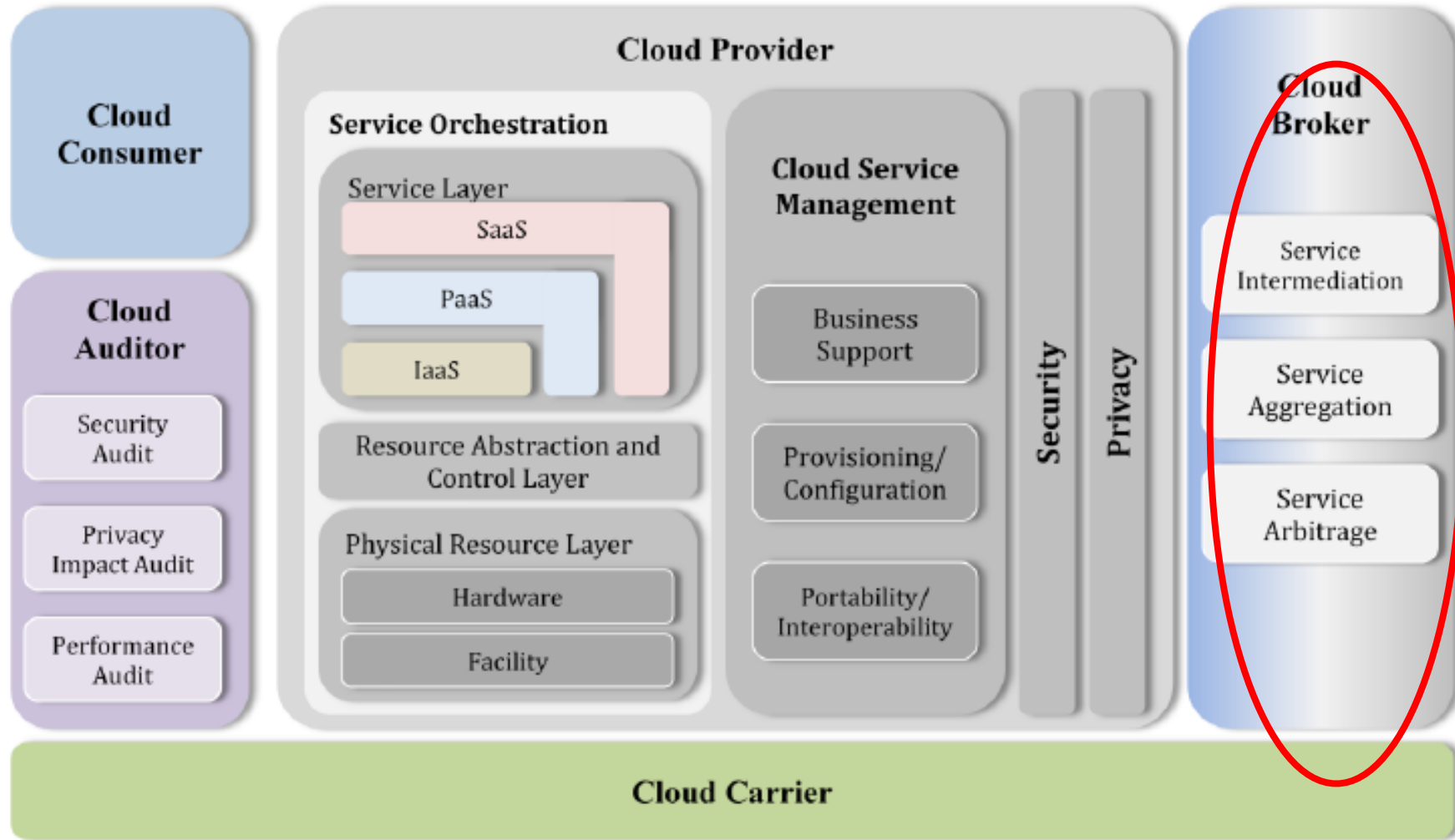- Ownership mind
- Software piracy

Cloud Computing itself can be a solution for some issues
- Brokerage function is critical for mass deployment in general

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Ref. New Definition by NIST

Source : http://collaborate.nist.gov/twiki-cloud-computing/pub/CloudComputing/ReferenceArchitectureTaxonomy/NIST_SP_500-292_-_090611.pdf

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Summary

Cloud computing is here to stay

- Communication Service Providers play important roles by leveraging the assets, focusing on the right market and moving fast

Blending the real and the cyber world through M2M communications is the key

- It will accelerate the need for affordable mobile communications as well as powerful storage and data processing facilities (M2M Cloud)
- City Operations Center of Smart City is on its evolution path

NEC is a leading provider of fixed and mobile network products, Cloud computing platform, "Aggregation" function, Vertical applications, underlying key technologies and City Operations Center

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