UNIVERSITÉ DE GENÈVE
CENTRE UNIVERSITAIRE D'INFORMATIQUE

ISS
INSTITUTE OF INFORMATION SERVICE SCIENCE

Cloud computing
Architectures, services et risques

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Presentation

- Institut de recherche inter-facultaire
  - Faculté des Sciences de la Société
  - Faculté Economie et Management
  - Centre Universitaire d'Informatique
  - Université de Genève

- Nombres clés:
  - 5 Professeurs, 60 personnes
  - 30 projets de recherche (FP7, AAL, SNF, CTI, COST)
  - 2.3MCHF/an (fonds externes)
  - 4 programmes d'enseignement (BSc, MSc, PhD, Executive)
  - ThinkTank

Cloud computing

Definition?

Exemples?

Definition

“ Le ***cloud computing***, abrégé en ***cloud*** (« le Nuage »), ou l’**informatique en nuage** (ou **nuagique**) ou encore l’**infonuagique** (au Québec), est l'exploitation de la puissance de calcul ou de stockage de serveurs informatiques distants par l'intermédiaire d'un réseau, généralement Internet.

Ces serveurs sont loués à la demande, le plus souvent par tranche d'utilisation selon des critères techniques (puissance, bande passante, etc.) mais également au forfait. “

http://fr.wikipedia.org/wiki/Cloud_computing

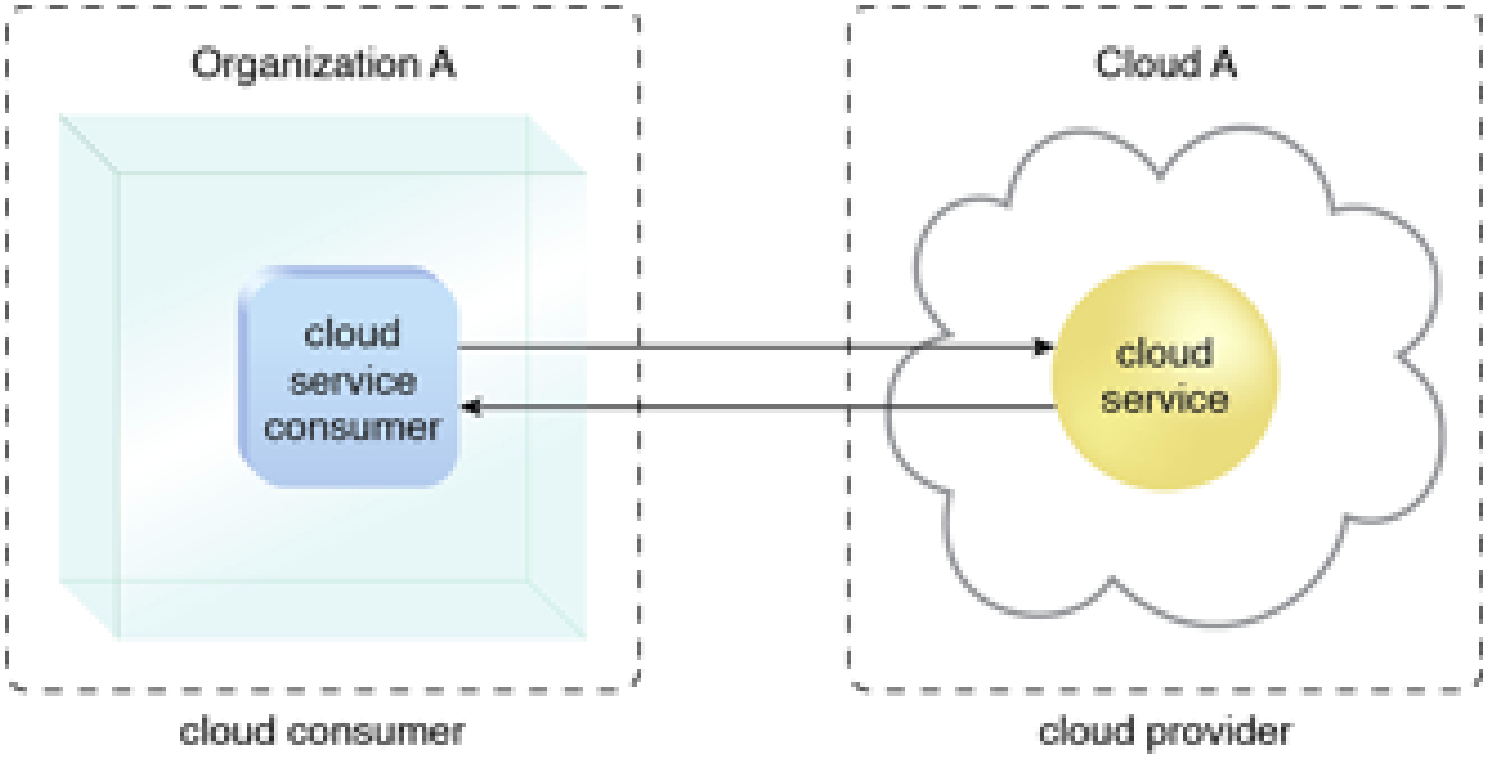
Definition

“Selon la définition du National Institute of Standards and Technology (NIST), le *cloud computing* est l'accès via un réseau de télécommunications, à la demande et en libre-service, à des ressources informatiques partagées configurables.

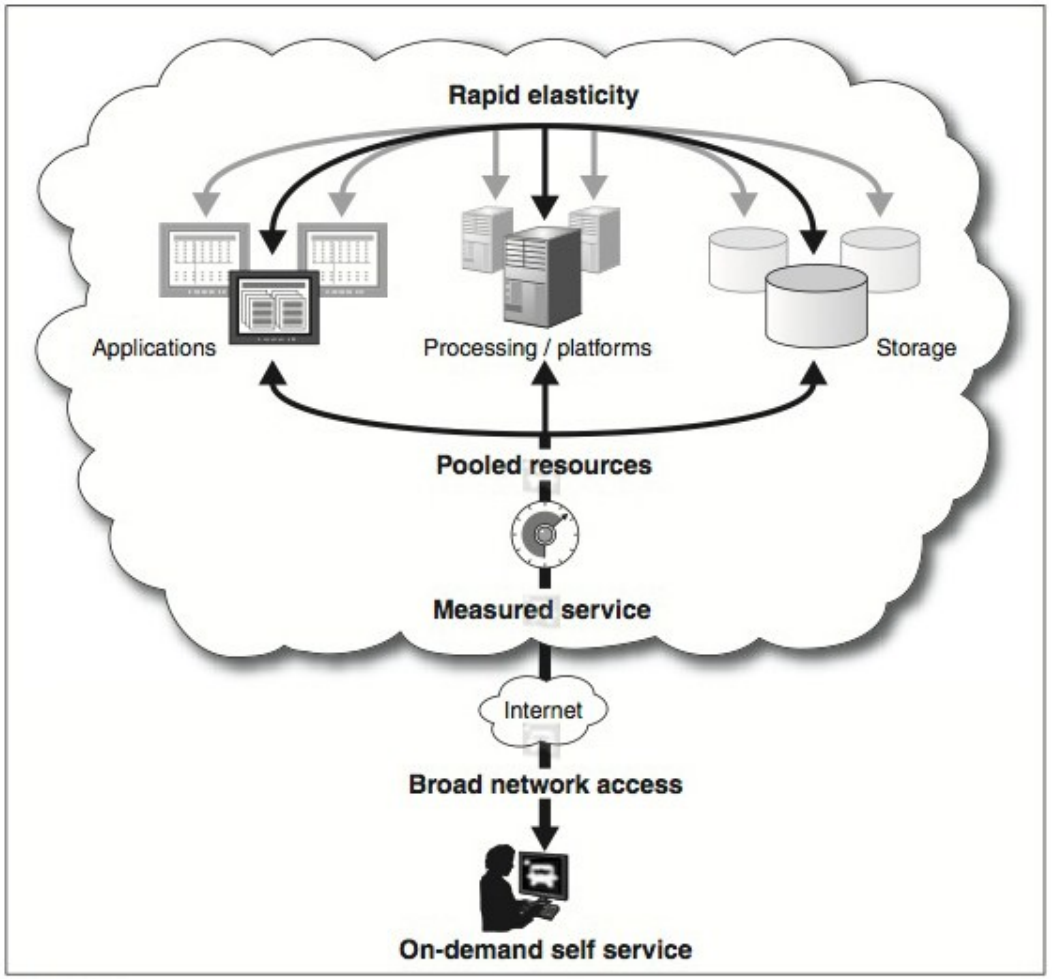
Il s'agit donc d'une délocalisation de l'infrastructure informatique. “

http://fr.wikipedia.org/wiki/Cloud_computing

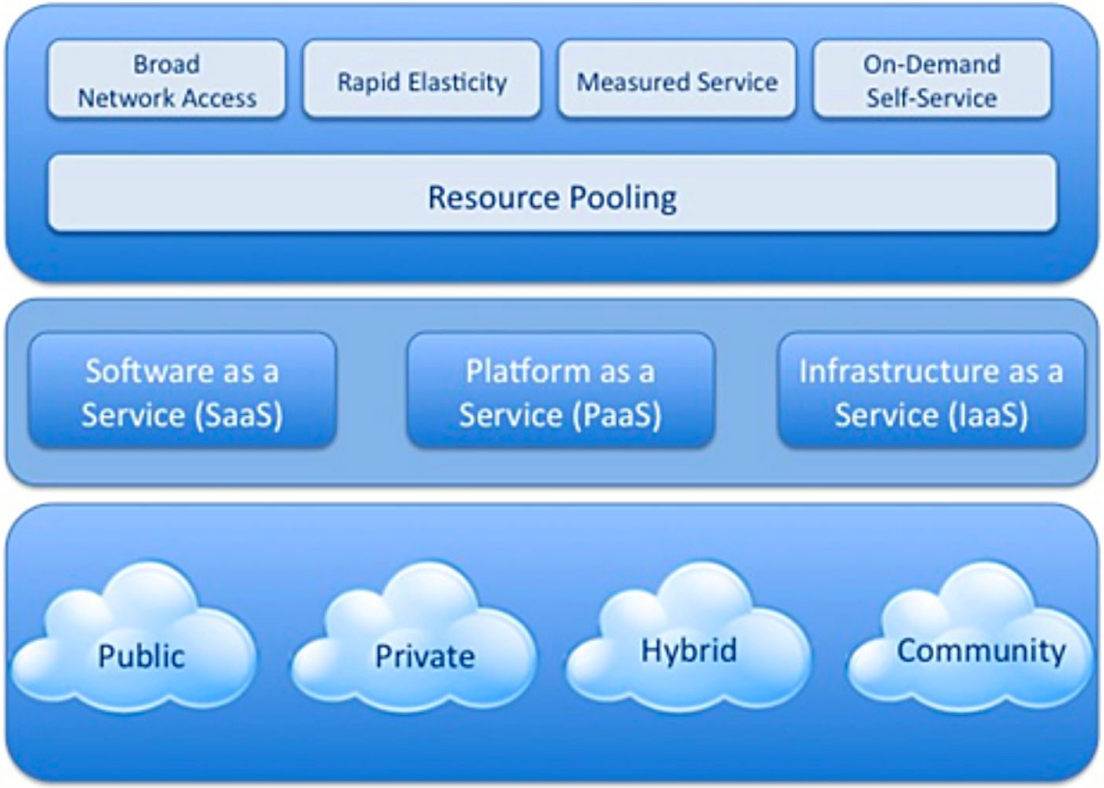
Principe: service à distance



Principe


Rapid elasticity
Applications
Processing / platforms
Storage
Pooled resources
Measured service
Internet
Broad network access
On-demand self service

NIST – Modèle visuel cloud computing



Caractéristiques

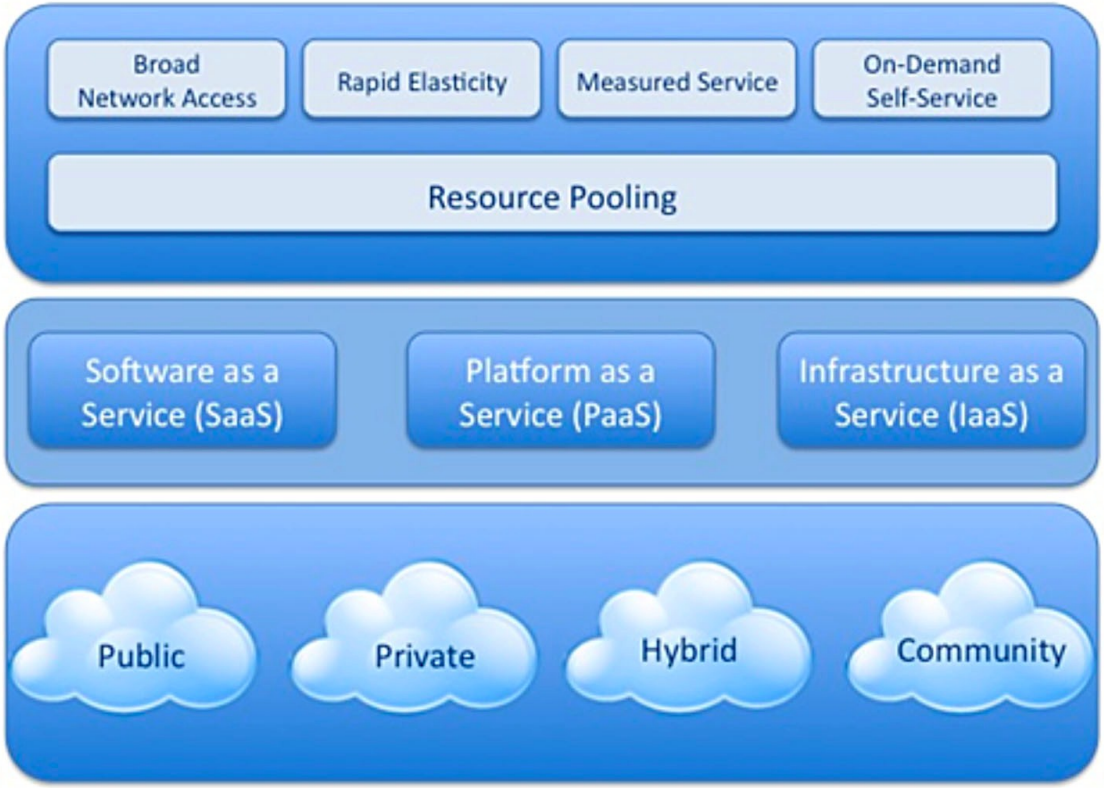
Modèles
De prestation

Modèles
De déploiement

Caractéristiques

- Service à la demande
- Accès à travers le réseau
- “Resource pooling”
  - Plusieurs clients partagent les mêmes ressources
- Elasticité
  - Adaptation au besoin
- Service mesurable

NIST – Modèle visuel cloud computing



Caractéristiques

Modèles
De prestation

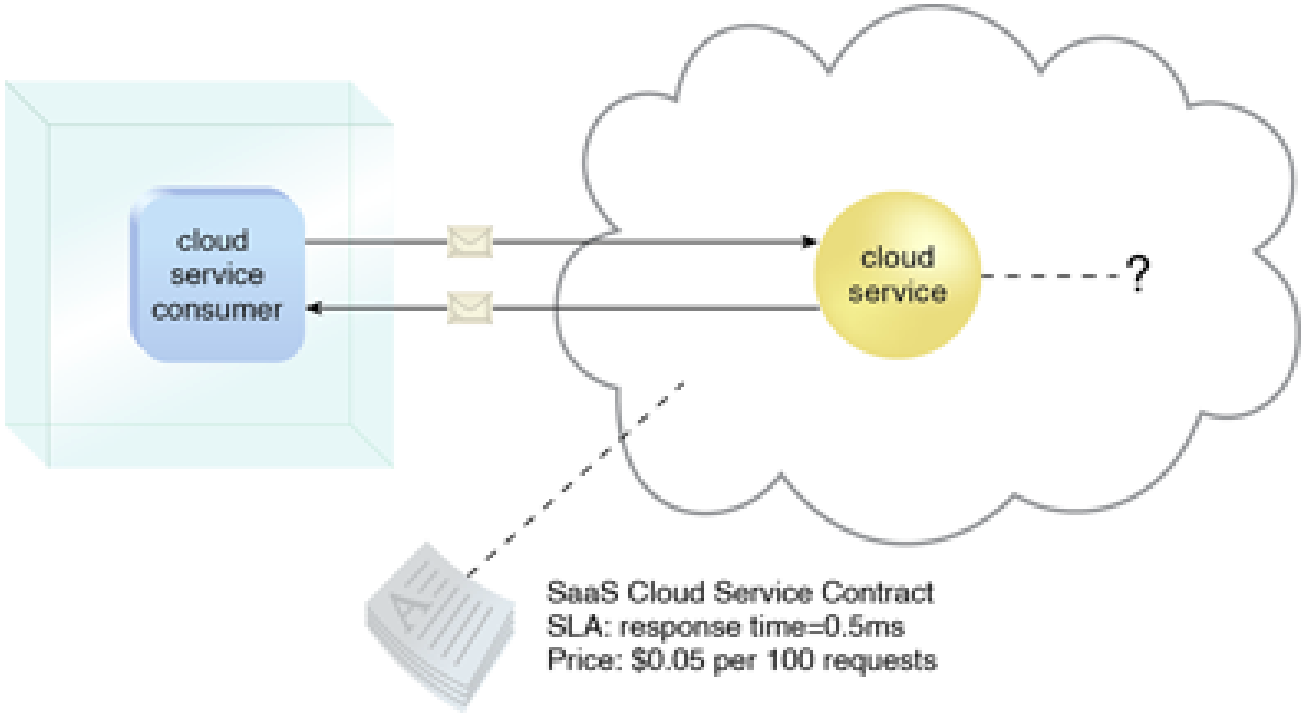
Modèles
De déploiement

Modèles de prestation

- Software as a Service (SaaS)
  - Data as a Service (DaaS)
- Platform as a Service (Paas)
- Infrastructure as a Service (IaaS)

Software as a Service (SaaS)

Software à la demande
Déployé à travers le réseau/Internet



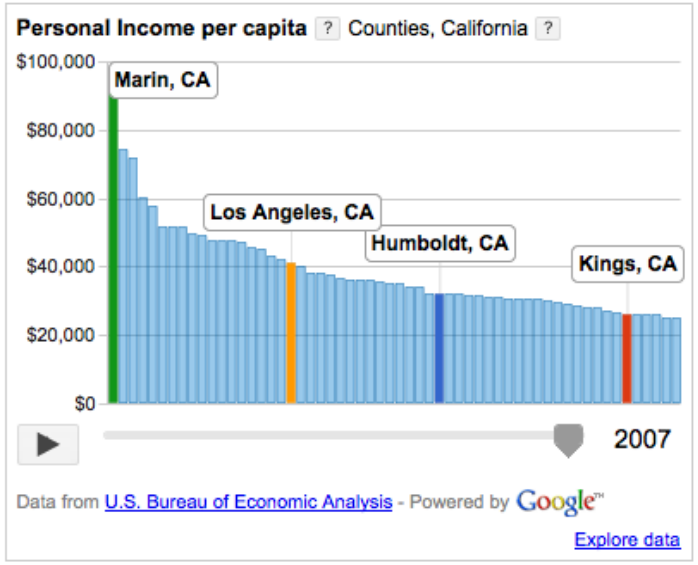
SaaS - Examples

Dropbox

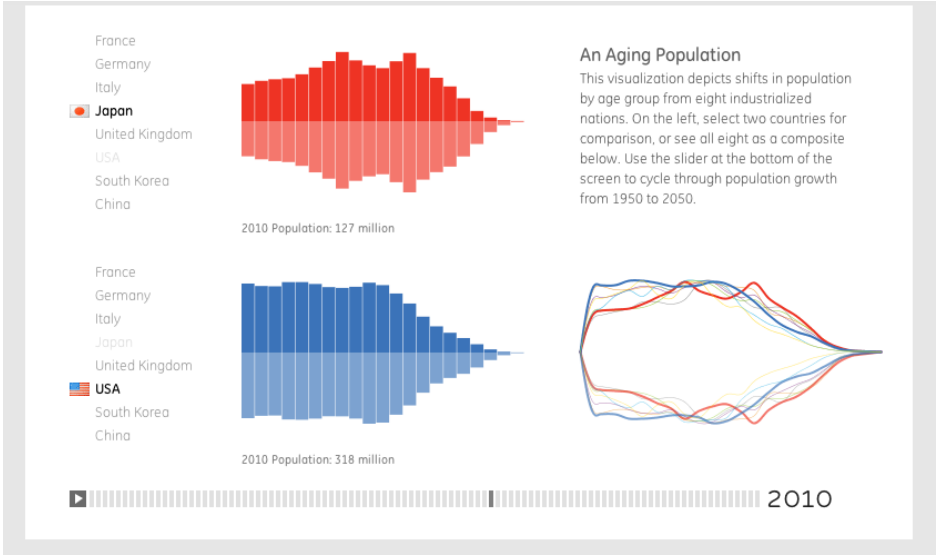
Data as a Service (DaaS)

- Données fournie à la demande
  - **Extraire** des données
    (BD, Data feeders, Social media, Open Data)
    - Social data (twitter), geo data, rss feeds, …
  - **Transformer** données / Augmenter les données
  - **Délivrer/Visualiser** données

DaaS - Examples



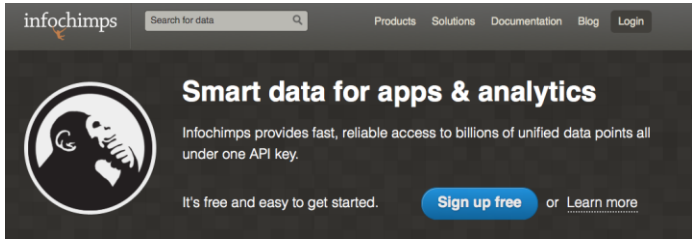
http://radar.oreilly.com/2010/07/data-as-a-service.html



http://visualization.geblogs.com/visualization/aging/

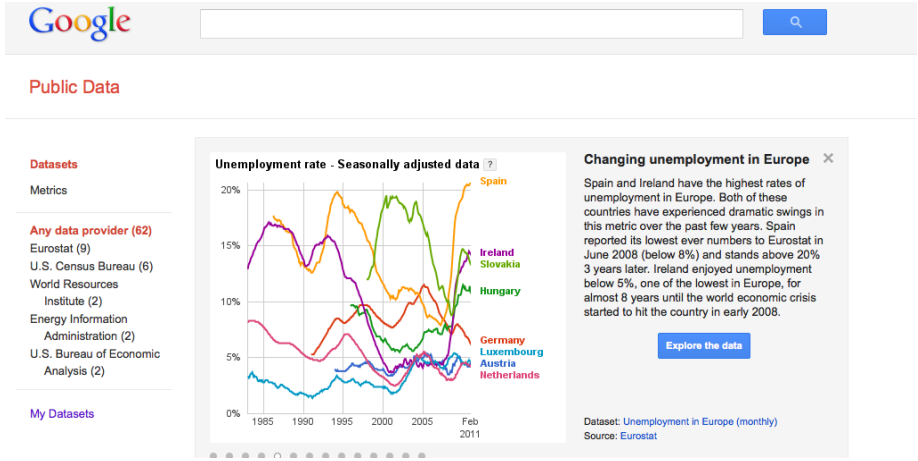
DaaS - Providers

- Infochimps



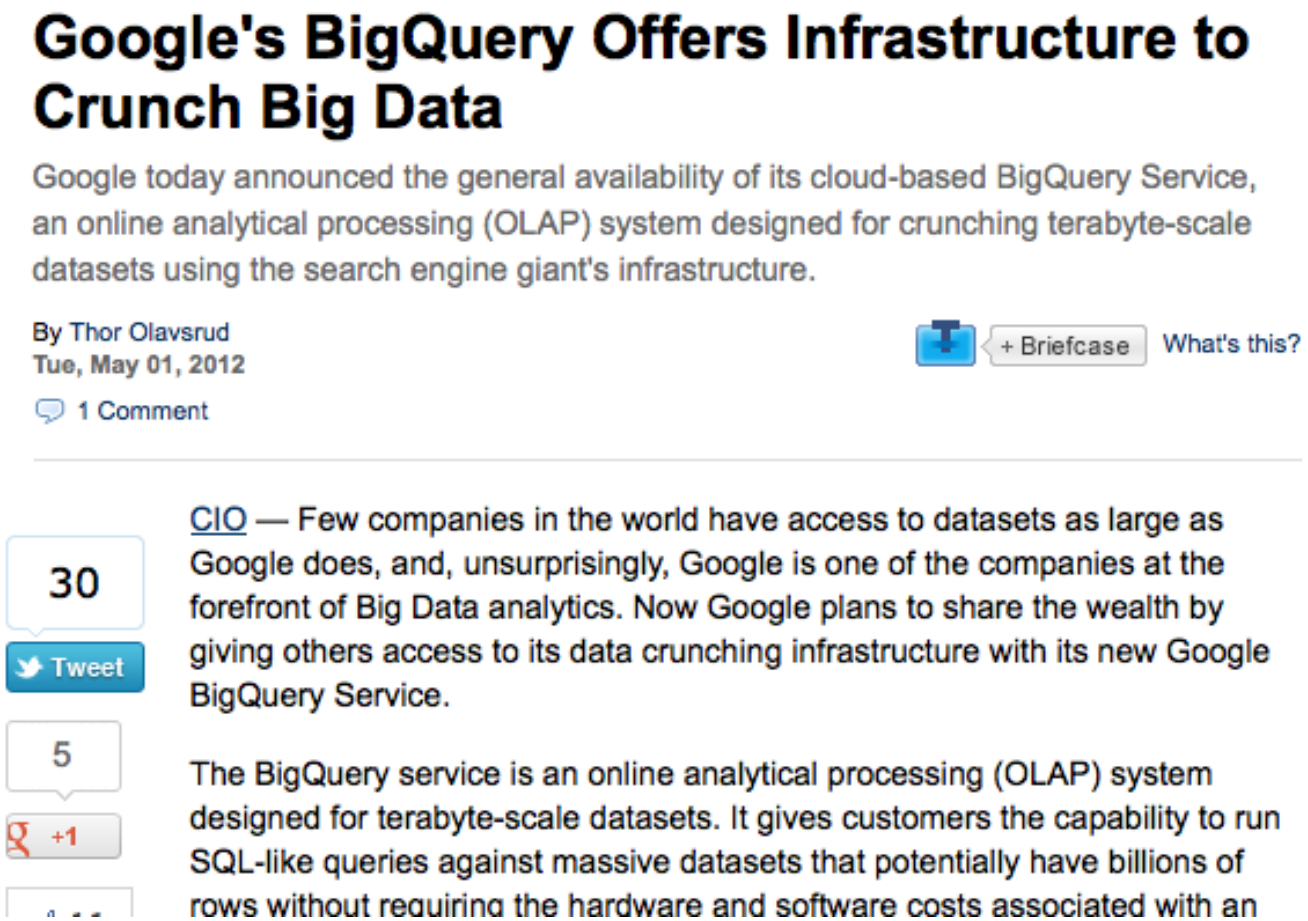
http://www.infochimps.com/how-it-works

Public Data Explorer (Google)



http://www.google.com/publicdata/directory?hl=en&dl=en#!

DaaS – Google BigQuery Service



Google's BigQuery Offers Infrastructure to Crunch Big Data

Google today announced the general availability of its cloud-based BigQuery Service, an online analytical processing (OLAP) system designed for crunching terabyte-scale datasets using the search engine giant's infrastructure.

By Thor Olavsrud
Tue, May 01, 2012

1 Comment

+ Briefcase What's this?

30 Tweet 5 +1

CIO — Few companies in the world have access to datasets as large as Google does, and, unsurprisingly, Google is one of the companies at the forefront of Big Data analytics. Now Google plans to share the wealth by giving others access to its data crunching infrastructure with its new Google BigQuery Service.

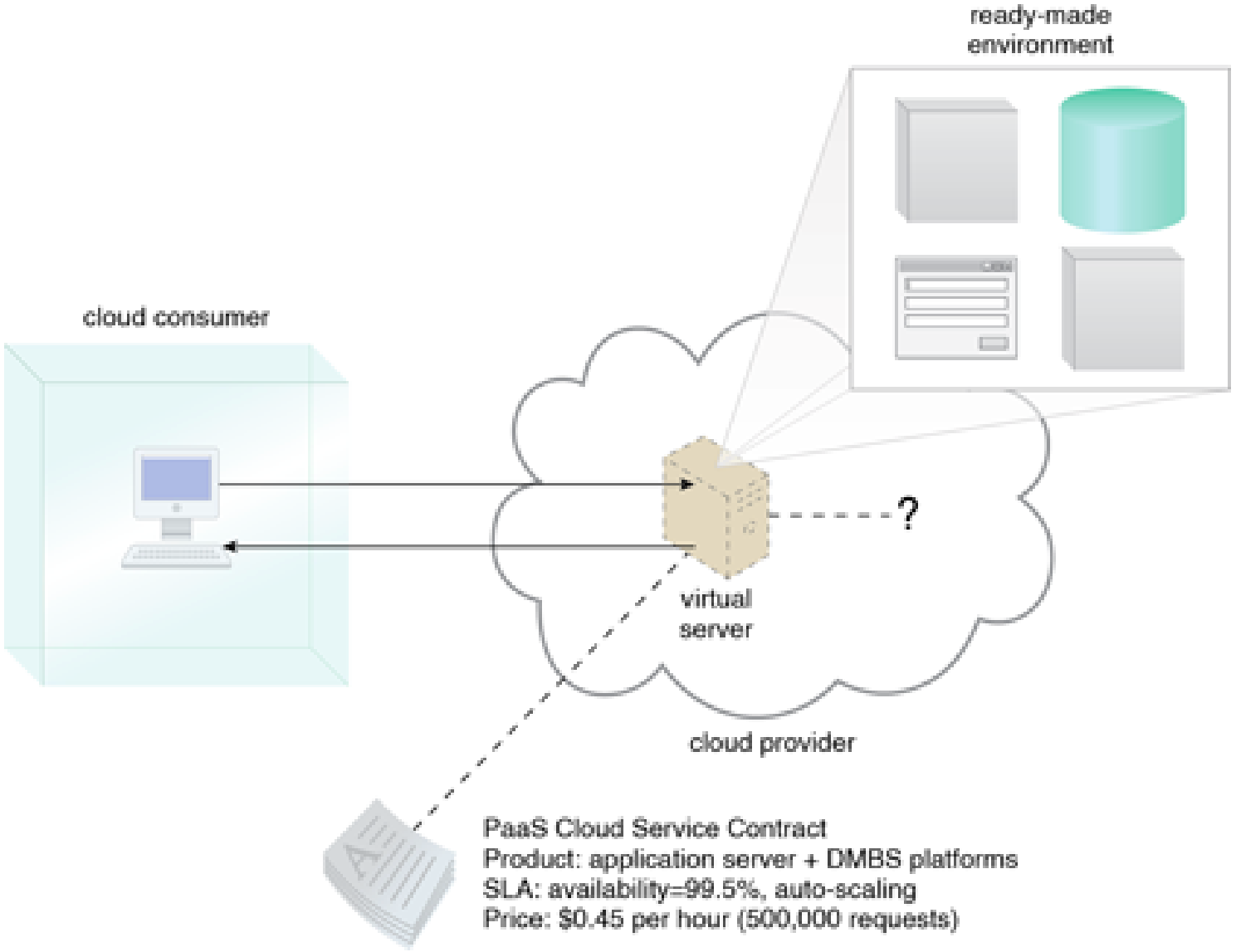
The BigQuery service is an online analytical processing (OLAP) system designed for terabyte-scale datasets. It gives customers the capability to run SQL-like queries against massive datasets that potentially have billions of rows without requiring the hardware and software costs associated with an

- http://www

Platform as a Service (PaaS)

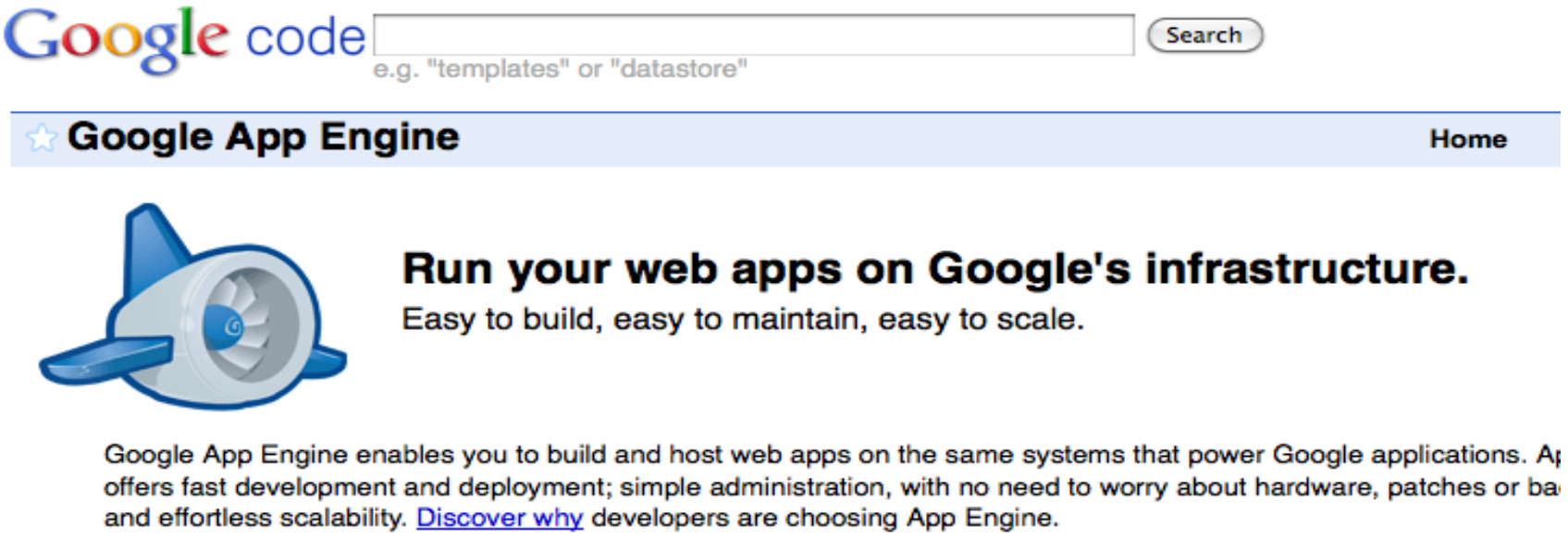
- Location de hardware, systèmes d’exploitation, stockage, réseau à travers Internet.
- Louer des serveurs virtualisés pour exécuter ou développer propres applications

PaaS


ready-made
environment
cloud consumer
?
virtual
server
cloud provider
PaaS Cloud Service Contract
Product: application server + DMBS platforms
SLA: availability=99.5%, auto-scaling
Price: $0.45 per hour (500,000 requests)

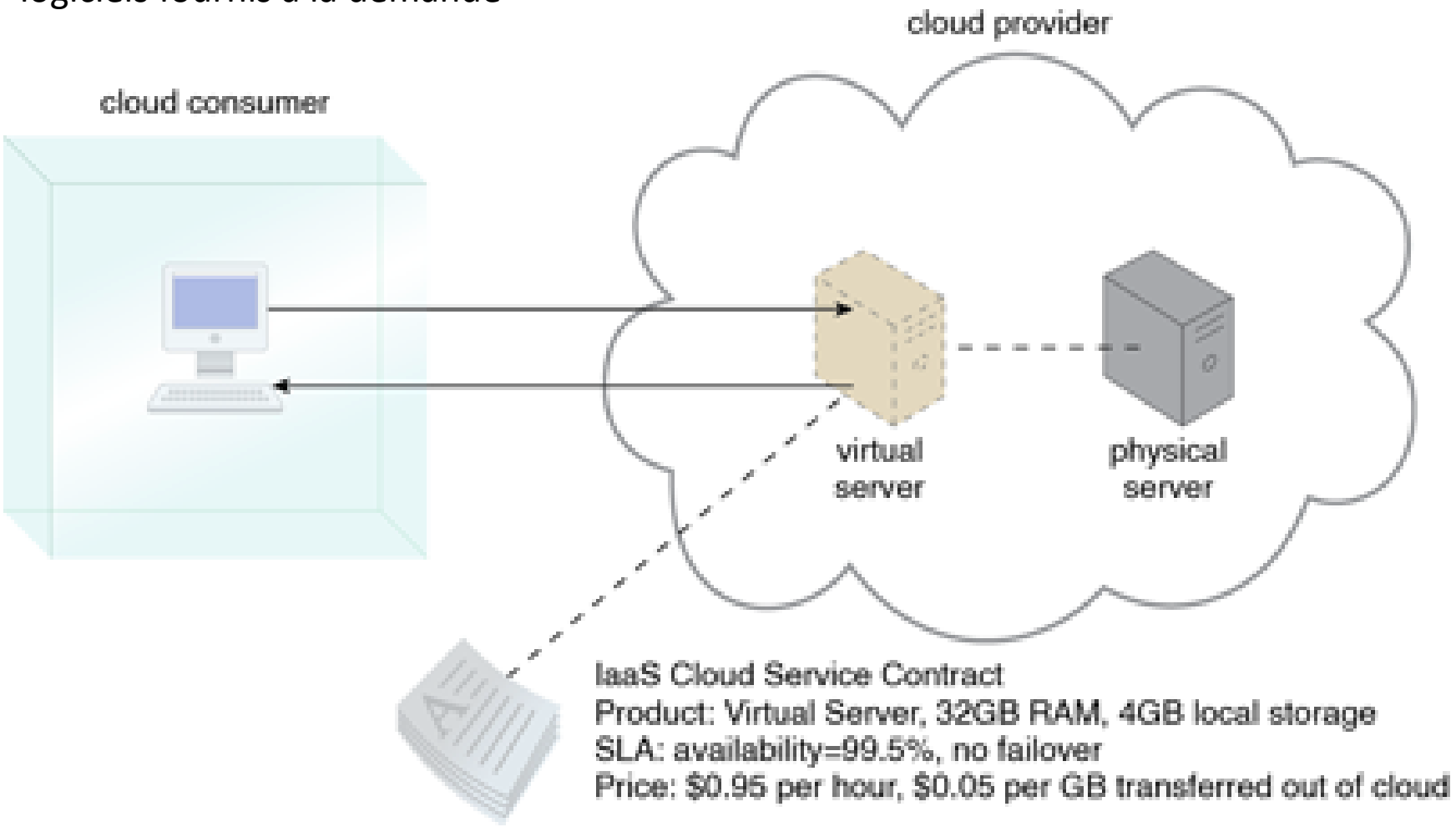
PaaS - Example

- Heroku (hosting service to upload web sites)
- Google Apps Engine
  - Choice of environment (Java, Python, etc.)
  - http://code.google.com/appengine/



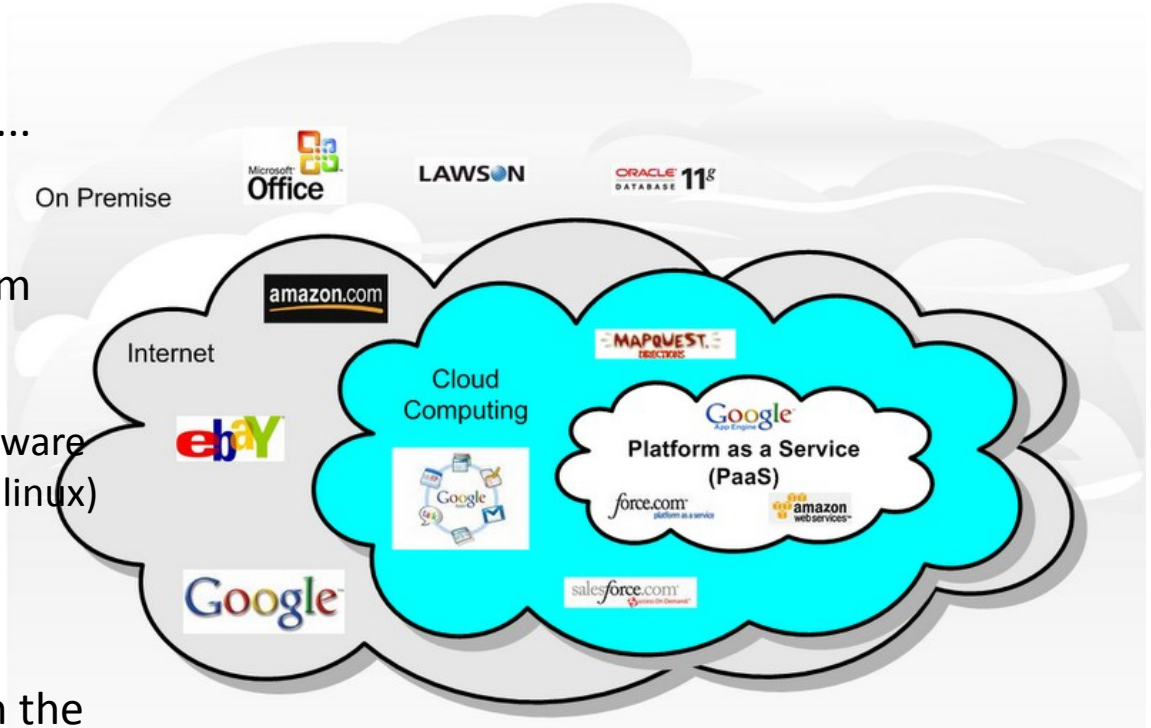
Infrastructure as a Service (IaaS)

Ressources et infrastructures de calcul,
logiciels fournis à la demande

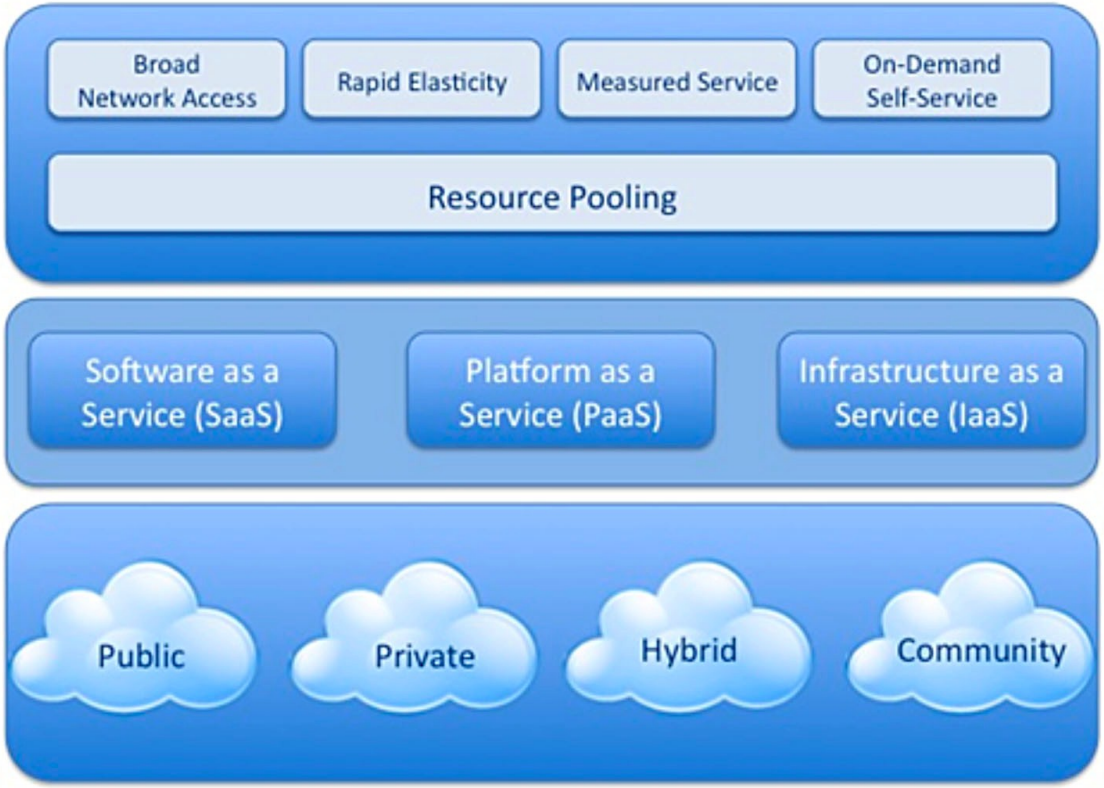


“Cloud” Service Provider

- Microsoft
  - Live meetings, MSN, ...
- Salesforce
  - Development platform
- Amazon
  - Provides entreprise software company (data centers, linux)
- Google
  - Data storage, emails, collaborative tools on the web, Apps engine



NIST – Modèle visuel cloud computing



Caractéristiques

Modèles
De prestation

Modèles
De déploiement

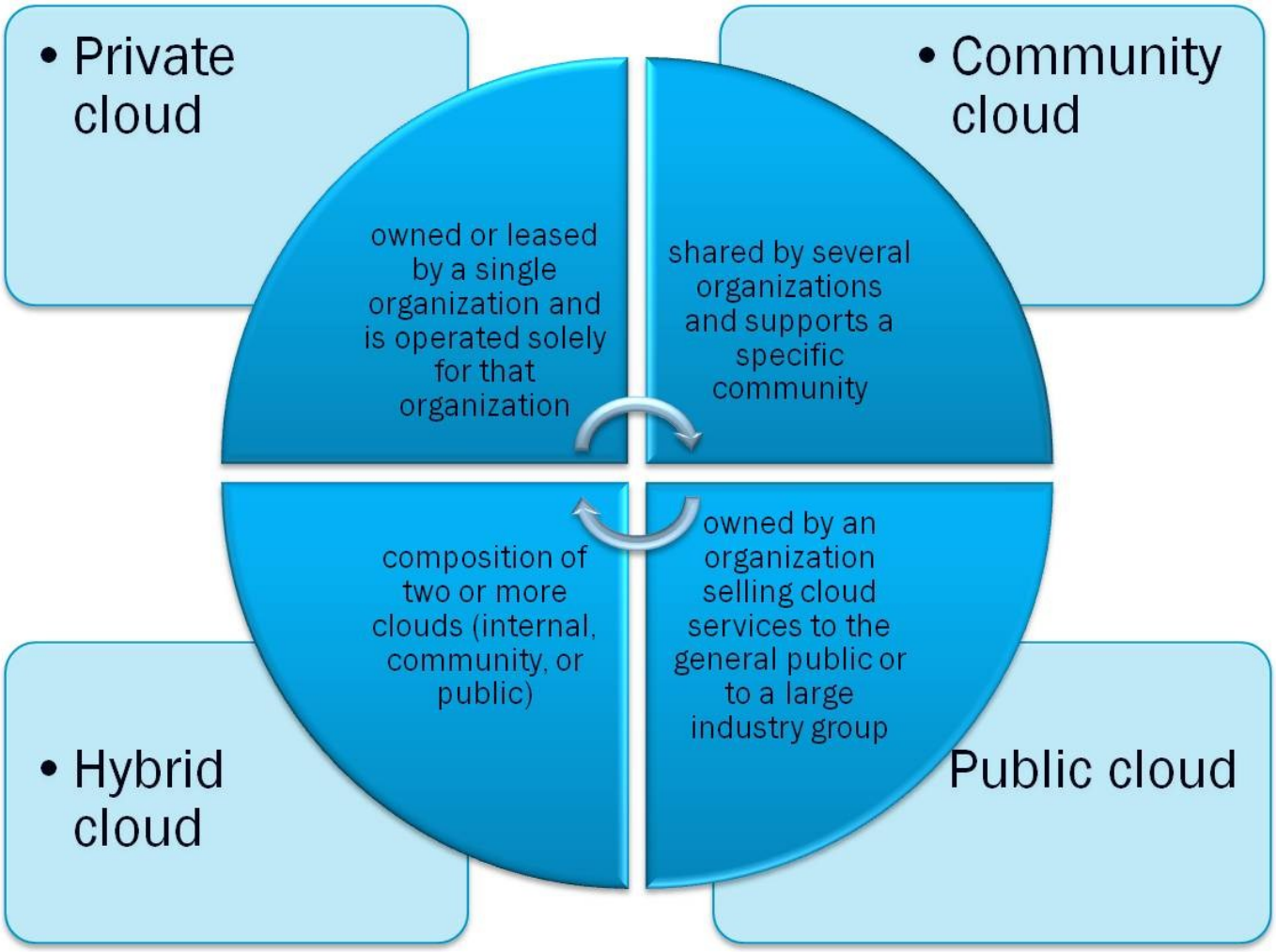
Modèles de déploiement

- **Cloud privé**
  - Expressément pour une organisation donnée
  - Géré par l'organisation ou un tiers
  - Délivré en interne ou en externe

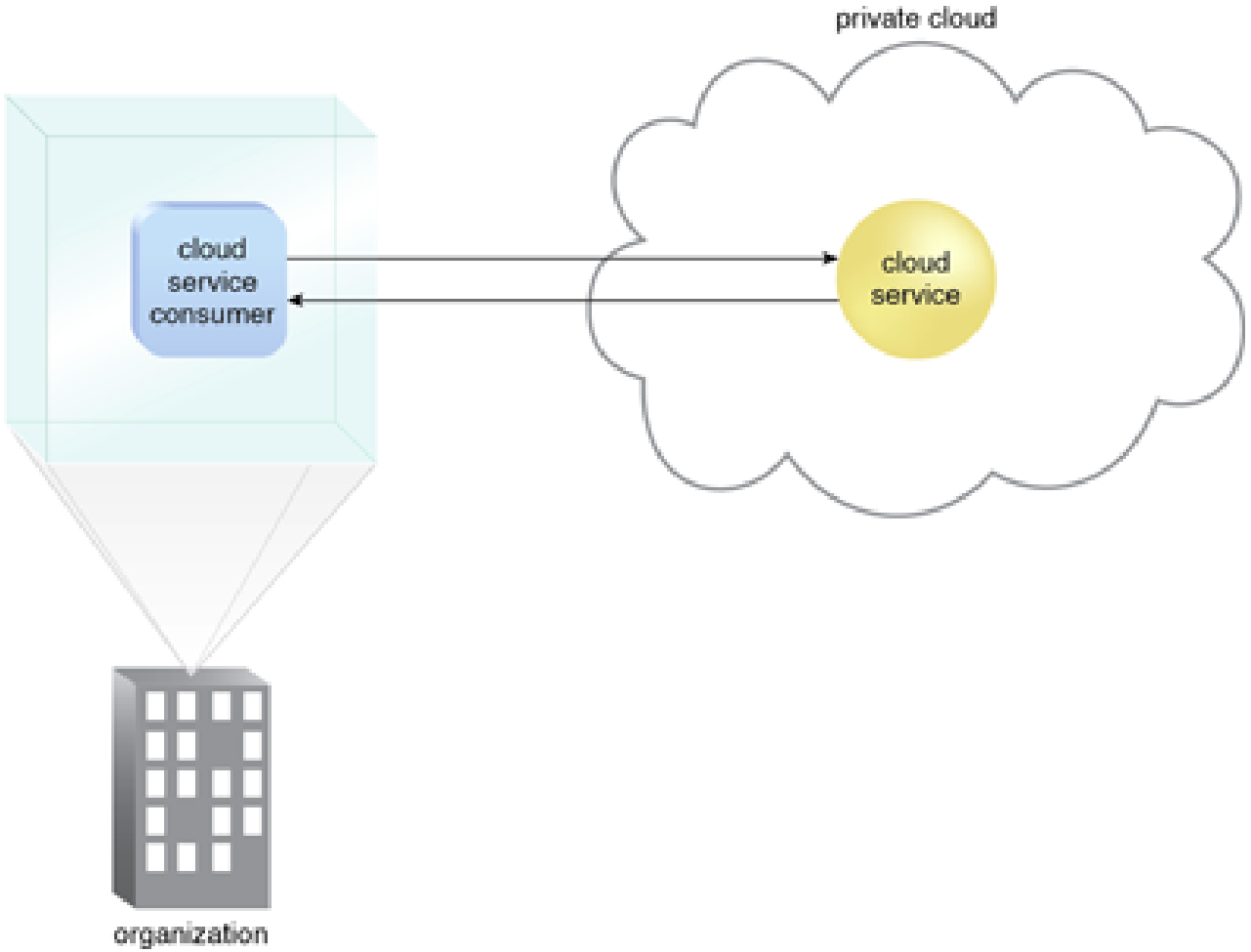
- **Cloud de Communauté**
  - Partagé par plusieurs organisations
  - Supporte une communauté spécifique
  - Géré par l'organsiation ou un tiers
  - Délivré en interne ou en externe

- **Cloud Public**
  - Disponible pour le public en généraé
  - Détenu par un fournisseur

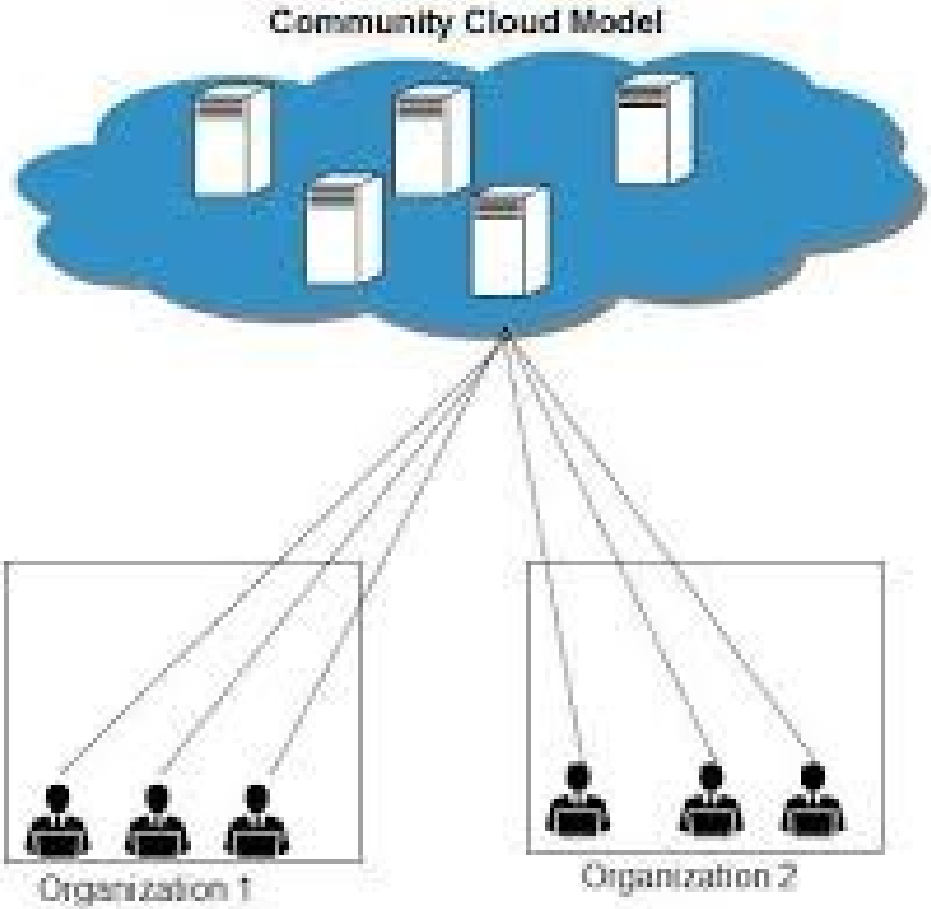
- **Cloud Hybride**
  - Composition de différents types de cloud (privé, communauté, public)
  - Relié entre eux par des technologies standards


• Private cloud
owned or leased by a single organization and is operated solely for that organization
• Community cloud
shared by several organizations and supports a specific community
• Hybrid cloud
composition of two or more clouds (internal, community, or public)
Public cloud
owned by an organization selling cloud services to the general public or to a large industry group

Cloud Privé

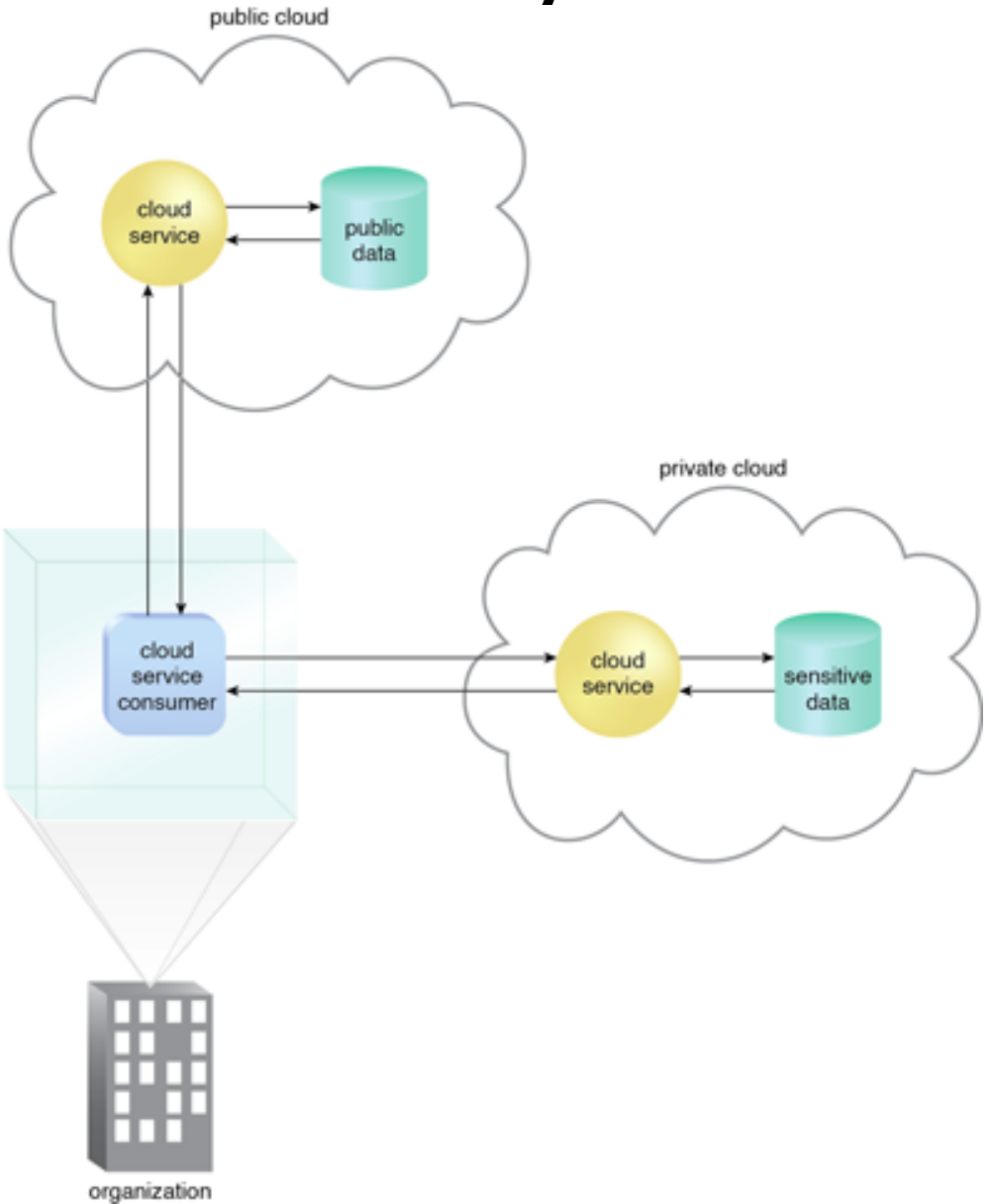

private cloud
cloud service consumer
cloud service
organization

Cloud de communauté

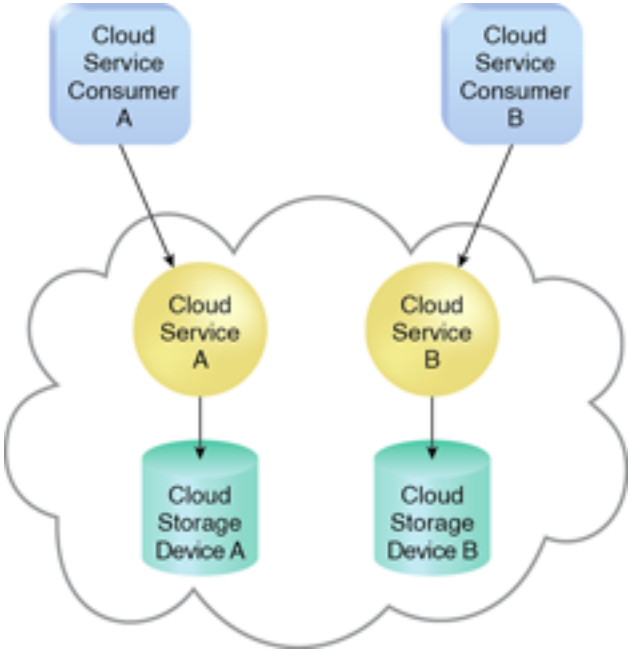


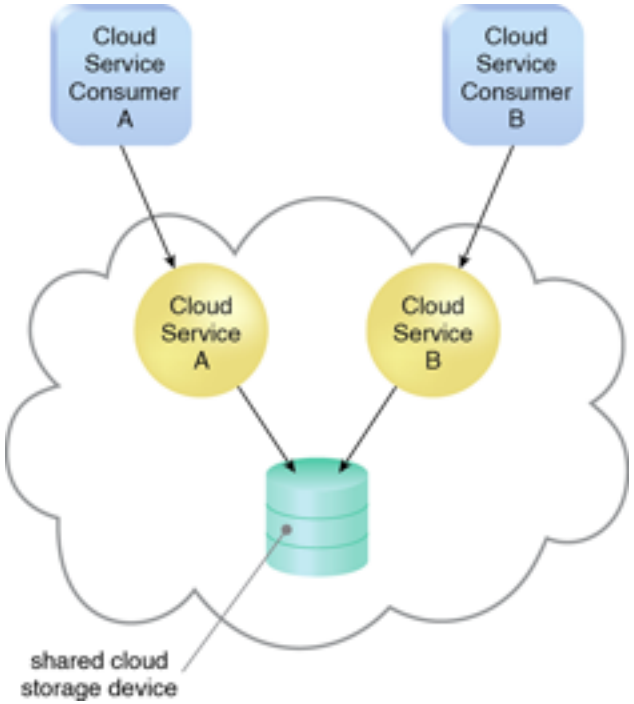
Cloud public

Cloud Hybrid



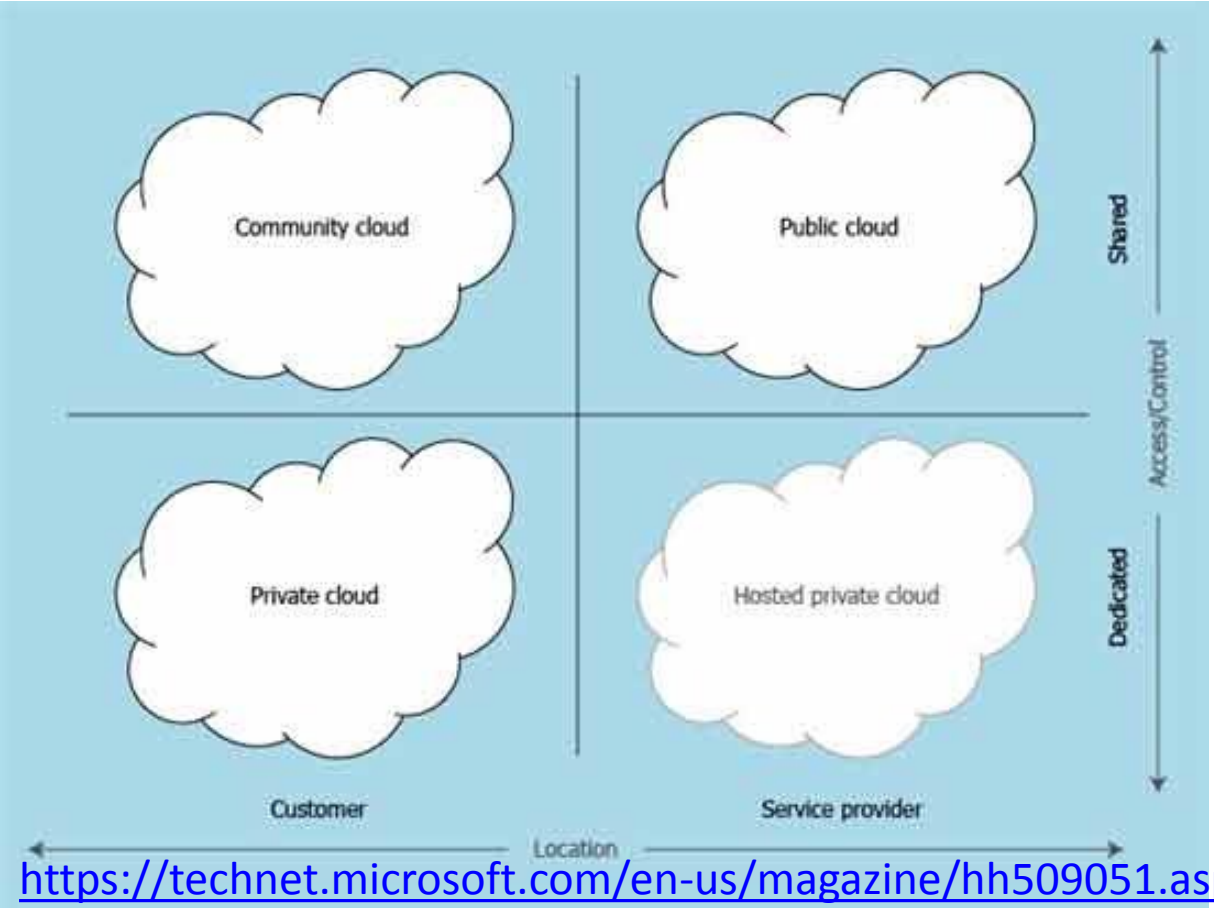
Single tenant / Multi-tenant



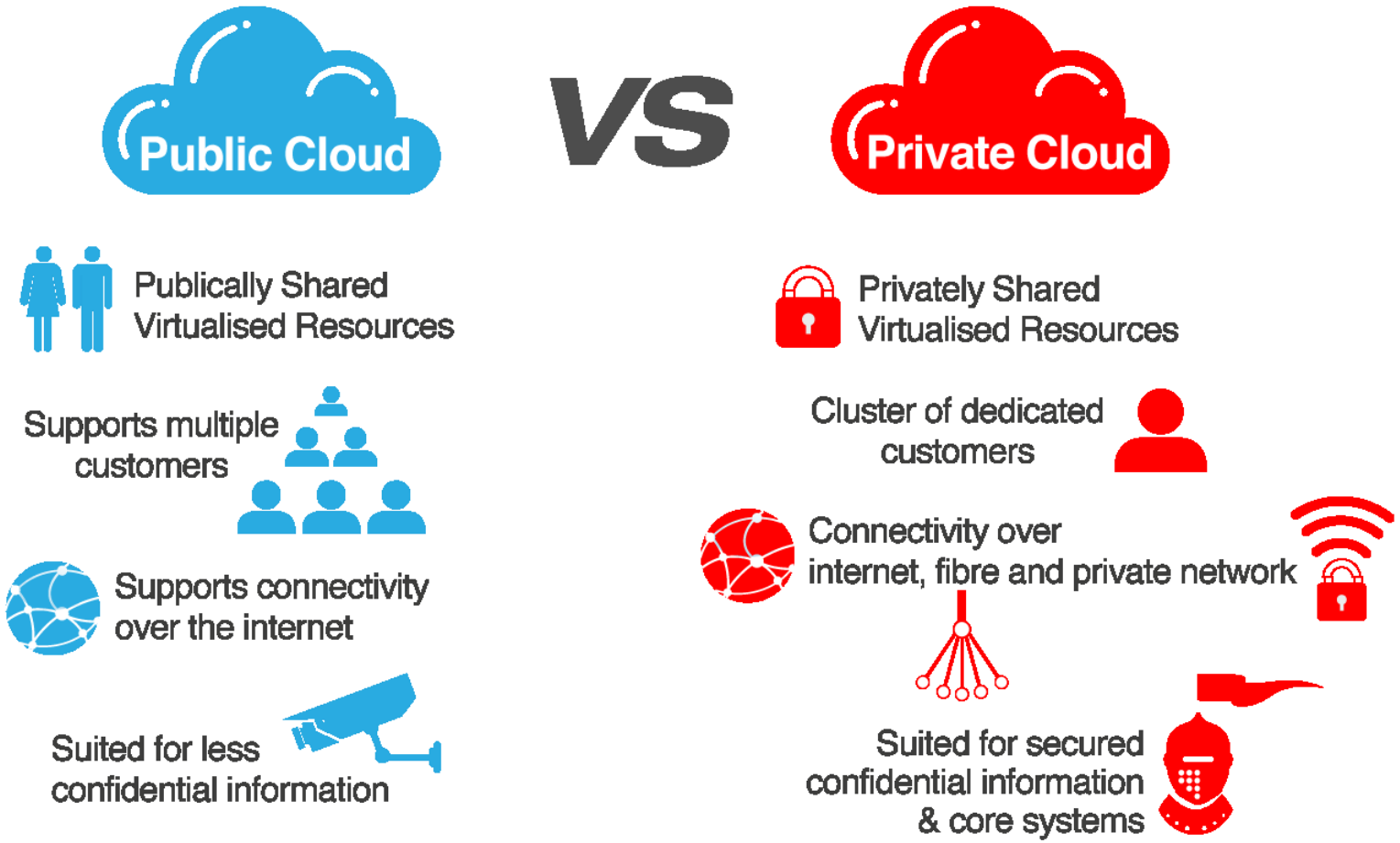


http://whatiscloud.com/multitenant_technology/index

Modèles de déploiement: localisation / partage

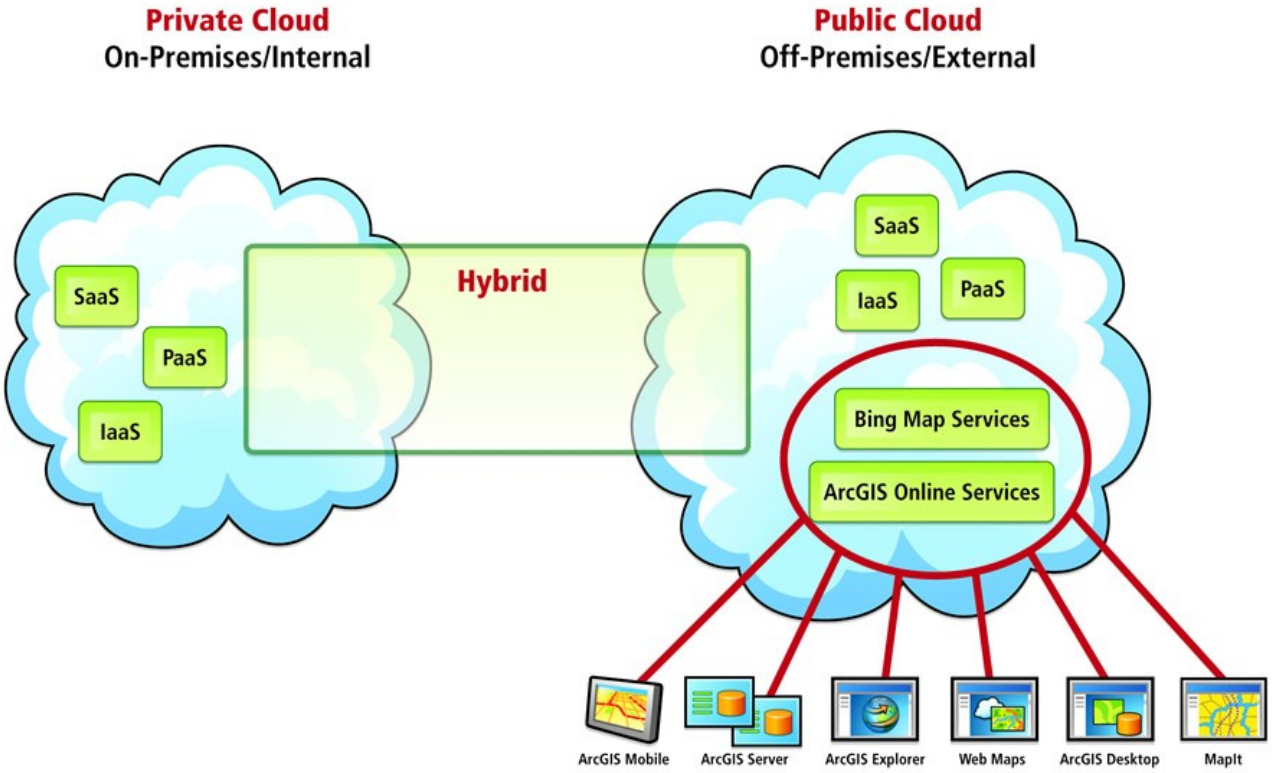


https://technet.microsoft.com/en-us/magazine/hh509051.aspx


Public Cloud
VS
Private Cloud
Publically Shared
Virtualised Resources
Supports multiple
customers
Supports connectivity
over the internet
Suited for less
confidential information
Privately Shared
Virtualised Resources
Cluster of dedicated
customers
Connectivity over
internet, fibre and private network
Suited for secured
confidential information
& core systems

Public Cloud
• Multiple Clients
• Hosted at Providers Location
• Shared Infrastructure
• Access over Internet
• Low-cost

Private Cloud
• Single Client
• Hosted at Providers / Orgs Location
• Access over Internet / Private Network
• High-security


Private Cloud
On-Premises/Internal
Public Cloud
Off-Premises/External
SaaS
PaaS
IaaS
Hybrid
SaaS
IaaS
PaaS
Bing Map Services
ArcGIS Online Services
ArcGIS Mobile
ArcGIS Server
ArcGIS Explorer
Web Maps
ArcGIS Desktop
MapIt

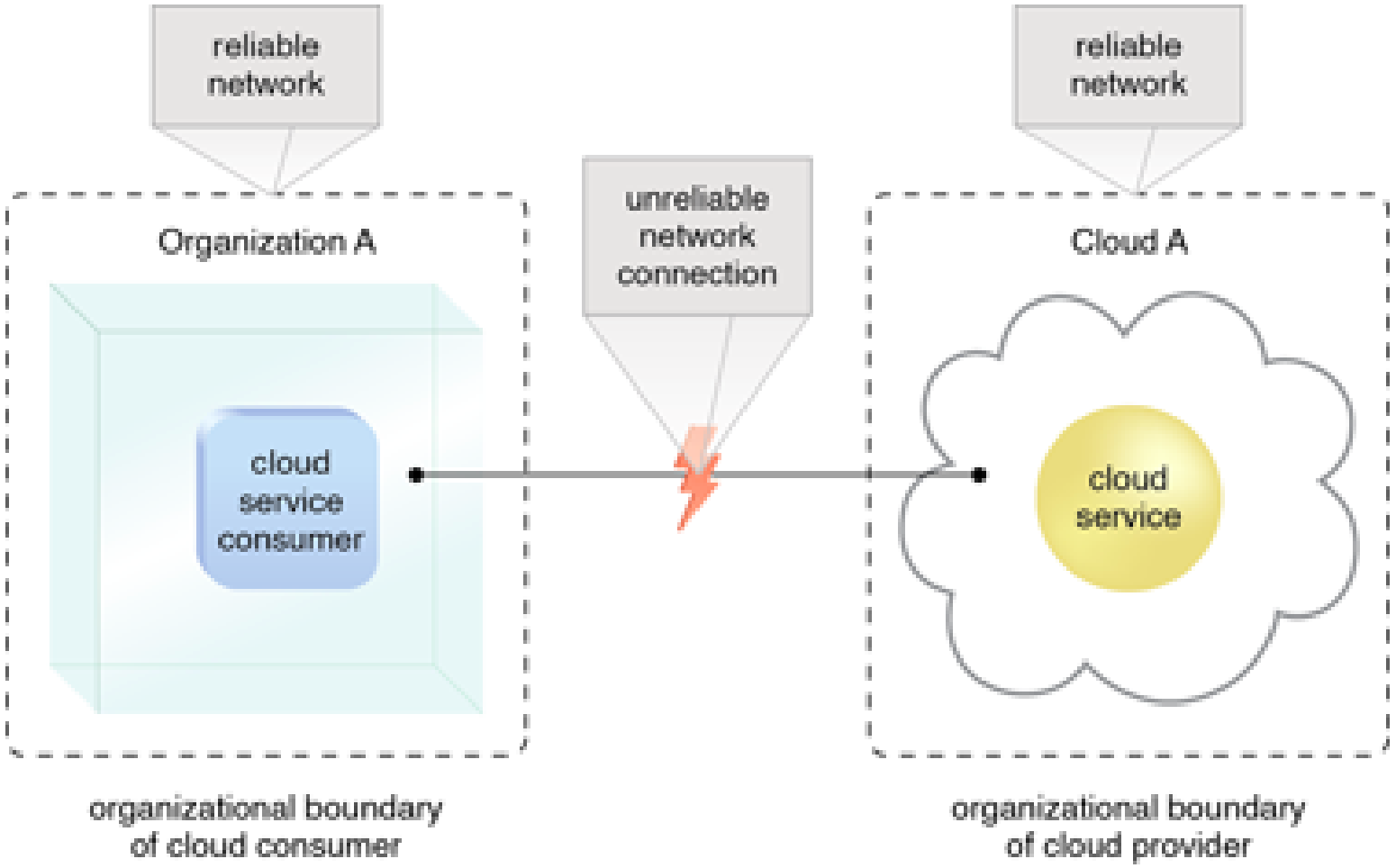
Cloud computing

Risques?

Cloud computing

- Risques Physiques
- Risques Légaux
- Risques – qualité / contrôle (SLA)

Risques physiques: Réseau



Risques Légaux

- Stockage délocalisé
  - Lois qui s'appliquent:
    - Pays du fournisseur
    - Pays où sont physiquement stockées les données
    - Pays où est stocké le backup
    - Pays du client (organisation)

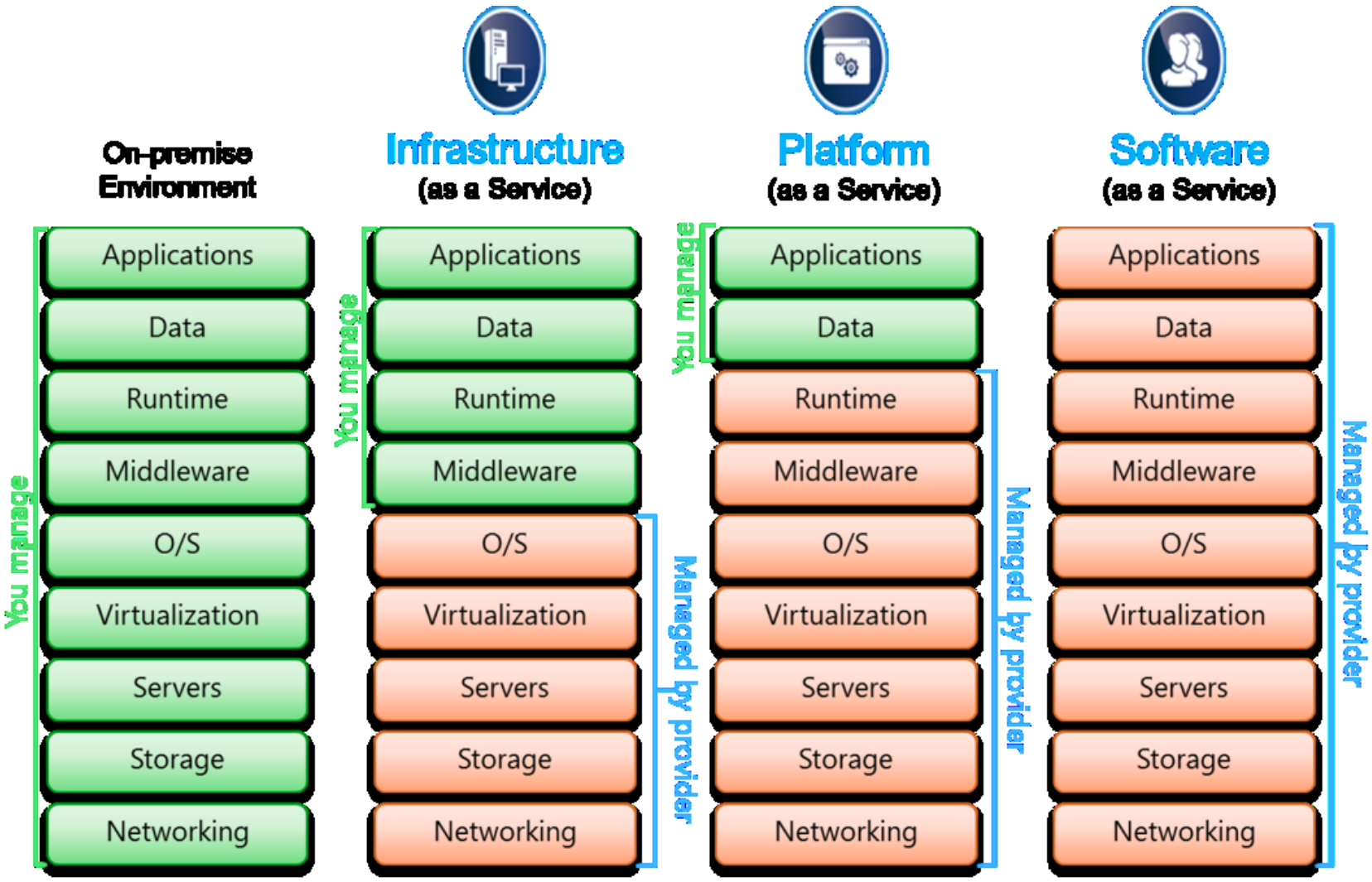
Microsoft 'must release' data held on Dublin server

29 April 2014 | Technology

Risques qualité / contrôle

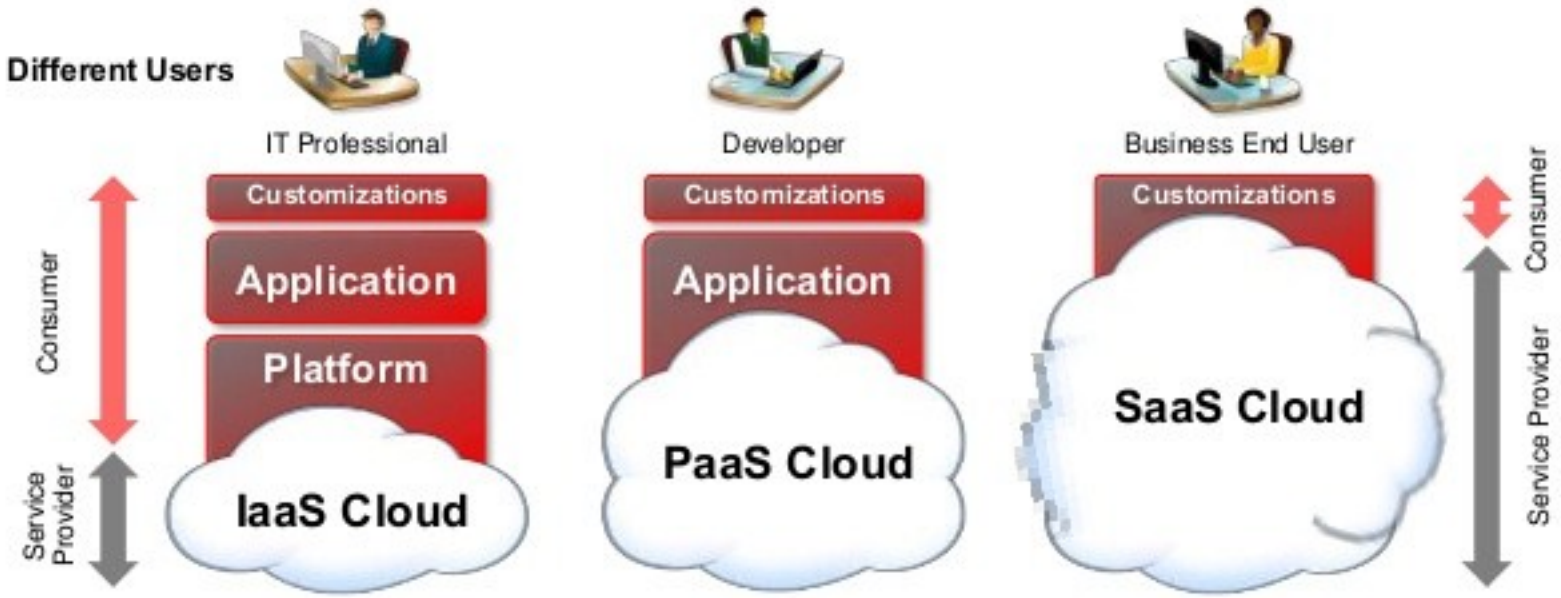
- Service Level Agreement:
  - Qualité du service fourni
    - Disponibilité
    - Mises à jour de sécurité
    - Fiabilité
- Contrôle – délocalisé chez le fournisseur

Responsabilités



How is Cloud Computing Security Different?

Consumer-Provider Security Responsibilities



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Exemples

Megaupload file-sharing site shut down

8 March 2012 | Technology | 688

Megaupload, one of the internet's largest file-sharing sites, has been shut down by officials in the US.

The site's founders have been charged with violating piracy laws.

Federal prosecutors have accused it of costing copyright holders more than $500m (£320m) in lost revenue. The firm says it was diligent in responding to complaints about pirated material.

In response, the hackers group Anonymous has targeted the FBI and US Department of Justice websites.

Cloud computing

Questions ?