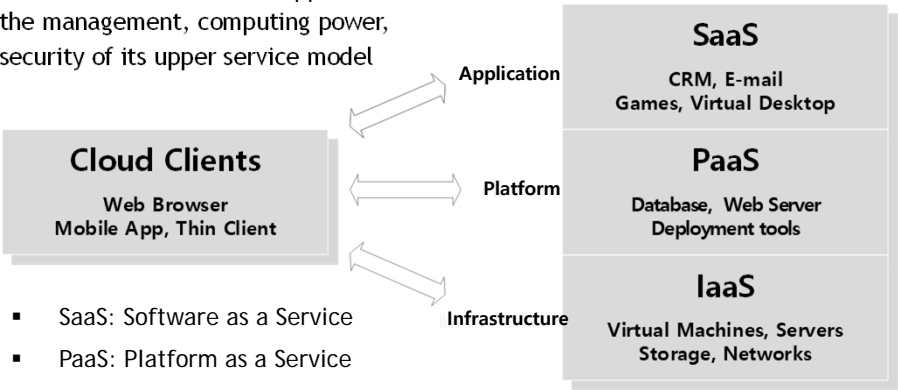Cloud Technology

IaaS, PaaS, SaaS

IaaS, PaaS, SaaS

❖ Cloud Service Models

The lower service model supports the management, computing power, security of its upper service model

Cloud Clients
Web Browser
Mobile App, Thin Client

Application

SaaS
CRM, E-mail
Games, Virtual Desktop

Platform

PaaS
Database, Web Server
Deployment tools

Infrastructure

IaaS
Virtual Machines, Servers
Storage, Networks

- SaaS: Software as a Service
- PaaS: Platform as a Service
- IaaS: Infrastructure as a Service

IaaS, PaaS, SaaS

❖ IaaS (Infrastructure as a Service)

- Infrastructure support over the Internet

- Cloud's Computing & Storage Resources
  - Computing Power
  - Storage Services
  - Software Packages & Bundles
 - VLAN (Virtual Local Area Network)
  - VM (Virtual Machine) Features

IaaS, PaaS, SaaS

❖ VM (Virtual Machine) Administration

- IaaS enables control of computing resources
  through Administrative Access to VMs
  ➔ Server Virtualization features

- Access to computing resources are enabled by
  Administrative Access to VMs

- VM Administrative Command examples
  - Save data on cloud server
  - Start web server
  - Install new application

IaaS, PaaS, SaaS

❖ IaaS Procedures
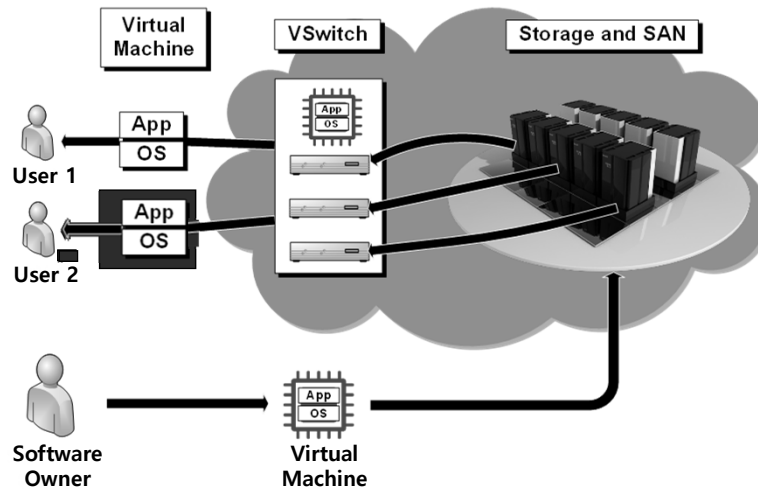
IaaS, PaaS, SaaS

❖ IaaS Benefits

- Flexible and Efficient Renting of Computer & Server Hardware
  - Virtual Desktops
  - Rentable Resources
    - VM, Storage, Bandwidth, Firewalls, IP Addresses, Monitoring Services, etc.
  - Rent Payment Basis
    - Resource type
    - Usage time
    - Service packages
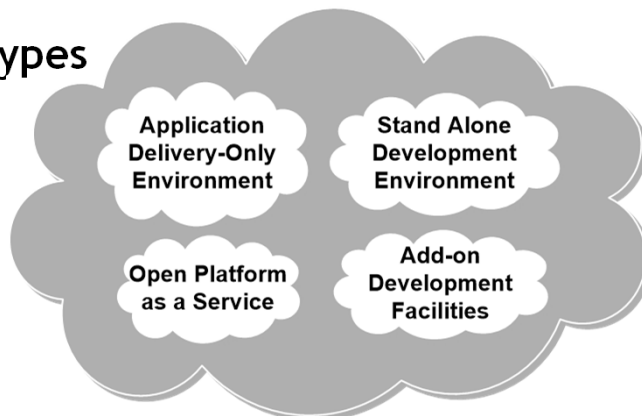
IaaS, PaaS, SaaS

❖ IaaS Benefits

- Portability & Interoperability with Legacy Applications

- Enables portability based on infrastructure resources that are used through Internet connections

- Enables a method to maintain interoperability with legacy applications and workloads between IaaS clouds

IaaS, PaaS, SaaS

❖ PaaS (Platform as a Service)
- Provides development & deployment tools for application development

## ❖ PaaS Types

Application Delivery-Only Environment

Stand Alone Development Environment

Open Platform as a Service

Add-on Development Facilities

IaaS, PaaS, SaaS

❖ PaaS Types

- **Application Delivery-Only Environment**
  - Provides on-demand scaling & application security
- **Stand-Alone Development Environment**
  - Provides an independent platform for a specific function
- **Open Platform as a Service**
  - Provides open source software to run applications for PaaS providers
- **Add-On Development Facilities**
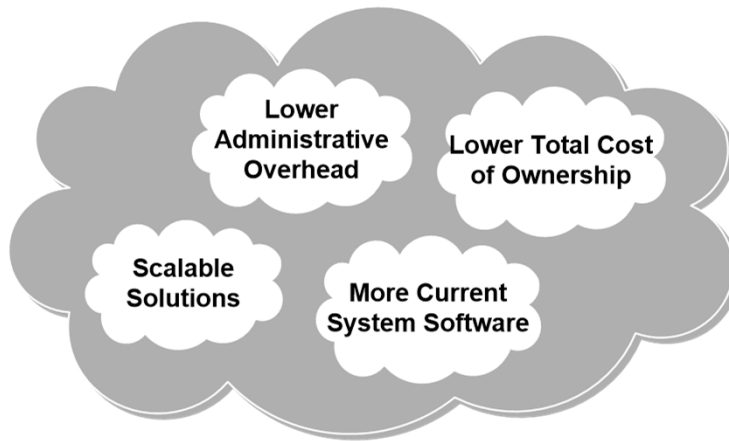 - Enables customization to the existing SaaS platforms

IaaS, PaaS, SaaS

❖ PaaS Runtime Environment for Apps
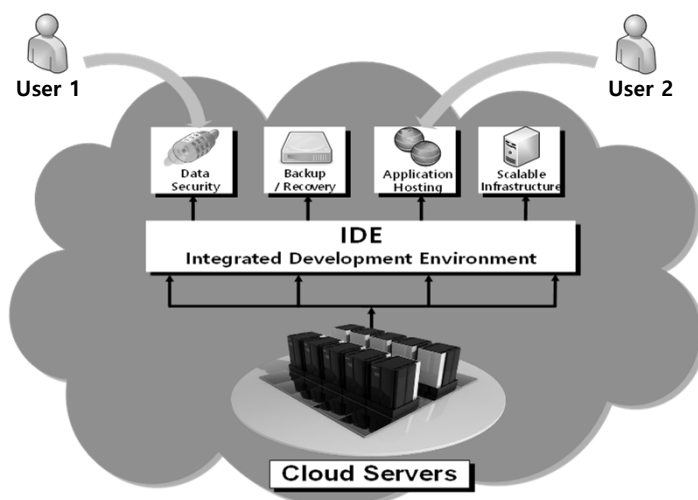
IaaS, PaaS, SaaS

❖ PaaS Benefits

IaaS, PaaS, SaaS

❖ PaaS Benefits

- Lower Administrative Overhead
  - User does not need to be involved in any administration of the platform

- Lower Total Cost of Ownership
  - User does not need to purchase any hardware, memory, or server

IaaS, PaaS, SaaS

❖ PaaS Benefits

- Scalable Solutions
  - Application resource demand based automatic resource scale control

- More Current System Software
  - Cloud provider needs to maintain software upgrades & patch installations

IaaS, PaaS, SaaS

❖ SaaS (Software as a Service)

- Provides software applications as a service to the user

- Software that is deployed on a cloud server which is accessible through the Internet

IaaS, PaaS, SaaS

❖ SaaS Characteristics

- **On Demand Availability**
  - Cloud software is available anywhere that the cloud is reachable via Internet

- **Easy Maintenance**
  - No user software upgrade or maintenance needed
    - ➜ All supported by the cloud

- **Flexible Scale Up or Scale Down**
 - Centralized Management & Data

IaaS, PaaS, SaaS

❖ SaaS Characteristics

- **Enables a Shared Data Model**
  - Multiple users can share a single data model and database

- **Cost Effectiveness**
  - Pay based on usage
  - No risk in buying the wrong software

- **Multitenant Programming Solutions**
  - Multiple programmers are ensured to use the same software version
    - ➜ No version mismatch problems

IaaS, PaaS, SaaS

❖ Open SaaS Applications
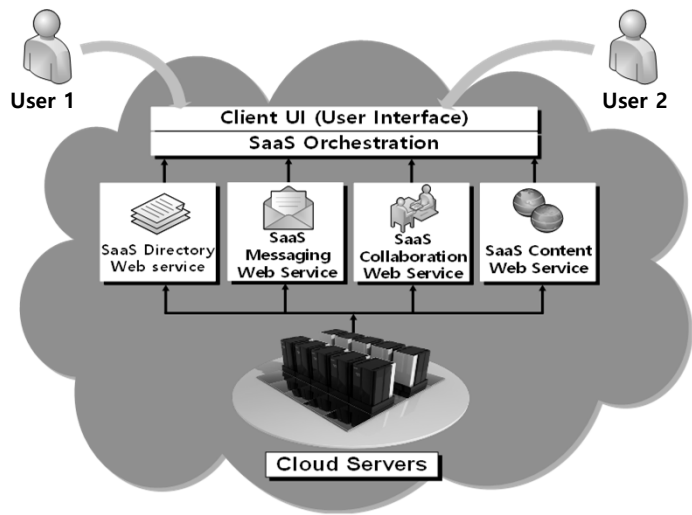
Cloud Technology

References

References

- K. Kumar and Y. H. Lu, "Cloud Computing for Mobile Users: Can Offloading Computation Save Energy?," Computer, vol. 43, no. 4, pp. 51-56, Apr. 2010.

- Wikipedia, http://www.wikipedia.org

- Apple, iCloud, https://www.icloud.com

- Google, Google Cloud, https://cloud.google.com/products [Accessed June 1, 2015]

- Virtualization, Cisco's IaaS cloud, http://www.virtualization.co.kr/data/file/01_2/1889266503_6f489654_1.jpg [Accessed June 1, 2015]

- Tutorialspoint, Cloud computing, http://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf [Accessed June 1, 2015]

References

- Image sources
  - AWS Simple Icons Storage Amazon S3 Bucket with Objects, By Amazon Web Services LLC [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0)], via Wikimedia Commons
  - iCloud Logo, By EEIM (Own work) [Public domain], via Wikimedia Commons
  - MobileMe Logo, By Apple Inc. [Public domain], via Wikimedia Commons