

# 閱讀摘錄與筆記

## The NIST Definition of Cloud Computing (2011)

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NIST: National Institute of Standards and Technology (美國國家標準暨技術研究院) 定義了 Cloud Computing 的範疇。

五種主要性質：

- on demand self-service: consumer is self-servable to the service
- broad network-access: accessible through network easily
- resource pooling: customer has no control over the provided resources
- rapid elasticity: resource elastically provisioned and released
- measured service: optimize resource use by leveraging a metering capability (metering involves business models)

三種服務：（根據 levels of the service/application）

- Infrastructure as a service (IaaS)
- Service as a service (SaaS)
- Platform as a service (PaaS)

四種模型：（根據 provider 與 user 的角色）

- public cloud: access and resource is opened to public
- private cloud: access and resource is limited to private (for security reasons)
- community cloud: access and resource shared among audience
- hybrid: 以上三種的任意混合

看完以上定義之後，再看看 Virtual Machine 之中重要的性質：

# VIRTUAL IS BETTER THAN REAL

- Virtual objects are often related to the following
  - **Resource Sharing**
  - **Protection, Safe execution, Isolation**
  - **Security, Privacy**
  - **Flexibility**
  - **Interoperability, Platform Independence, Portability**

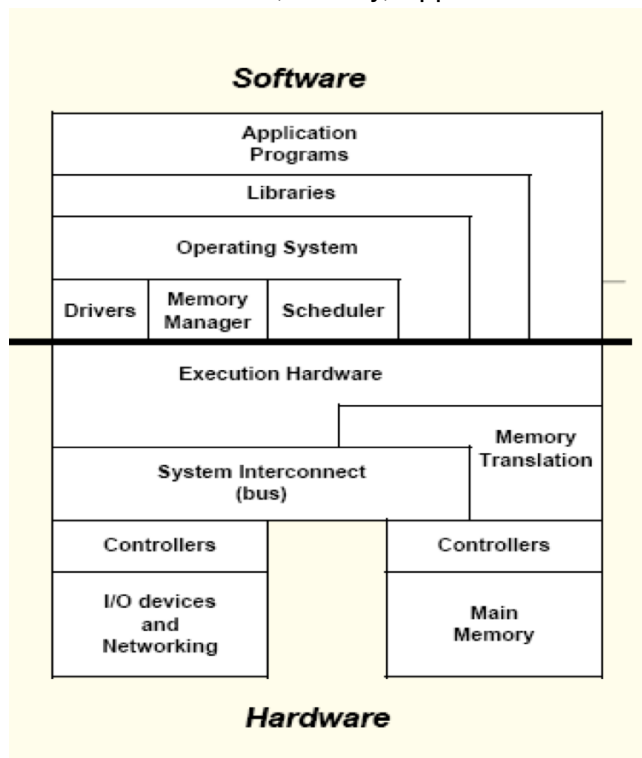
**Cloud Computing**

# VIRTUALIZATION PROPERTIES

- Isolation
  - Fault isolation
  - Performance isolation
- Encapsulation
  - Cleanly capture all VM states
  - Enables VM snapshots, clones
- Migration
  - Independent of physical hardware
  - Enables migration of live VMs
- Interposition
  - Enables transparent resource overcommitment, encryption, compression, replication.

Abstraction is key!

在 HW 之上，有 OS, Library, App. 這三層主要的抽象化。



HW 將邏輯電路抽象化為 ISA 。

OS 在 ISA 上作抽象化，提供 ABI —— User level ISA + OS System Calls 。

Library 在 ABI 上作抽象化，提供 API —— User level ISA + Library Calls (such as Clib, OpenGL)

這時 VM 介入抽象化中，hypervisor 可以監控控制底下 VM 的行為，對使用者而言即是 cloud service 。

更進一步抽象化 hypervisor 的行為，使用者無需知道硬體細節，環境（硬體/OS/Library）被提供端部署好之後馬上就可以使用。