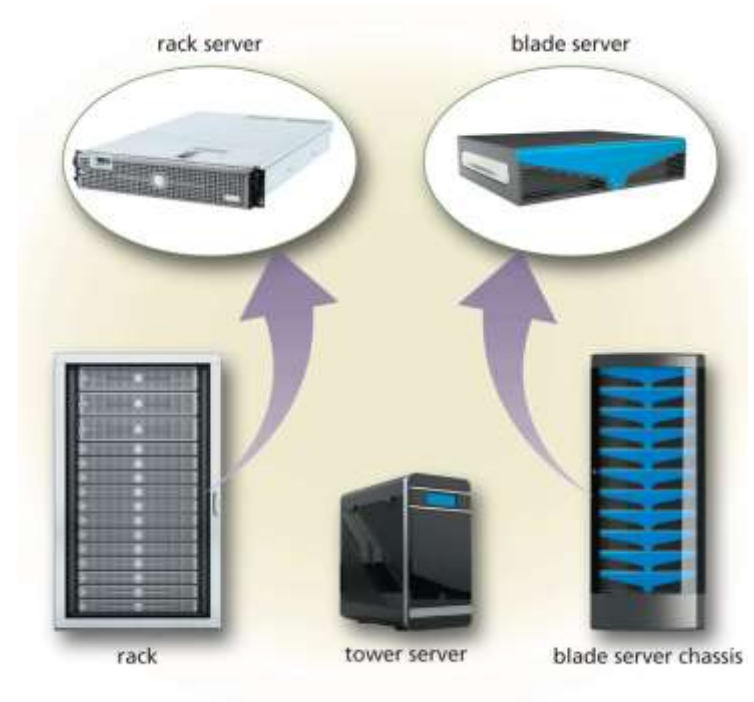


Servers伺服器

- A **server** is a computer dedicated to **providing one or more services** to other computers or devices on a network.
- Some servers, called **dedicated servers**, **perform a specific service** and can be placed with other dedicated servers to perform multiple services (Table 3-1).
 - Each type of dedicated server uses **software** designed specifically to manage its service.
 - Dedicated servers typically require a faster processor, more memory, and additional storage.

Servers 伺服器

- Servers include a processor, memory, storage, and network connections.
 - Depending on its function, a server **may not require a monitor or input device.**
 - **Some are controlled remotely.**
- Form factors for servers include
 - Rack server 機架式伺服器
 - Blade server 刀鋒伺服器
 - Tower server 直立式伺服器



Servers 伺服器

Rack server 機架式伺服器



- ☐ sometimes called a rack-mounted server
- ☐ is a server that is housed in a slot (bay) on a metal frame (rack).
- ☐ A rack can contain multiple servers, each in a different bay.
- ☐ The rack is fastened in place to a flat surface.



機架式伺服器

Servers 伺服器

Blade Server 刀鋒伺服器

- ☐ is a server in the form of a single circuit board, or blade.
- ☐ The individual blades insert in a blade server chassis that can hold many blades.
- ☐ Like a rack server, the chassis is fastened in place to a flat surface.



刀鋒伺服器

Servers 伺服器

Tower server



- ☐ is a server built into an upright cabinet (tower) that stands alone.
- ☐ The tower can be similar in size and shape to a desktop tower or larger.
- ☐ 體積大佔空間，當企業使用多台伺服器時，主機存放空間更是可觀



Servers 伺服器



機架式伺服器



刀鋒伺服器

你們會選擇 **Tower Server**、**Rackmount Server** 還是 **Blade Server** ?

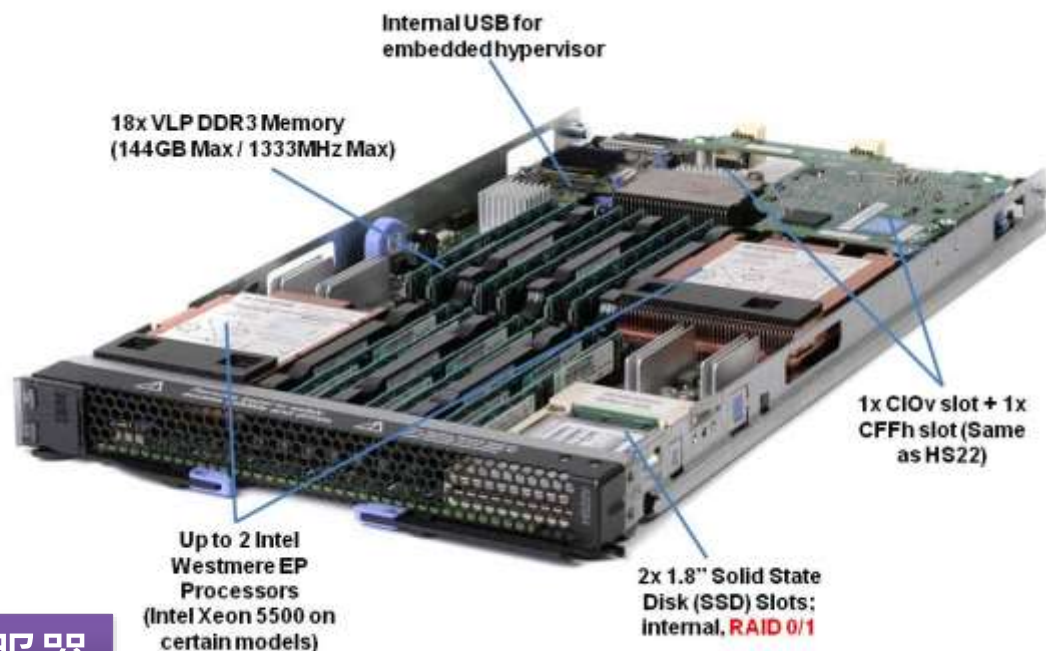
挑戰超高運算密度的Dell刀鋒伺服器| iThome

刀鋒、微型、多節點各有優劣伺服器類型高下見真章

Servers 伺服器



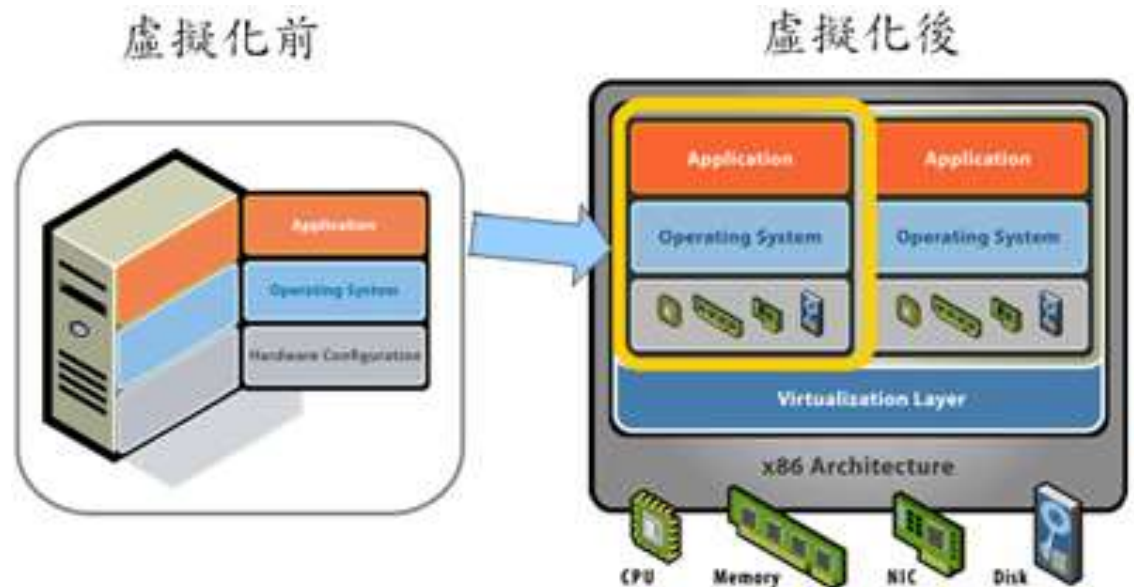
刀鋒伺服器



- 刀鋒伺服器則是機架式主機**倣效網路及電信設備的卡板式設計**再進化。更合乎商業經濟運用而設計，比機架式主機**更省空間**。
- 刀鋒伺服器有一個完整的機座，統一集中的方式，提供電源、風扇散熱、網路通訊等功能。而基座上可插置多張單板電腦，因狀似刀片（Blade），因此稱之為刀鋒伺服器，而基座則稱之為刀鋒基座。

Servers伺服器

- Some organizations **use virtualization to improve utilization of technology.**
- ***Virtualization*** is the practice **of sharing or pooling computing resources**, such as servers and storage devices. 虛擬化



Servers伺服器

- **Server virtualization** uses **software** to divide a physical server logically into many virtual servers.
 - virtual servers use **software** to configure and emulate physical servers.
 - From the end user's point of view, **a virtual server behaves just like a physical server.**
- The **advantages** are that a virtual server can be
 - **created and configured quickly**
 - **does not require a new physical server,**
 - **and is easier to manage.**

虛擬化

- 簡單來說，就是建立某物件的虛擬版本，而非實體版本的流程。
- 虛擬化適用於電腦、作業系統、儲存裝置、應用程式以及網路。
 - 伺服器虛擬化才是虛擬化的核心所在。
- IT 部門面臨的挑戰是目前的 x86 伺服器所造成的限制，其設計一次只能執行一個作業系統和應用程式。
- 虛擬化使用軟體模擬硬體的存在，並建立一個虛擬電腦系統。
 - 能在一個虛擬系統上執行更多物件，並能在單一伺服器上執行多個作業系統和應用程式。
 - 這能帶來規模經濟和更高效率。

Servers 伺服器

- A **server farm** is a network of several servers together in a single location.
- Server farms make it possible to combine the power of multiple servers.
- A **mainframe** is a large, expensive, powerful server that can handle hundreds or thousands of connected users simultaneously



Terminals 終端機

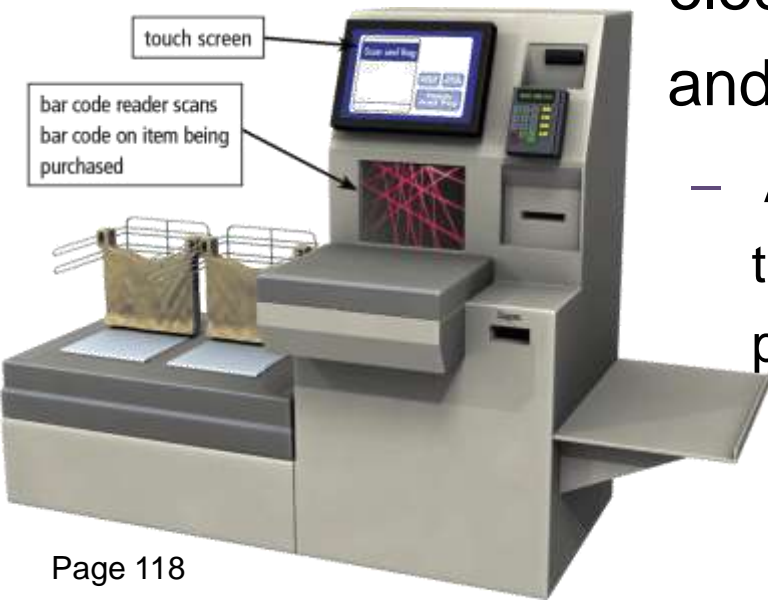


- Most retail stores use a **POS terminal** to record purchases, process credit or debit cards, and update inventory.

POS終端機可記錄採購商品、處理帳款或更新庫存

- The POS terminal is a combination of an electronic cash register, bar code reader, and printer.

- A bar code reader is an input device that uses laser beams to read bar codes on products.



Terminals 終端機

POS terminal

- Some POS terminals are Internet capable, which allows **updates to inventory** at geographically separate locations.
- Many POS terminals handle credit card or debit card payments.
 - After swiping your card through the reader, the POS terminal connects to a system that authenticates the purchase.
 - Once the transaction is approved, the terminal prints a receipt for the customer.



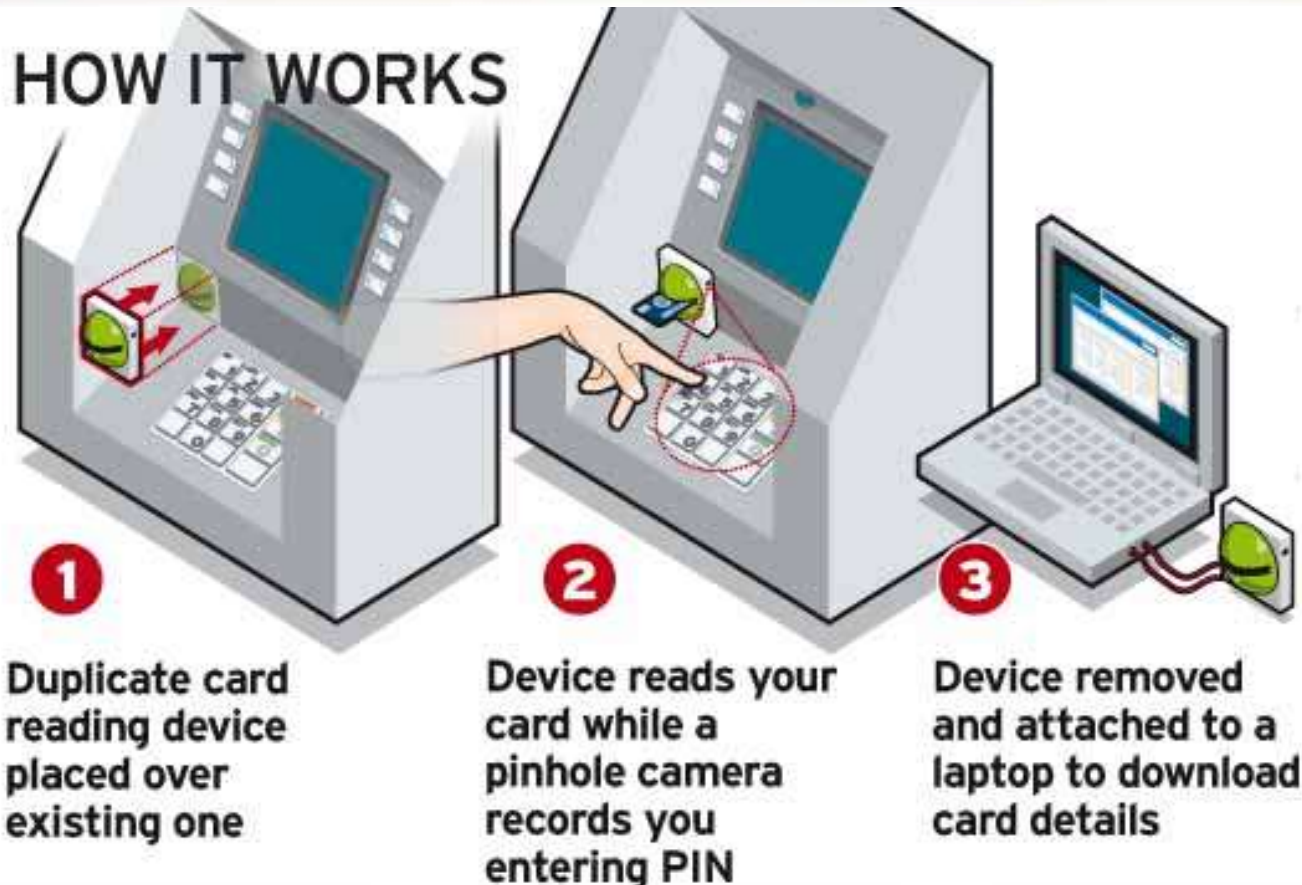
- Many grocery stores offer **self-service checkouts**, where consumers use POS terminals to scan purchases, scan their store or saver card and coupons, and then pay for the goods.

Terminals

- An **ATM** (automated teller machine) is a self-service banking terminal that connects to a host computer through a network
 - 使用自動櫃員機 (ATM) 可直接存取銀行帳戶
 - Thieves can capture a credit card number and PIN by placing a **skimmer** on an ATM



How does ATM skimming work



The first part is the **skimmer** itself, a card reader placed over the ATM's real card slot

The second part of the device is a **camera**.

The third part is **download card details**

ATM Skimming

Skimming is an illegal activity that involves the installation of a device, usually undetectable by ATM users, that secretly records bank account data when the user inserts an ATM card into the machine. Criminals can then encode the stolen data onto a blank card and use it to loot the customer's bank account.

1. 隱藏式相機

1 Hidden camera

A concealed camera is typically used in conjunction with the skimming device in order to record customers typing their PIN into the ATM keypad. Cameras are usually concealed somewhere on the front of the ATM—in this example, just above the screen in a phony ATM part—or somewhere nearby (like a light fixture).

2. 跟原始讀卡器很像的 skimmer

2 Skimmer

The skimmer, which looks very similar to the original card reader in color and texture, fits right over the card reader—the original card reader is usually concave in shape (curving inward), while the skimmer is more convex (curving outward). As customers insert their ATM card, bank account information on the card is “skimmed,” or stolen, and usually stored on some type of electronic device.

3. 偽裝按鍵

3 Keypad overlay

The use of a keypad overlay—placed directly on top of the factory-installed keypad—is a fairly new technique that takes the place of a concealed camera. Instead of visually recording users punching in their PINs, circuitry inside the phony keypad stores the actual keystrokes.





using an overlay — a fake keyboard fitted over the real keypad.



Cloud Computing 雲端運算

- **Cloud computing** refers to an environment of servers that house and provide access to resources users access through the Internet
 - Access software
 - Store files online
 - Configure an environment of server for optimal performance.

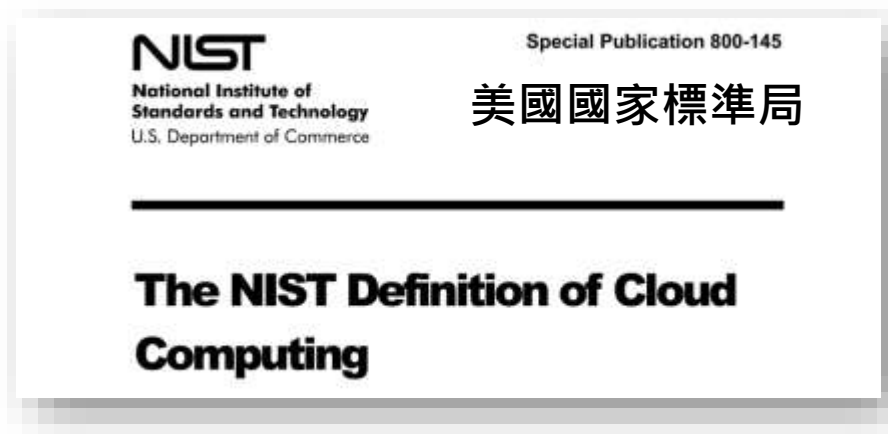


Cloud Computing 雲端運算

定義

- 雲端運算是一個模式，能便利地隨需透過網路存取設定好的共享運算資源池（如網路、伺服器、儲存裝置、應用程式與各類服務）。
- 可以最少的管理工作或服務供應商互動，進行快速配置和發佈。
- 這種雲端模型提升了服務可用性

- 以**5個基本特徵**、**3個服務模式**及**4種佈署模型**說明



五大基礎特徵



On-demand self-service. 隨需自助服務



Broad network access 廣泛的網絡接入



Resource pooling 共享資源池



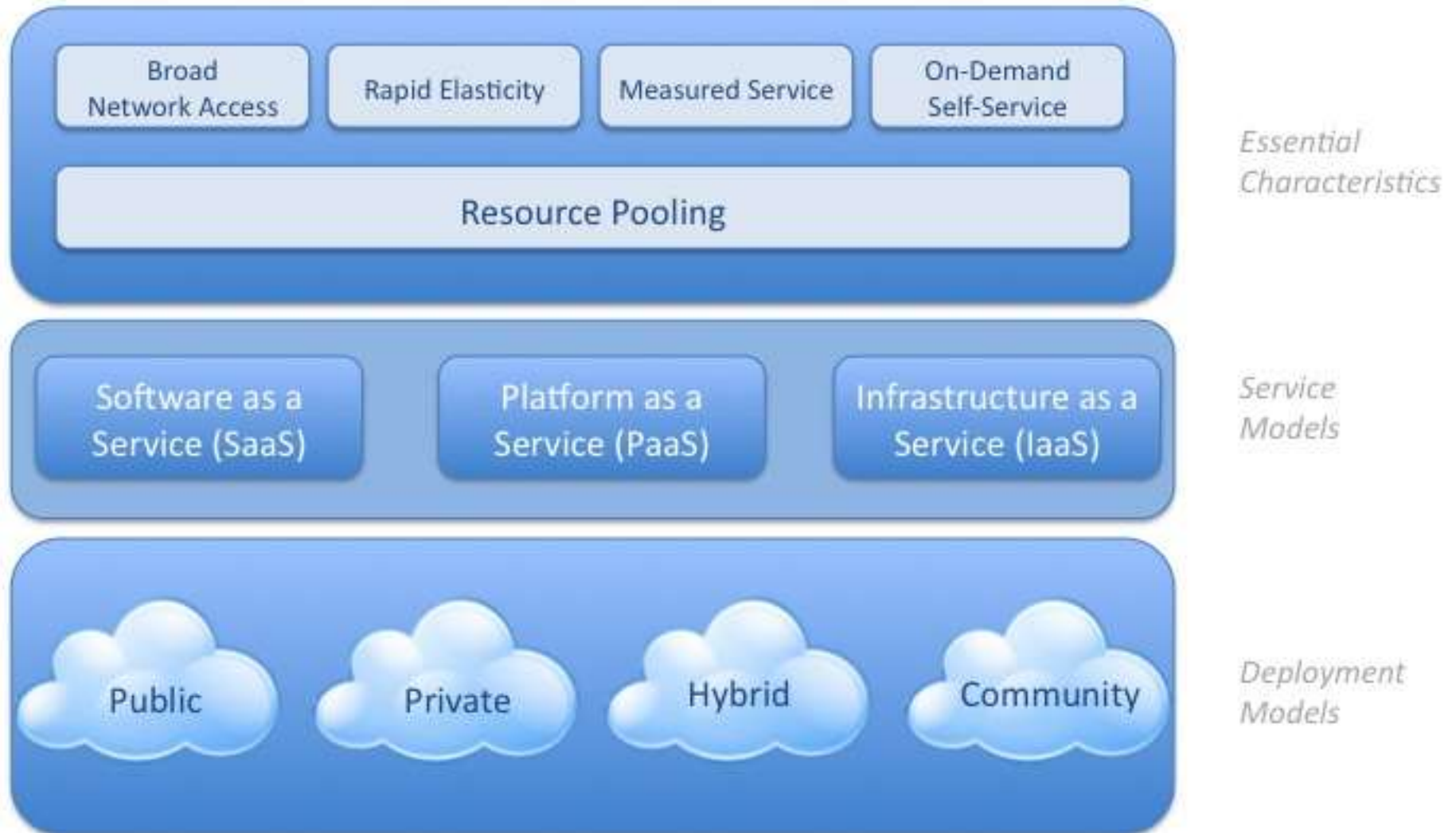
Rapid elasticity 快速彈性



Measured Service 測量服務

Visual Model Of NIST Working Definition Of Cloud Computing

<http://www.csrc.nist.gov/groups/SNS/cloud-computing/index.html>

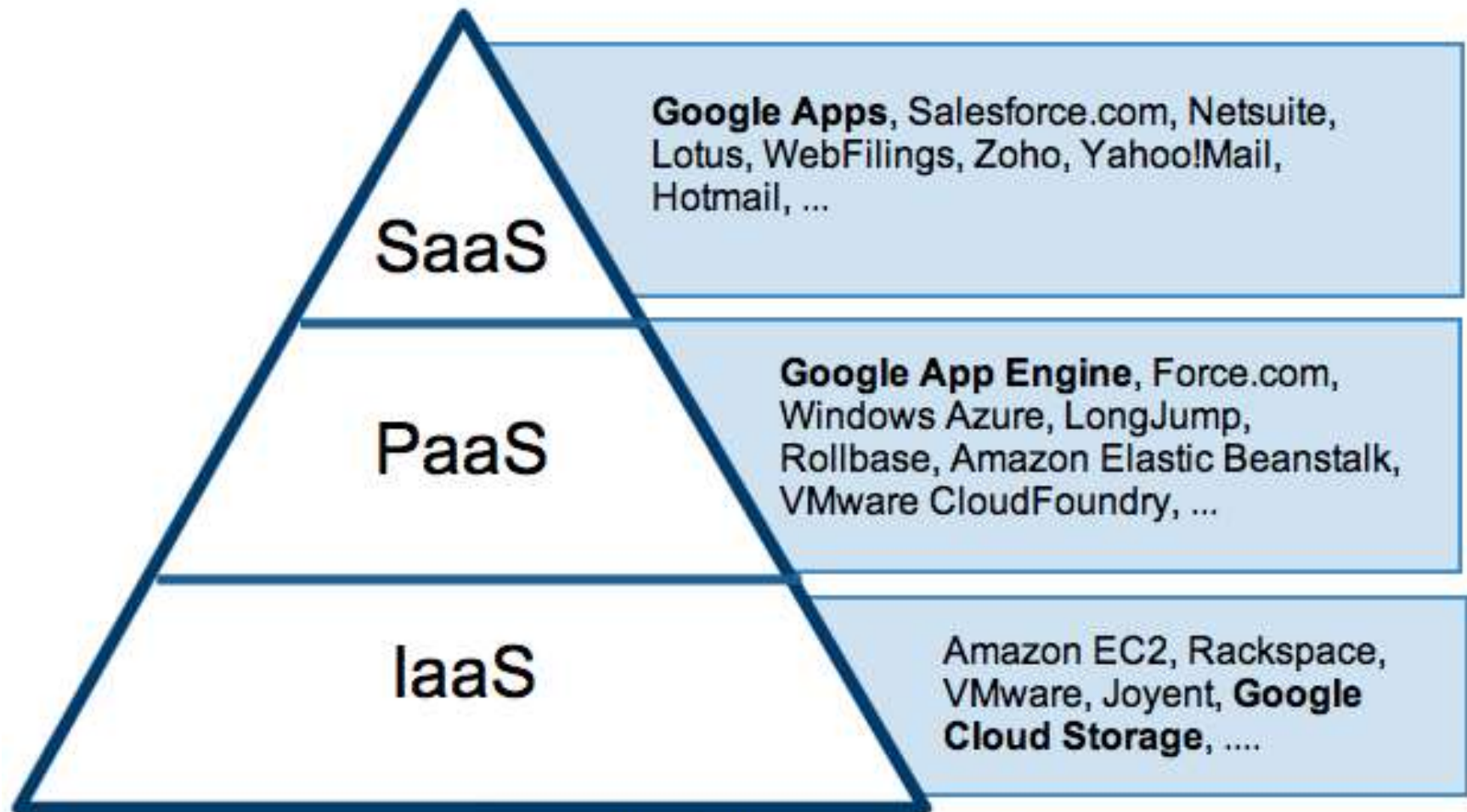


Cloud Computing 雲端運算

3種雲端運算服務型式

- **SaaS** (Software as a Service , 軟體即服務)
 - 軟體廠商將其軟體運行在具有高度延展性的雲端基礎設施上，以服務的形式提供，讓使用者透過瀏覽器等精簡型介面即可使用軟體。
- **PaaS** (Platform as a Service , 平臺即服務)
 - 以服務的形式提供應用程式開發平臺，用戶以供應商支援的程式語言與工具，可將自行開發或購買的應用程式部署到雲端架構。
- **IaaS** (Infrastructure as a Service , 基礎設施即服務)
 - 以服務的形式提供運算、儲存、網路等硬體運算資源，讓使用者能夠如同使用實體設備一樣管控，而不需要理會其背後的硬體架構與維護。

Cloud Computing 雲端運算



Source: Gartner AADI Summit Dec 2009

Cloud Computing 雲端運算



SAAS

Software
as a Service

Email

CRM

Collaborative

ERP

CONSUME



PAAS

Platform
as a Service

Application Development

Decision Support

Web

Streaming

BUILD ON IT



IAAS

Infrastructure
as a Service

Caching

Legacy

File

Networking

Technical

Security

System Mgmt

MIGRATE TO IT

One key spirit of Cloud Computing

用一句話說明雲端運算服務

形成服務才是重點!!

Everything as a Service !!

Anytime
隨時

Anywhere
隨地

With Any
Devices
使用任何裝置

Accessing
Services
存取各種服務

Are all cloud services available to everyone?

- Some cloud services are public and others are private.
- A public cloud is made available free or for a fee to the general public or a large group, usually by a cloud service provider.
- A **private cloud** is dedicated to a single organization. 私有雲
- Some cloud services are hybrid, combining two or more cloud types.

私有雲

- 私有雲（ Private cloud ）是將雲基礎設施與軟硬體資源建立在防火牆內，以供機構或企業內各部門共享數據中心內的資源。私有雲完全為特定組織而運作的雲端基礎設施，可以是由該組織自己管理，或由第三方廠商管理，它可以部署在企業內，也可部署在企業外。
- 私有雲就是企業或組織為了自己而建立的雲端運算架構，只服務企業內部或受到信任的人員。企業會這麼做，一方面是想擁有雲端運算的優點——運算資源調度彈性高，但又顧慮到商業資料放到公有雲的安全問題，畢竟公有雲的服務架構是多租戶型式，所有人的資料都放在同一個系統裏，企業因而不得不顧慮到資料有可能被其他人取得的風險。
- 由於私有雲主要是建立在企業管控的網路，比起公有雲的安全性高，但因為企業自建的私有雲規模不夠大，經濟效益就不如公有雲，而且也由於規模有限，運算資源較難快速地擴張

Digital Cameras

數位相機的作業原理

步驟 1

將鏡頭對準要拍攝的對象，然後按下快門。此時光線會通過相機的鏡頭。

步驟 2

影像會聚焦在名為電荷耦合元件（charge-coupled device；CCD）的晶片上。

步驟 3

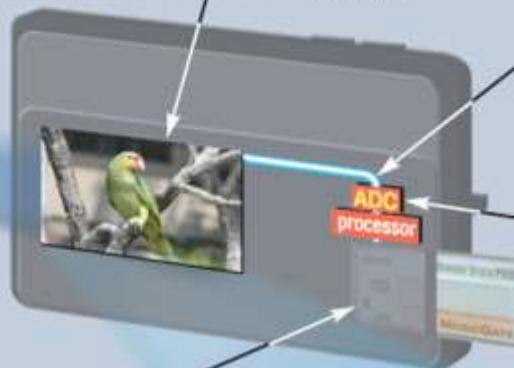
CCD 產生表達該影像的類比訊號。

步驟 4

透過類比數位轉換器（analog-to-digital converter；ADC），將類比訊號轉換為數位訊號。

步驟 5

相機中的處理器會調整影像的品質，並將數位影像儲存在相機中的儲存媒體上。



Digital Cameras

- Two factors affect the **quality of digital camera photos**

Resolution 解析度

- Resolution** is the number of horizontal and vertical pixels in a display device
解析度指的是顯示裝置中的水平與垂直的像素數量
- A **pixel** is the smallest element in an electronic display
像素 (pixel, picture element 的簡稱, 也稱畫素) 是電子影像中的最小元素

Number of bits stored in each pixel 每個像素儲存的位元個數

- Each pixel consists of one or more bits of data
每個像素是由一或多個位元的資料所組成
- The more bits used to represent a pixel, the more colors and shades of gray that can be represented
呈現像素時使用的位元愈多, 就能夠表示出更多種色彩和灰階層次

Game Devices



gamepad



joystick

遊戲手把



pedals and wheel

搖桿與轉盤



dance pad

跳舞機踏墊



motion-sensing game
controller

動作偵測的控制器



guitar



balance board

嵌入式電腦

- **嵌入式電腦** (embedded computer) 是具有特殊用途的電腦，當作是大型產品的元件

消費性電子產品

- 行動和數位電話
- 數位電視
- 相機
- 錄影機
- DVD錄放影機
- 電話答錄機

家用自動化設備

- 恆溫裝置
- 灑水系統
- 保全監控系統
- 電器
- 燈具

汽車

- 防鎖死煞車
- 引擎控制模組
- 安全氣囊控制器
- 定速控制器

程序控制器和 機器人

- 遠端監視系統
- 電源監視器、
- 機器控制
- 醫療設備

電腦裝置和 辦公室機器

- 鍵盤
- 印表機
- 傳真機
- 影印機



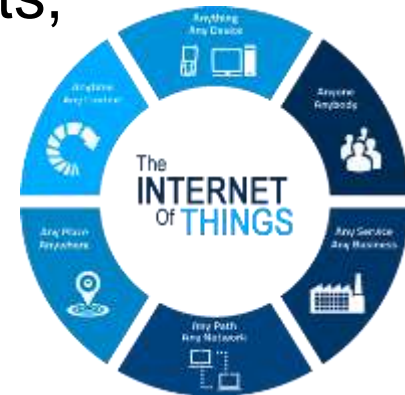
Can embedded computers use the Internet to communicate with other computers and devices?

- **Smart TV** enables you to browse the web, stream video from online media services, listen to Internet radio, communicate with others on social media sites, play online games, and more — all while watching a television show.



Can embedded computers use the Internet to communicate with other computers and devices?

- A trend, called the **Internet of Things**, describes an **environment** where processors are embedded in every product imaginable (things), and those ‘things’ **communicate with each other via the Internet** (i.e., alarm clocks, coffeemakers, apps, vehicles, refrigerators, phones, washing machines, doorbells, streetlights, thermostats, navigation systems, etc.). 物聯網
 - Without human intervention
 - machine-to-machine (M2M) communications.



Ports and Connections

- A **USB port**, short for **universal serial bus** port, can connect up to **127** different peripheral devices together with a single connector
- Newer versions (i.e., USB 3.0) transferring data and information faster than earlier ones (i.e., USB 2.0).
 - Newer versions are **backward compatible**向下相容, which means they support older USB devices as well as newer ones.
 - older USB devices do not run any faster in a newer USB port.

Ports and Connections

- USB ports also may be able to **transfer power** to recharge many smartphones and tablets.
 - Newer versions of USB can charge connected mobile devices even when the computer is not in use.
- To attach multiple peripheral devices using a single USB port, you can use **a USB hub. USB hub集線器**

Explaining USB 3.0

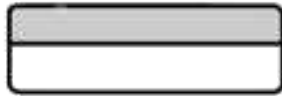
Explaining USB 3.1

USB ports

USB 2.0



A Female



A Male



B Male



Micro B Male



Mini-A



Mini-B



Mini-4 pin



USB 3.0



A Female



A Male



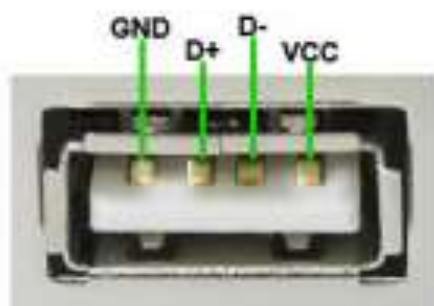
B Male



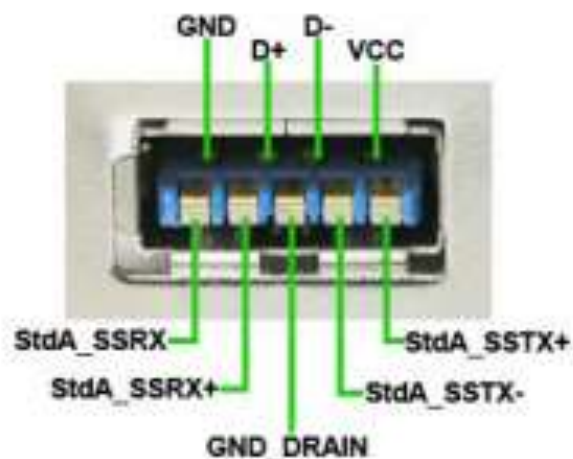
Micro B Male



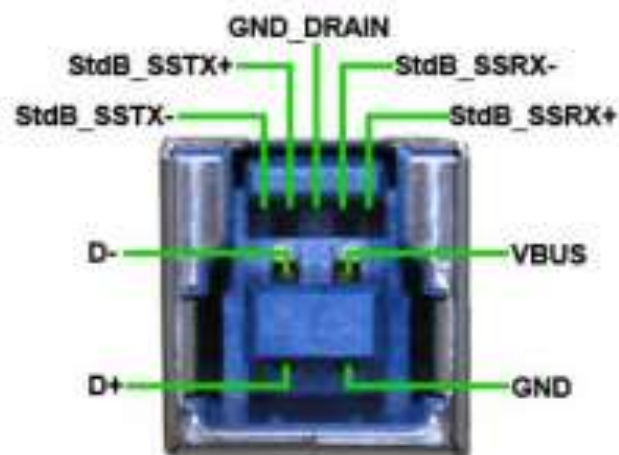
Hi-Speed USB 2.0 A plug pinout



SuperSpeed standard A plug pinout



SuperSpeed standard B plug pinout



USB 2.0 A
plug pinout



USB 3.0 A
plug pinout



USB 3.0 micro-B
plug pinout

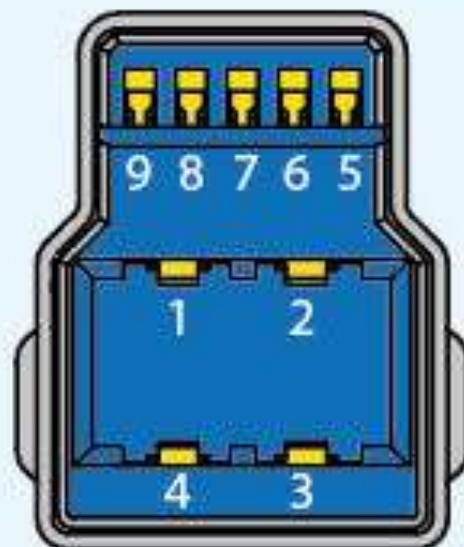


USB 3.0 B
plug pinout

USB 3.0 type B pinout, cable Assembly

source: www.reviewharddrive.com

USB type B Pinout, Cable Assembly		
Pin	Signal Name	Description
1	VBUS	Red
2	D-	White
3	D+	Green
4	GND	Black
5	StdA_SSTX-	Blue
6	StdA_SSTX+	Yellow
7	GND_DRAIN	GROUND
8	StdA_SSRX-	Purple
9	StdA_SSRX+	Orange
Shell	Shield	Connector Shell



USB 3.0 type B Connector



USB 3.0 transfer capability

The high USB 3.0 speed becomes possible due to its full duplex transfer capability in which two lanes are fully reserved for sending the data and the rest of the two lanes are reserved for receiving it.



USB 3.0 B

USB接頭轉換一欄表

USB 3.0 (Super Speed)	USB 2.0 (High Speed)
<ul style="list-style-type: none"> ◆超高速傳輸達5Gbps ◆速度約625MB/S，為USB 2.0的10倍 ◆可向下相容USB 2.0 ◆購買前請確認商品有支援到USB 3.0 	<ul style="list-style-type: none"> ◆高速傳輸480Mbps ◆速度約60MB/S ◆可向下相容USB 1.1和1.0







A公轉Mini公	A母轉Mini公	A公轉Micro B	A公轉A公	A公轉A母
Mini USB有4 pin和5 pin區分，市面上多為5 pin，通常用於手機、數位相機、MP3、MP4、外接硬碟...等多種數位產品之間的資料傳輸用。	和A母轉Micro B為相同用途：用於主機與週邊設備之間的連結，譬如外接滑鼠／鍵盤／隨身碟／讀卡機等。惟前提是須具備OTG Host功能才具有資訊擴充能力，否則僅為一般轉接頭使用。	Micro USB為Mini USB下一代規格，以5 pin為主。相較於上一代，它的高度減半，寬度差不多。 USB 2.0和3.0的接頭不同，市面上多數智慧手機的充電傳輸線為2.0規格。USB 3.0適用於新型3.0外接硬碟、筆電或讀卡機。	一般用在特殊情形下，通常是數位主機設備之間的相互連結或延伸。可同時搭配A母轉A母的轉接頭使用。	亦即USB延長線，通常使用在主機與數位週邊設備需要延伸長度或延伸無線網卡增強訊號用。
A母轉A母	A公轉B公	A公轉B母	A母轉B公	A母轉B母
一般用在特殊情形下，兩端可對接兩條USB公頭連接線，使數位主機設備之間的連結得以延伸至更長的距離。	通常用於主機與週邊設備之間的「連結」，大多適用於傳真機、掃描器、印表機及舊型的3.5吋外接硬碟。	通常用於主機與週邊設備之間的「轉接」，大多適用於傳真機、掃描器、印表機及舊型的3.5吋外接硬碟。	通常用於主機與週邊設備之間的「轉接」，大多適用於傳真機、掃描器、印表機及舊型的3.5吋外接硬碟。可同時搭配A公轉A公連接線。	一般用在特殊情形下，兩端可對接兩條USB連接線，使數位主機設備之間的連結得以延伸至更長的距離。

USB

SB Type-C 與 USB 3.1 不同

系統架構/連接器規格翻新 **USB 3.1**傳輸效能大躍進

USB版本	速率稱號	頻寬	速度
USB 3.1	超高速+ SuperSpeed+ 	10Gbps	約1.192GB/s (9,537Mbit/s)
USB 3.0	超高速 SuperSpeed 	5Gbps	約596MB/s (4,768Mbit/s)
USB 2.0	高速 Hi-Speed 	480Mbps	約57.2MB/s (58,594KB/s)
USB 1.1	全速 Full Speed 	12Mbps	約1.43MB/s (1,465KB/s)
USB 1.0	低速 Low Speed	1.5Mbps	約183.1KB/s (187500B/s)

Ports and Connections

Port replicators and Docking stations

- Instead of connecting peripheral devices directly to ports on a mobile computer, some mobile users prefer the flexibility of **port replicators** and **docking stations**
- A **port replicator** is an external device that provides connections to peripherals through ports built into the device

連接埠擴充基座是一種外接式裝置，提供透過內建在裝置中的各連接埠能與各周邊裝置連接

- A **docking station** is an external device that attaches to a mobile computer or device

銜接站是一種與行動式電腦或裝置連接的外接式裝置

Ports and Connections

Wireless Device Connections

- Instead of connecting computers and mobile devices to peripheral devices with a cable, some peripheral devices use wireless communications technologies



Wireless Device Connections

- **Bluetooth**

- Wireless communication technology that uses **short-range radio signals** to transmit data between two Bluetooth-enabled computers or devices.
 - computers, mobile devices and many peripheral devices, such as a mouse, keyboard, printer, or headset, and many vehicles and consumer electronics
- have to be within about **33 feet** of each other, but the range can be extended with additional equipment.

Ports and Connections

Wireless Device Connections

- **Bluetooth wireless port** adapter that will convert an existing USB port into a Bluetooth port.

藍芽無線連接埠轉接器可將USB埠轉換成藍芽埠





3-1 Pair Bluetooth Devices

- Before two Bluetooth devices will communicate with each other, they might need to be **paired**.
- **Pairing** is the process of initiating contact between two Bluetooth devices and allowing them to communicate with each other.
- **Discoverable mode**
 - State of a Bluetooth device when it is waiting for another Bluetooth device to locate its signal.



Bluetooth

自1997年7月
開始發展

為一工作在
2.4GHz頻段的低耗電技術



可以加密保護資料的
安全性










可用特殊技術消除
電波干擾和衰減

Bluetooth 4.0 的分類

- 藍牙已經有許多版本問世。藍牙技術聯盟（Bluetooth SIG）於2011釋出 Smart 標誌，讓使用者在藍牙 4.0 版可以清楚分辨不同版本。未來藍牙將會分為三種：**Bluetooth Smart Ready**、**Bluetooth Smart**、以及標準 **Bluetooth**。
- 新的印記是為了要分辨裝置間的相容性以及標示各版本的適用傳輸頻率。
 - Smart Ready 適用於任何雙模藍牙 4.0 的電子產品，如 iPhone 4S。
 - Smart 則是應用在「心率監控器或計步器等使用鈕扣式電池並傳輸單一資訊的裝置」。
 - **Smart Ready** 的相容性會最高，可與 Smart 及標準藍牙相通。標準藍牙則無法與 Smart 相通。這樣的分類其實有些複雜，還是一定要看看下面的那張表才能記住。

Bluetooth 4.0 的分類

- 藍牙技術聯盟公佈 Smart 和 Smart Ready 標誌

If your product bears this logo...	It's compatible with products bearing any of these logos...
	  
	 
	

適用於任何雙模藍牙 4.0 的電子產品

應用在「心率監控器或計步器等使用鈕扣式電池並傳輸單一資訊的裝置」

Bluetooth 4.0 的分類



Bluetooth

Bluetooth® 目前主流規格				
版本	2.0+EDR	2.1+EDR	3.0+HS	4.0
發佈時間	2004.11	2007.7	2009.4	2010.6
速率	1~3Mbps	1~3Mbps	24Mbps	Normal : 3Mbps HS : 24Mbps
新規格特色	<ul style="list-style-type: none"> • 增強資料傳輸率EDR (Enhanced Data Rate) 	<ul style="list-style-type: none"> • 簡易安全配對SSP (Simple Secure Pairing) • 低耗電監聽模式SSR (Sniff Subrating) • 加密中止/繼續EPR (Encryption Pause/Resume) • 延伸查詢回應EIR (Extended inquiry response) • 監測超時LSTO (Link Supervision Timeout) • 服務品質QoS (Quality of Service) 	<ul style="list-style-type: none"> • AMP技術 (Alternate MAC/PHY) • 增強電源控制EPC (Enhanced Power Control) • 單點無線資料傳輸UCD (Unicast Connectionless Data) • 通用測試規範GTM (Generic Test Methodology) 	<ul style="list-style-type: none"> • 低功耗、低成本 • 可用頻道調整為40個 • 可彈性選用單純接收、傳送，或兩者兼具 • 可彈性選擇與原有藍牙裝置互通 • 可彈性選擇使用高速傳輸技術
主要用途	小檔案傳輸，目前多數藍牙裝置如手機、耳機採用版本		高速傳輸、大型檔案傳輸	醫療、運動、健康管理、家庭娛樂

- 過往藍牙的傳輸距離大約為30英尺（10公尺左右）
- 藍牙4.0規格中的有效傳輸距離提升至最高約200英尺（60公尺左右）。
- 藍牙4.0的發展方向--運動管理、醫療健康照護與家用自動化
- 藍牙4.1於2013年底推出，其目的是為了讓 Bluetooth Smart 技術最終成為物聯網發展的核心動力。
- 藍牙4.2 於2014年12月推出。

Bluetooth 5.0四倍範圍、雙倍速度

1. 更快的傳輸速度

- 藍牙 5 能夠實現 4 倍於藍牙 4.2 的速度提升。（速度上限為24Mbps）

2. 更廣的傳輸範圍

- 藍牙 5 標準的覆蓋範圍將是藍牙 4.2 的 2 倍。（理論上可達300米,100公尺）

3. 提升室內定位精確度功能

- 藍牙 5.0 第 3 個重要特色是可以提高室內定位的精確度，結合 Wi-Fi 技術，將可以實現精度小於 1 公尺的定位。



Bluetooth 5.0四倍範圍、雙倍速度

4. 這是一個為 IoT 打造的標準

- 由於物聯網裝置無法提供太多的電力，藍牙 5 針對 IoT 物聯網的裝置應用，提供更好的效能，以及更低的功耗需求。

5. 想用藍牙 5.0 的新功能？你可能需要買新的裝置

- 與過去「.X」版本的升級不同，這次的升級需要採用新的晶片。因此過去的藍牙升級只需要韌體更新就可以處理，但是這次舊有的手機，雖然還是可以與藍牙 5 的裝置連接，但是就無法使用新的功能。

Bluetooth 5，將實現4倍通訊距離、2倍傳輸速度、與**8倍廣播資料傳輸量**，實現「**非連線式**」物聯網，可提升家庭、商用及工業用Beacon與定位應用技術

Wireless Device Connections

- **Wi-Fi** Short for wireless fidelity
 - **Broadband Internet connection** that uses **radio signals** to provide connections to computers and devices with built-in Wi-Fi capability or a communications device that enables Wi-Fi connectivity.
 - **radio signals** that conform to **802.11 standards**, which were developed by the Institute of Electrical and Electronics Engineers (IEEE).
 - in **open or outdoor areas** free from interference, the Wi-Fi computers or devices should be within **300 feet** of each other.
 - In **closed areas**, the wireless range is about **100 feet**.
 - To obtain communications at the maximum distances, you may need to install extra hardware.

NFC

- **NFC**(near field communications)近距離無線通訊
 - uses close-range radio signals to transmit data between two NFC-enabled devices.
 - Examples of NFC-enabled devices include smartphones, digital cameras, computers, televisions, and terminals. Other objects, such as credit cards and tickets, also use NFC technology.
 - For successful communications, the devices either touch or are within an inch or two of each other.

NFC

- NFC為Near Field Communication近距離無線通訊 (近場通訊)
 - 「Near，近」則是指近接、靠近之意，
 - 「Field，場」是指電磁感應的磁場 (Magnetic field)
- 由Philips(Mifare 卡)、 Sony(Felica 卡)、 Samsung、 Nokia等知名大廠所組成NFC(Near Field Communication)國際聯盟，推動用手機結合NFC技術來做 為近端交易通訊平台.
- NFC FORUM 成員
 - Nokia、Philips以及Sony 於2004 共同發起， 成員有MasterCard、MasterCard、VISA、 Microsoft、 NEC、 Panasonic、 Renesas、 Samsung、 TI、 HP等，2008年末已超過 140 位成員。(資策會、中華電信、電檢中心、宏達電 資策會、中華電信、電檢中心、宏達電)

NFC

- 原理是使用單1晶片，結合感應讀卡器、感應式卡片，利用點對點功能，在20公分距離內以13.56MHz頻率範圍運作；它可讓行動設備在20公分近距離內進行交易存取，最常見的應用有如捷運悠遊卡感應，未來也可當門禁卡使用。
- **NFC**技術同時具備非接觸式卡片與**RFID Tag**讀取功能，因此藉由**NFC**技術將可實現資訊流、金流、物流高度整合的便利行動商務環境。

NFC

- 其傳輸速度有106 Kbit/秒、212 Kbit/秒或者424 Kbit/秒三種。
- 目前近場通訊已通過成為ISO/IEC IS 18092國際標準、EMCA-340標準與ETSI TS 102 190標準。
- NFC採用主動和被動兩種讀取模式。
- NFC支援三種工作模式
 - 卡模擬模式、點對點模式、讀卡機模式

NFC工作模式

- **卡模擬模式 (Card emulation mode)** :
 - 應用於被讀取的用途，相當於一張採用RFID技術的IC卡。可以替代現在大量的IC卡（包括信用卡）場合商場刷卡、悠遊卡、門禁管制，車票，門票等等。
 - 此種方式下，有一個極大的優點，那就是卡片透過非接觸讀卡器的RF域來供電，即便是寄主裝置（如手機）沒電也可以工作。
 - NFC裝置若要進行Card Emulation相關應用，則必須內建安全元件（Security Element, SE）之NFC晶片。

NFC工作模式

- 點對點模式 (P2P mode)

- 這個模式和紅外線差不多，可用於資料交換，只是傳輸距離較短，傳輸建立速度較快，傳輸速度也快些，功耗低（藍芽也類似）。(近距離交換少量資料)
- 將兩個具備NFC功能的裝置連結，能實現資料點對點傳輸，如下載音樂、交換圖片或者同步裝置位址簿。因此透過NFC，多個裝置如數位相機、PDA、電腦和手機之間都可以交換資料或者服務。

NFC工作模式

- 讀卡機模式 (Reader/Writer mode)
 - 應用在讀取的用途，作為非接觸讀卡機使用，比如從海報或者展覽資訊電子標籤上讀取相關資訊。

觸控功能是怎麼運作的？

- NFC 會發射觸發動作的短距離訊號。將兩個裝置彼此碰觸，如智慧型手機和喇叭，NFC 就會立即連接兩者。僅 4cm 的短傳輸距離可強化安全性且不需密碼驗證。





PROTECTING HARDWARE

Protecting Hardware

- You should take measures to protect computers and devices from **theft, vandalism, and failure**.



Safeguards against Hardware Theft and Vandalism

- To help reduce the chances of theft, companies and schools use a variety of security measures

為了減少盜竊的機會，公司和學校使用的各種安全措施

Physical access controls

實體存取控制

Alarm systems

警報系統

Cables to lock equipment

電纜鎖定設備

Real time location system

即時定位系統

Passwords, possessed objects, and biometrics

通關密碼、持有物、生物驗證

Protecting Hardware

- Some schools and businesses use **cables** to lock computers and help prevent theft of equipment
- **Device-tracking apps**
 - use GPS, Wi-Fi, IP addresses, and other means to determine the location of a lost or stolen computer or device.
- Users can configure computers and mobile devices to require identification before allowing access.
 - User name and password
 - **Fingerprint**



Protecting Hardware

- Hardware can fail for a variety of reasons :
多種因素可導致硬體故障，包括
 - Aging hardware 老化的硬體
 - Natural disasters 自然災害
 - Electrical power problems 電源問題
 - Noise, under voltages, and overvoltage
雜訊、電壓過低、電壓過高
 - Errors in programs or apps 電腦程式錯誤

Protecting Hardware

Hardware Failure(1/2)

- Electrical disturbances that can cause damage include **undervoltages** and **overvoltages**.
 - An **undervoltage** occurs when the electrical supply or voltage drops, often defined as more than **five percent, below the normal volts**.
 - **Undervoltages** can cause data loss but generally do not cause equipment damage.
 - A **brownout** is a prolonged (more than a minute) undervoltage.
 - A **blackout** is a complete power failure.

Protecting Hardware

Hardware Failure(2/2)

- Electrical disturbances that can cause damage include **undervoltages** and **overvoltages**.
 - An **overvoltage**, or **power surge**, occurs when the incoming electrical supply or voltage increases, often defined as **more than five percent, above** the normal volts.
 - A momentary overvoltage, called a **spike**, occurs when the increase in power lasts for less than one millisecond (thousandth of a second).
 - Uncontrollable disturbances such as lightning bolts can cause spikes.
 - Overvoltages can cause immediate and permanent damage to hardware.

Protecting Hardware

- A **surge protector**, also called a **surge suppressor**
 - uses electrical components to **provide a stable current flow** and minimize the chances of an overvoltage reaching the computer and other electronic equipment



Protecting Hardware

- An **uninterruptible power supply (UPS)**
 - is a device that contains surge protection circuits and one or more batteries that can provide power during a temporary or permanent loss of power

不斷電系統





3-3 Evaluate Surge Protectors and UPSs

- Two ways to protect from system failures caused by electrical power variations include **surge protectors** and **uninterruptable power supplies (UPS)**

兩種保護系統避免電壓變化的方法，包含過電壓保護器和不斷電系統





3-3 Evaluate Surge Protectors and UPSs

- Evaluate Surge Protectors and UPSs
 - Individual on/off switch for each device
 - Built-in fuse
 - UL1499 突波保護器標準
 - Joule rating at least 600 (越高越好)
 - indicator light show the device is functioning properly
 - Low clamping voltage 箝制電壓(越低越好)
 - Low response time (< 10 nanoseconds)



Protecting Hardware

- Two types of UPS devices are standby and online.
- **A standby UPS** 離線式
 - Uninterruptible power supply that **switches to** battery power when a problem occurs in the power line.
 - sometimes called an **offline UPS**
- **An online UPS** 在線式
 - Uninterruptible power supply that **always runs off the battery, providing continuous protection.**
 - always runs off the battery, which provides continuous protection.
 - An online UPS is much more expensive than a standby UPS.



What other measures can organizations implement if their computers must remain operational at all times?

- Some companies use **duplicate components** or **duplicate computers** to protect against hardware failure.
- A **fault-tolerant computer** has duplicate components so that it can continue to operate when one of its main components fail. 容錯電腦

Health Concerns of Using Technology

- **Physical Risks**

- A **repetitive strain injury (RSI)**重複施緊傷害

is an injury or disorder of the muscles, nerves, tendons, ligaments, and joints

- Tendonitis 肌腱炎
 - Carpal tunnel syndrome (CTS) 腕隧道症候群

- **Computer vision syndrome (CVS)**電腦視覺症後群

is a technology-related health condition that affects eyesight

參考資料與延伸閱讀

- [你們會選擇 Tower Server、Rackmount Server 還是 Blade Server ?](#)
- [挑戰超高運算密度的Dell刀鋒伺服器| iThome](#)
- [刀鋒、微型、多節點各有優劣伺服器類型高下見真章](#)
- [360°應用：精簡型電腦\(Thin Client\) - DigiTimes電子時報](#)
- [How does ATM skimming work?](#)
- [Research - COMPUTEX 2014穿戴式裝置Activity tracker展出](#)
- [何謂NFC](#)
- [NFC - MBA智库百科](#)
- <http://store.sony.com.tw/nfc/>
- [何謂NFC什麼是NFC的應用功能以及技術規格](#)
- [NFC無所不在](#)