





• 完成課程後,學員可以:

- 了解學校採用<mark>雲端電腦基本原則、成本、技術要求和安全問題;</mark>
- 了解全球趨勢,並認識到雲端電子學習之好處;
- -安裝雲端系統;
- 制定合適的教學方法,採用雲計算以促進學習和教學效果;
 了解雲端電腦的機會、特點、優勢和局限性。





- 雲端電腦概述
- 學校採用雲電腦概述
- 學員討論:在學校應用雲端電腦的機會、安排、優勢及限制
- 小休
- 設置公共雲系統的實現與教學實例
 動手實踐和深入的討論: O365
- 作業安排



Traditional Infrastructure Model



Time

Acceptable Surplus



Time



Unacceptable Surplus



Time

Unacceptable Deficit



Utility Infrastructure Model



什麼是雲端電腦?

- Cloud Computing is a general term used to describe a new class of network based computing that takes place over the Internet,
 - basically a step on from Utility Computing
 - a collection/group of integrated and networked hardware, software and Internet infrastructure (called a platform).
 - Using the Internet for communication and transport provides hardware, software and networking services to clients
- These platforms hide the complexity and details of the underlying infrastructure from users and applications by providing very simple graphical interface or API

什麼是雲端電腦?

- In addition, the platform provides on demand services, that are – always on, anywhere, anytime and any place.
- Pay for use and as needed, elastic
 - scale up and down in capacity and functionalities
- The hardware and software services are available to
 - general public, enterprises, corporations and businesses markets



- Shared pool of configurable computing resources
- On-demand network access
- Provisioned by the Service Provider

Adopted from: Effectively and Securely Using the Cloud Computing Paradigm by peter Mell, Tim Grance

Cloud Summary

- Cloud computing is an umbrella term used to refer to Internet based development and services
- A number of characteristics define cloud data, applications services and infrastructure:
 - Remotely hosted: Services or data are hosted on remote infrastructure.
 - Ubiquitous: Services or data are available from anywhere.
 - Commodified: The result is a utility computing model similar to traditional that of traditional utilities, like gas and electricity - you pay for what you would want!

Cloud Services Models



Example Cloud Services



Infrastructure As A Service (laaS)

- IaaS also known as HaaS (Hardware as a Service) provides access to computing resource in a virtualised environment:
- Virtual server space, network connections, bandwidth, IP addresses and load balancers.
- Physically, the pool of hardware resource is pulled from a multitude of servers and networks usually distributed across numerous users/clients.



虛擬伺服器技術





NetProtect 防火牆







External T-Resource







LDAP

SAMS DB Server



Office Admin















Running Windows Server 2012/2008 R2 - Hyper-V



虛擬伺服器技術之好處

- 1部伺服器 虛擬技術
- 電費減少
- 節省位置
- 極容易Recovery 使用 Hyper-V 內的快照功能 (Snapshots/ Checkpoint)
- 快速遷移虛擬伺服器 減少停機時間
- 减少硬件 少硬件少問題
- 隨時增加資源 提高所有虛擬伺服器可用性
- 統一管理介面方便TSS

虛擬伺服器技術學校實例

學校伺服器	電力度數	費用	等同二氧化碳排放
每日用8台舊型號350W伺服器24hrs	24528度	中電:每年 \$25,631.76 港燈:每年 \$33,088.27	中電:每年13,242kg 港燈:每年19,622kg
每日用1台新型號1200W伺服器 24hrs	10512度	中電:每年 \$10,985.04 港燈:每年 \$14,180.68	中電:每年5,676kg 港燈:每年8,409kg

註一:直至2013年1月1日為止,在包括了燃料價的淨電費方面,中華電力(每度電1.045元)較香港電燈(每度電1.349元) 註二:中華電力(每度電耗0.54kg二氧化碳)、香港電燈(每度電耗0.8kg二氧化碳)

一年最少可減省\$14,646及7,566kg的CO2的排放



b

Server Manager + Local Server



🛛 🕄 📔 🚩 Manage Tools



實例-天水園香島中學

- 六台 Linux 伺服器系統相容構成管理上的困難
- Linux 屬開放源碼的作業系統 欠缺支援
- 數百部電腦運作不同的系統 產生大量問題
- 系統的維護,支援-極度倚賴個別IT技術人員
- IT 技術人員花時間自行摸索尋找解決方法
- 無法支援和配合學校的軟件更新



天水圍香島中學副校長伍學齡

DESKTOP VIRTUALIZATION (VDI)

Microsoft Desktop Virtualization





Deliver virtualization to the user through a more comprehensive platform!

User State Virtualization







Access to data and personal settings on any device

文件跟著走

Log in to retrieve your data and restore productivity

*Includes User Experience Virtualization (UE-V), Folder Redirection and **Offline Files**

Thin client

Login xxx

Application Virtualization

軟件唔洗裝既!

Access to applications on any device without installs

即開即用

Log in to retrieve applications and restore productivity

容易更新

Faster provisioning of virtual applications on demand







Virtual Desktop Infrastructure Hosted Virtual Desktops

靈活存取 Windows

Secure access to Windows from any connected device Pursue "Bring Your Own Device" programs

Pursue Bring four Own Device progra

保護學校數據

Centralize school data and control user access

一按即有

Instant provisioning of school resources

集中化管理

Fast desktop delivery with centralized management





Thin client

Microsoft VDI Solution with Windows Server 2012



Powered by Windows Server 2012 Remote Desktop Services

Desktop sessions	Pooled VMs	Personal VMs

1 platform | 1 experience | 3 deployment choices

Efficient management Best value for VDI Rich experience online everywhere

Microsoft RemoteApp: Hosted Virtual Application Applications



Hardware Requirements



Server



Thin client

Server Requirements - Example

Server Estimation: 4GB Ram, 10GB Hard disk for 30 Users

CPU: Intel(R) Xeon(R) Processor E5-2630 2.30GHz, 15M Cache, 7.2GT/s QPI, Turbo, 6C, 95W x 2

RAM: 160GB RAM

Hard Disk: 6 x 2TB 7.2K RPM Near Line, 6Gbps SAS 3.5" Hot Plug Hard Drive

Power Supply: Redundant Power Supply

Thin Client - Example

Thin Client		
OS: Windows Embedded Standard 7		
CPU: Single Core		
Memory: 4GB Flash / 1GB RAM		
Display Port: DVI – D adapter available		
Network: 10/100/1000 Gigabit Ethernet / Wireless 802.11 a/b/g/n		
Graphics: On-Board Graphic Card		

Microsoft VDI Architecture



Case Sharing

Staff Room: 75 PCs

Original PC Specification:

CPU : Pentium 4 3Ghz RAM : 2 GB DDR2-Synch DRAM HDD : 80GB 5400RPM HDD Display : Integrated Intel® 3100 OD : DVD R/W

Requirements:

O/S : Windows 7 Enterprise B. S/W : Microsoft Office 2010

Estimated Specification: Intel i3 processor with 4 GB RAM



Estimated cost to replace all PC ~ HKD 4500.00 X 75 = ~ HKD <u>337,500.00</u>

實例-中華基金中學

必須為學生提供最新軟件應用程式

軟件種類和版本不斷推陳出新 - 需要不斷進行更新

更換速度未如理想的電腦硬件 - 必要改進

管理效能和環保原則方面皆有改進必要

Virtual Desktop Infrastructure





Application Virtualization



Desktop Virtualization 好處

- 舊機重生
- 省時省力Upgrade軟件
- 舊軟件繼續運行 作業系統相容性
- 增加電腦的安全性
- 極方便還原應用程式
- 桌面電腦,手提電腦, 平板電腦皆可運行



Microsoft Remote Desktop

By Microsoft Corporation

Open iTunes to buy and download apps.



Compatibility: Requires iOS 6.0 or later. Compatible with iPhone, iPad, and iPod touch. This app is optimized for iPhone 5.

Description

With the Microsoft Remote Desktop app, you can connect to a remote PC and your work resources from almost anywhere. Experience the power of Windows with RemoteFX in a Remote Desktop client designed to help you get your work done wherever you are.

Microsoft Corporation Web Site Microsoft Remote Desktop Support ApplicationMore

Screenshots





e 上椎蔥這個網址

iPhone | iPad



Platform as a Service

- PaaS is a category of cloud computing that provides a platform and environment to allow developers to build applications
- Allows users to create software applications using tools supplied by the provider. PaaS services can consist of preconfigured features that customers can subscribe to; they can choose to include the features that meet their requirements
- The infrastructure and applications are managed for customers and support is available.
- Services are constantly updated, with existing features upgraded and additional features added.
- PaaS providers can assist developers from the conception of their original ideas to the creation of applications, and through to testing and deployment.

Platform as a Service

- Key PaaS Offerings:
 - Operating system
 - Server-side scripting environment
 - Database management system
 - Server Software
 - Support
 - Storage
 - Network access
 - Tools for design and development
 - Hosting
- PaaS Advantages
 - No investiment in Infrastructure:
 - Being able to 'rent' virtual infrastructure has both cost benefits and practical benefits.
 - No need to purchase hardware or employ the expertise to manage it. Focus on the development of applications.
 - Makes Development/Quality Content Creation possible for 'non-experts'
 - With some PaaS offerings anyone can develop an application. They can simply do this through their web browser utilising one-click functionality.
 - Salient examples of this are one-click blog software installs such as WordPress.

Platform as a Service

- PaaS Advantages contd...
 - Flexibility
 - Customers can have control over the tools that are installed within their platforms or create a platform that suits their specific requirements.
 - Allows to 'pick and choose' the features that are necessary.
 - Adaptability
 - Features can be changed if circumstances dictate that they should.
 - Teams in various locations can work together; as an internet connection and web browser are all that is required
 - Developers spread across several locations can work together on the same application build.
 - Security
 - Security is provided, including data security and backup and recovery.

PaaS examples

 AWS Elastic Beanstalk, Cloud Foundry, CloudControl, Cloudera, Engine Yard, Google App Engine

PaaS Example: Google App Engine



Software as a Service

- Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over the network.
- Software vendors host and maintain the servers, databases and code that constitute an application
- Allows buyers to pay an annual or monthly subscription fee, which typically includes the software license, support and most other fees. A major benefit of SaaS is being able to spread out costs over time
- Key Characteristics:
 - A multitenant architecture: in which all users and applications share a single, common infrastructure and code base that is centrally maintained.
 - Easy Customization: The ability for each user to easily customize applications to fit their business
 processes without affecting the common infrastructure
 - Better Access: Improved access to data from any networked device while making it easier to manage privileges, monitor data use, and ensure everyone sees the same information at the same time

Software as a Service [19]

SaaS characteristics Contd..

- Harnesses Web: Anyone familiar with Amazon.com or My Yahoo! will be familiar with the Web interface of typical SaaS applications.
- Updates are automated: whenever there is an update it is available online to existing customers, often free of charge. No new software will be required as it often is with other types of applications and the updates will usually be deployed automatically by the cloud provider.
- Cross device compatibility: SaaS applications can be accessed via any internet enabled device, which makes it ideal for those who use a number of different devices, such as internet enabled phones and tablets, and those who don't always use the same computer.
- Accessible from any location: rather than being restricted to installations on individual computers, an application can be accessed from anywhere with an internet enabled device

SaaS Examples

 Google – Mail, Drive Calendar etc., Twitter, Facebook and Flickr etc. are all examples of SaaS, with users able to access the services via any internet enabled device. Enterprise users are able to use applications for a range of needs.



Cloud Service Models



Adopted from: Effectively and Securely Using the Cloud Computing Paradigm by peter Mell, Tim Grance

Cloud Computing Service Layers

	Services	Description
Application Focused	Services	Services – Complete business services such as PayPal, OpenID, OAuth, Google Maps, Alexa
	Application	Application – Cloud based software that eliminates the need for local installation such as Google Apps, Microsoft Online
	Development	Development – Software development platforms used to build custom cloud based applications (PAAS & SAAS) such as SalesForce
Infrastructure Focused	Platform	Platform – Cloud based platforms, typically provided using virtualization, such as Amazon ECC, Sun Grid
	Storage	Storage – Data storage or cloud based NAS such as CTERA, iDisk, CloudNAS
	Hosting	Hosting – Physical data centers such as those run by IBM, HP, NaviSite, etc.



- Large Web companies are exploiting the fact that they have data storage capacity that can be hired out to others.
 - allows data stored remotely to be temporarily cached on desktop computers, mobile phones or other Internet-linked devices.
- Amazon's Elastic Compute Cloud (EC2) and Simple Storage Solution (S3) are well known examples
 - Mechanical Turk



Saving documents

 When you do a "save as" on your computer, you choose where to save the material.



學員討論: 在學校應用雲端電腦的機會、安排、優勢及 限制

• Lower computer costs:

- You do not need a high-powered and high-priced computer to run cloud computing's web-based applications.
- Since applications run in the cloud, not on the desktop PC, your desktop PC does not need the processing power or hard disk space demanded by traditional desktop software.
- When you are using web-based applications, your PC can be less expensive, with a smaller hard disk, less memory, more efficient processor...
- In fact, your PC in this scenario does not even need a CD or DVD drive, as no software programs have to be loaded and no document files need to be saved.

Improved performance:

- With few large programs hogging your computer's memory, you will see better performance from your PC.
- Computers in a cloud computing system boot and run faster because they have fewer programs and processes loaded into memory...

Reduced software costs:

- Instead of purchasing expensive software applications, you can get most of what you need for free-ish!
 - most cloud computing applications today, such as the Google Docs suite.
- better than paying for similar commercial software
 - which alone may be justification for switching to cloud applications.

Instant software updates:

- Another advantage to cloud computing is that you are no longer faced with choosing between obsolete software and high upgrade costs.
- When the application is web-based, updates happen automatically
 - available the next time you log into the cloud.
- When you access a web-based application, you get the latest version
 - without needing to pay for or download an upgrade.
- Improved document format compatibility.
 - You do not have to worry about the documents you create on your machine being compatible with other users' applications or OSes
 - There are potentially no format incompatibilities when everyone is sharing documents and applications in the cloud.

- Unlimited storage capacity:
 - Cloud computing offers virtually limitless storage.
 - Your computer's current 1 Tbyte hard drive is small compared to the hundreds of Pbytes available in the cloud.
- Increased data reliability:
 - Unlike desktop computing, in which if a hard disk crashes and destroy all your valuable data, a computer crashing in the cloud should not affect the storage of your data.
 - if your personal computer crashes, all your data is still out there in the cloud, still accessible
 - In a world where few individual desktop PC users back up their data on a regular basis, cloud computing is a data-safe computing platform!

Universal document access:

- That is not a problem with cloud computing, because you do not take your documents with you.
- Instead, they stay in the cloud, and you can access them whenever you have a computer and an Internet connection
- Documents are instantly available from wherever you are

Latest version availability:

- When you edit a document at home, that edited version is what you see when you access the document at work.
- The cloud always hosts the latest version of your documents
 - as long as you are connected, you are not in danger of having an outdated version

- Easier group collaboration:
 - Sharing documents leads directly to better collaboration.
 - Many users do this as it is an important advantages of cloud computing
 - multiple users can collaborate easily on documents and projects
- Device independence.
 - You are no longer tethered to a single computer or network.
 - Changes to computers, applications and documents follow you through the cloud.
 - Move to a portable device, and your applications and documents are still available.

- Requires a constant Internet connection:
 - Cloud computing is impossible if you cannot connect to the Internet.
 - Since you use the Internet to connect to both your applications and documents, if you do not have an Internet connection you cannot access anything, even your own documents.
 - A dead Internet connection means no work and in areas where Internet connections are few or inherently unreliable, this could be a deal-breaker.

- Does not work well with low-speed connections:
 - Similarly, a low-speed Internet connection, such as that found with dial-up services, makes cloud computing painful at best and often impossible.
 - Web-based applications require a lot of bandwidth to download, as do large documents.
- Features might be limited:
 - This situation is bound to change, but today many web-based applications simply are not as full-featured as their desktop-based applications.
 - For example, you can do a lot more with Microsoft PowerPoint than with Google Presentation's web-based offering

• Can be slow:

- Even with a fast connection, web-based applications can sometimes be slower than accessing a similar software program on your desktop PC.
- Everything about the program, from the interface to the current document, has to be sent back and forth from your computer to the computers in the cloud.
- If the cloud servers happen to be backed up at that moment, or if the Internet is having a slow day, you would not get the instantaneous access you might expect from desktop applications.

- Stored data might not be secure:
 - With cloud computing, all your data is stored on the cloud.
 - The questions is How secure is the cloud?
 - Can unauthorised users gain access to your confidential data?
- Stored data can be lost:
 - Theoretically, data stored in the cloud is safe, replicated across multiple machines.
 - But on the off chance that your data goes missing, you have no physical or local backup.
 - Put simply, relying on the cloud puts you at risk if the cloud lets you down.



設置公共雲系統的實現與教學實例 動手實踐和深入的討論O365





Mix Office Mix

- 免費的 PowerPoint add-in
- •利用 PowerPoint 2016 提供簡單的方式製作網上教室內容及報告



OneNote Class Notebook Creator

A framework for teaching and learning with OneNote and Office 365



More Details: http://onenoteforteachers.com/en-US/teachers/



- 在第一節課裡,我們討論了 O365的基本操作,是時候 學以致用
- •任務:在O365上建立一組學習材料
- 要求

-課程內容可以是任何學科 -下一節本課程學員會以學生身份參與你的網上課程