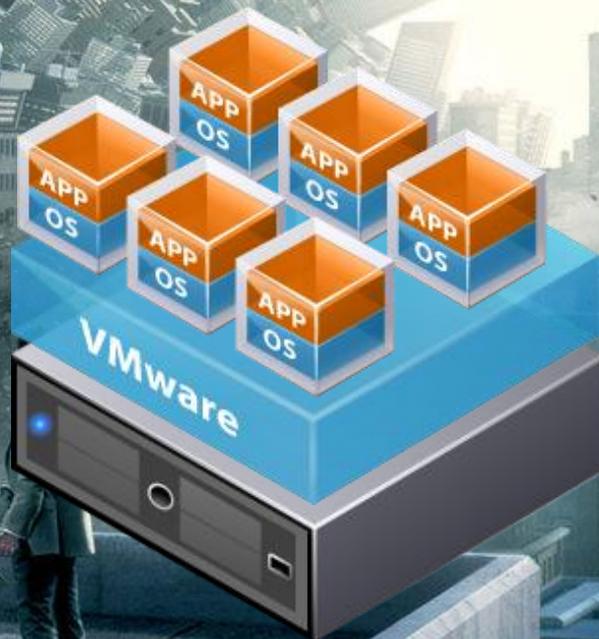


INCEPTION

校園虛擬化環境建置、 基礎操作與轉換



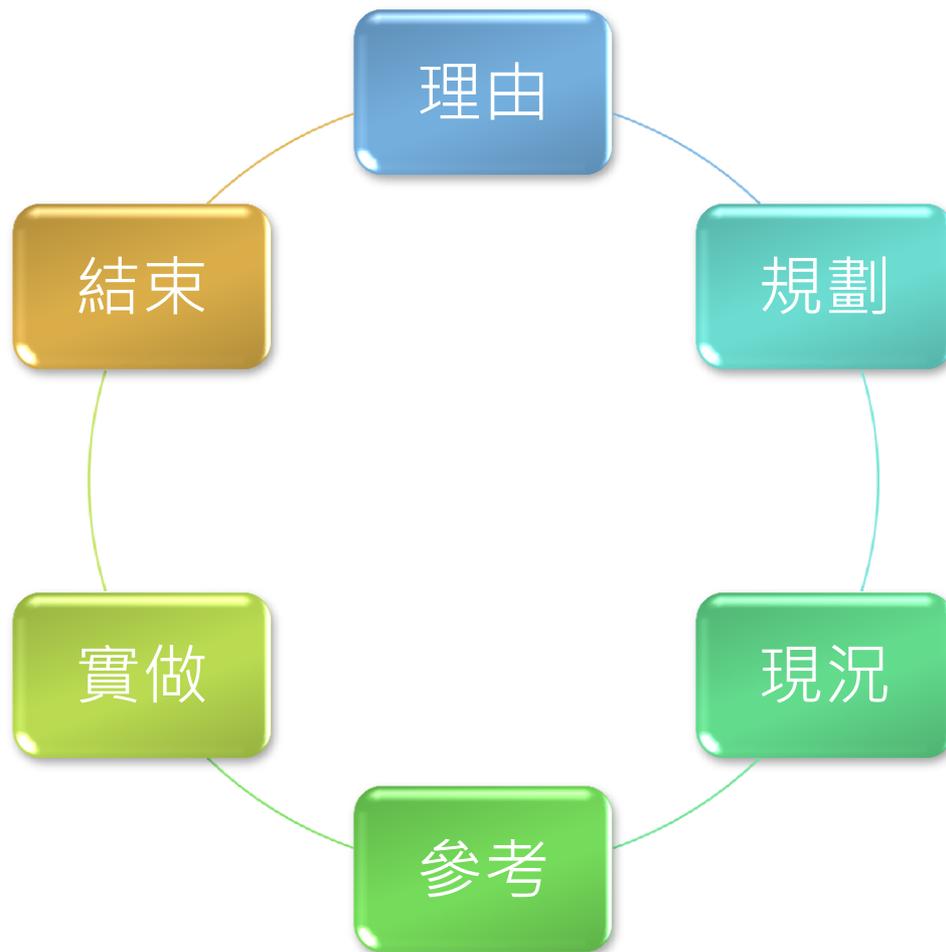
Traditional Architecture



Virtual Architecture

部分相關圖片資料來自 VMware 官方 PPT 資料檔，網路圖片。

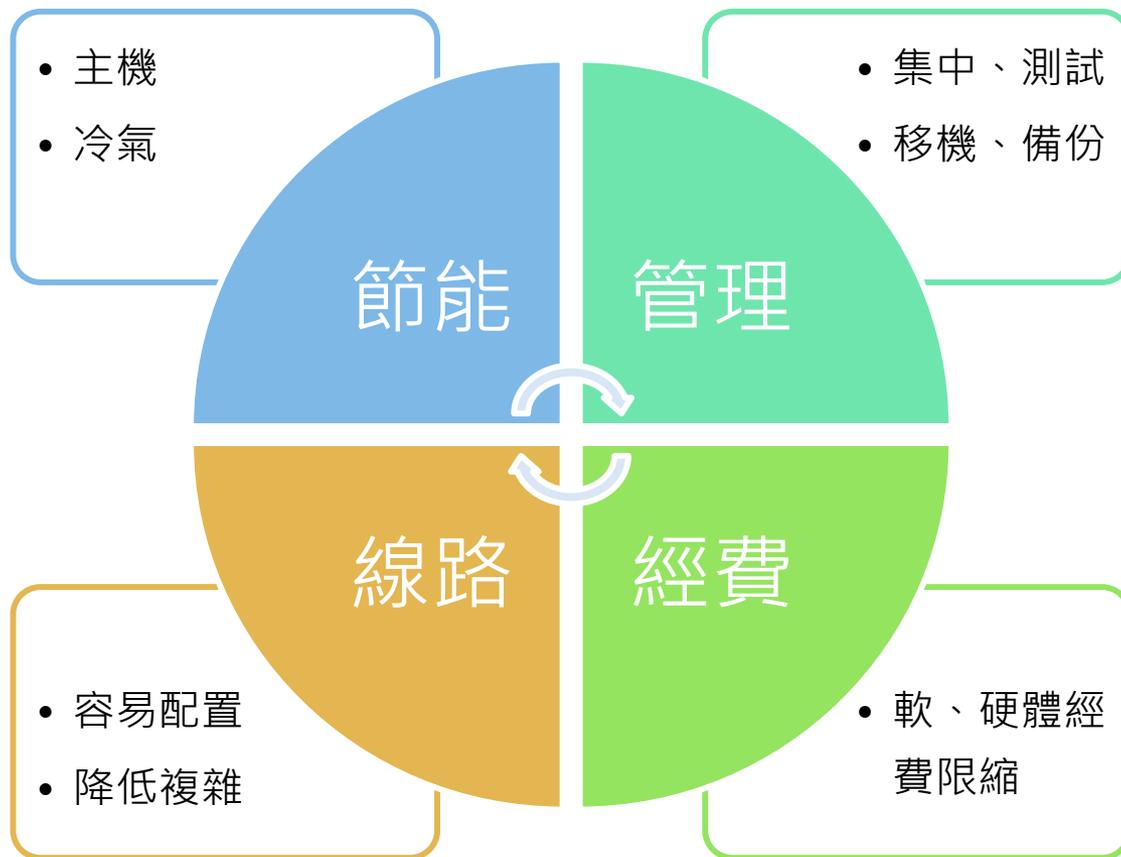
內容



理由



虛擬化的原因



考量重點

- ☞ 配置可靠性高的伺服器等級主機，記憶體為重要考量
- ☞ 主幹網路設備強化，如10G網卡及10G集線器
- ☞ 儲存系統的獨立化，如SAN、DAS、NAS
- ☞ 免費方案、商業化方案、混合考量
- ☞ iSCSI、NFS或其它對於儲存系統的連接方式
- ☞ 管理操作人員對於各系統操作的熟稔度
- ☞ 將同類型的服務集中或分離處理
- ☞ 備援機制
- ☞ 參考資源多樣化

規畫



系統的選擇



VMFS與RDM的差異

Storage 的選擇



本機硬碟/RAID



網路界接
NAS/DAS/SAN
RAID System

網卡速度的選擇



1Gbps = 125MBps



10Gbps = 1.25GBps
(須配合10G交換器)

主機CPU/RAM需求

- Intel VT-x/AMD AMD-V，使用CPU-Z、CrystalCPUIDD等程式判斷CPU是否支援VT技術；然後主機的BIOS必須將Virtualization Technology Enable。

The image displays three windows from system information tools:

- CPU-Z:** Shows processor details for an Intel Xeon E3 1260L. The 'Instructions' section has 'VT-x' highlighted in a red box.
- CrystalCPUID Pure x64 Edition 4.15.5.452:** Shows detailed CPU information. The 'HTT' field is highlighted in a red box and contains 'VT'. The 'AMD-V' field is also highlighted in a red box.
- AMD System Information:** Shows details for an AMD Phenom II X6 1090T Processor. The 'AMD-V' field is highlighted in a red box.

虛擬化主系統

- ☞ VMware Workstation/Player 可以建置在32或64位元 CPU/OS的主機，但如果實體RAM超過4GB以上，最好使用64位元CPU&OS，方可完整存取RAM，而主機RAM越多越好。
- ☞ ESXi 5/5.1 Server 使用64位元CPU，RAM也是越多越好，一般家用PC，目前應該可以擴充到32GB(8GB*4)，伺服器級大致都可以達到96GB以上，不過免費版的 ESXi 5/5.1 實體RAM被限制在32GB，除非購買更高階的授權。

儲存系統

- ☞ 獨立儲存系統如果考慮免費方案，可以參考下列資料：
 - FreeNAS 8.x 新版：FreeBSD 系統，有中文化
 - NAS4F4ree 9.x：前身為 FreeNAS 0.7.x，FreeBSD 系統 9.x，中文化、ZFS檔案系統
 - Starwind 5.8 for Windows：OS至少要 Windows 2003 以上
 - OpenMediaVault 0.4：Debian 系統
 - NexentaStor Community 3.x：ZFS檔案系統，免費 18TB
 - Openfiler 2.99：歷史悠久的 NAS 軟體
 - Open- E DSS V7 Lite：軟體式，免費 2TB
 - 以上都有提供 iSCSI 或 NFS 連接方式
- ☞ 商業付費儲存系統：看各校的購置預算。

與儲存系統連接方式

∞ 以 V Mware 而言，至少有：

- iSCSI (Internet Small Computer System Interface)

- 又稱為IP-SAN，是一種基於網際網路及SCSI-3協議下的存儲技術，由IETF提出，並於2003年2月11日成為正式的標準。
- 與傳統的SCSI技術比較起來，iSCSI技術有以下三個革命性的變化：
 - 把原來只用於本機的SCSI協同透過TCP/IP網路傳送，使連接距離可作無限的地域延伸
 - 連接的伺服器數量無限 (原來的SCSI-3的上限是15)
 - 由於是伺服器架構，因此也可以實現在線擴容以至動態部署

○ NFS(Network File System)

- 是在 Unix 系統間實作磁碟檔案分享的一種方法，它支援應用程式在客戶端透過網路存取位於伺服器磁碟中資料的一種檔案系統協議。最早於1984年由昇陽開發。功能是透過網路讓不同的機器、不同的作業系統能夠彼此分享個別的資料。
- NFS 提供了以下的服務：
 - 在目錄 (directory) 中尋找檔案
 - 列出目錄中的檔案
 - 管理目錄
 - 取得各檔案的屬性 (file attribute)
 - 檔案的讀 / 寫

虛擬GuestOS備份

∞ 免費方案可以考慮：

- Veeam Backup Free Edition 6.x
 - 支援 ESXi & Hyper-V
 - 可以不關機線上備份
 - 有壓縮功能
 - 無排程備份
- VM Explorer 4.x
 - 支援 ESXi & Hyper-V
 - 最多管理5部 ESXi 主機
 - 無排程備份
 - 4.0.046 起支援 ESXi 5.1.0

- ghettoVCB.sh
 - 在 ESXi Server 下執行備份的程式
 - 可以設定歷史備份數量
 - 須配合 cron 做排程備份
 - 有壓縮備份
 - ESXi 5.1 須要修改版號判斷即可
- MKSBackup 9.38.x
 - 結合 ghettoVCB.sh 做 ESXi GuestOS 備份
 - 在 Windows 下可以配合工作排程做排程備份

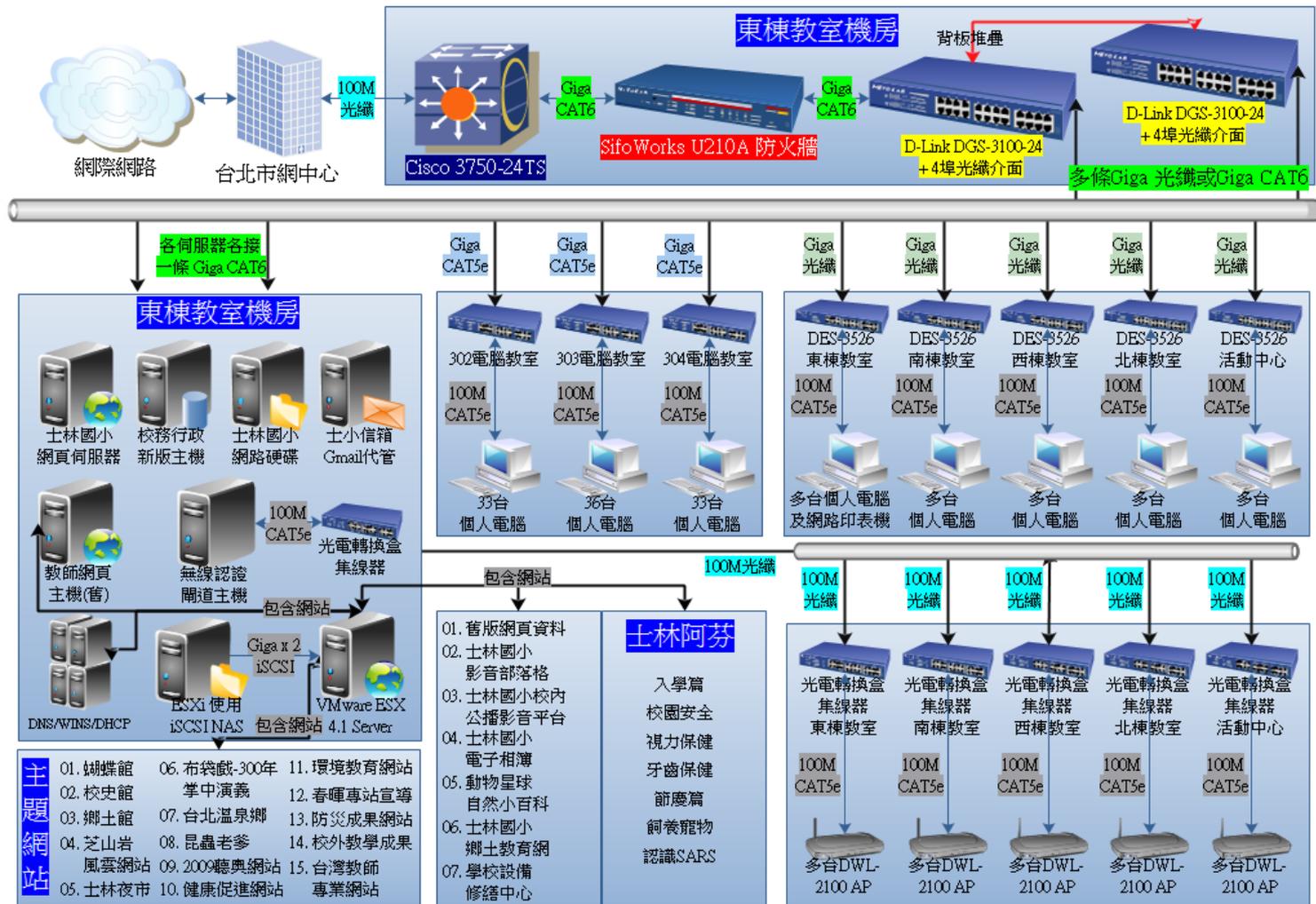
P2V實體轉虛擬

- ☞ 以 VMware 而言，可以使用
 - vSphere vCenter Converter Standalone 5.x
 - Clonezilla 再生龍
 - EASEUS Todo Backup Free 4.0

現況



網站整合



方式

∞ 目前做法：

- IIS、ASP性質等類型的網站(頁)集中至一台主機後，再以虛擬主機(非VM化)的作法，配合DNS將每個網站(頁)以獨立的FQDN做到每個網站(頁)看似有獨立的主機在服務。
- Apache + PHP + MySQL maybe + Tomcat 類型的網站(頁)另外集中至一台主機後，也是以虛擬主機(非VM化)的作法做到獨立的FQDN。
- 校務行政主機為實體機，考量到資料庫的讀取頻繁，故不做虛擬化處理，但也已經在虛擬伺服器主機建置好相關的GuestOS。

IIS 綜合網站

網際網路資訊服務 (IIS) 管理員

檔案(F) 執行(A) 檢視(V) 視窗(W) 說明(H)

網際網路資訊服務 (本機電腦)

- FTP 站台
- 應用程式集區
- 網站
 - 八芝蘭村
 - 新版校務行政
 - 台北溫泉鄉
 - 布袋戲
 - 士林國小優質
 - 成語之香食天
 - 士林國小防災
 - 蕨地任務
 - 昆蟲老爹
 - 士林夜市
 - 八芝蘭鄉土文
 - 97學年度學生
 - 校際交流
 - 小西園布袋戲
 - 士林國小春暉
 - 校園中的有毒
 - 士林國小鄉土
 - 校內 Spedtest

| 描述 | 識別元 | 狀態 | 主機標頭值 |
|-------------|-----------------|----------------|------------|
| 八芝蘭村 | 芝山岩風雲 | 台北溫泉鄉 | 1111884722 |
| 2009聽障奧 | 93年兒童節慶 | 我會數數 | 445809168 |
| 92年第2學 | 漢珍劍橋電子 | 資優班網站 | 931817138 |
| 92年體育表 | 92年第2學期初 | 士林國小校外教學成果網 | 745931650 |
| 93年兒童節 | 士林國小腸病 | 士林國小健康促進網站 | 2074513131 |
| 士林國小優 | Microsoft Share | 布袋戲 | 1131029614 |
| 動物星球小 | 樂器中的女王 | 修繕網站 | 743824770 |
| 士林國小小 | 92年體育表演 | 新版校務行政(校內使用) | 1036987750 |
| 雲之奧妙 | 2009聽障奧運 | 交通安全網頁 | 582350584 |
| 校際交流 | 士林國小健康 | 士林國小優質學校網頁 | 1132863853 |
| 八芝蘭鄉土 | 士林國小校史 | 97學年度學生學習方案 | 1352946590 |
| 士林國小遷 | 士林國小舊we | 士林阿芬 | 669615099 |
| 成語之香食 | 我們的社區 | 士林夜市 | 1299373495 |
| 昆蟲老爹 | 我會數數 | 校內 Spedtest 測速 | 1787769917 |
| 士林國小場 | 只要我長大 | 小西園布袋戲演出 | 135788871 |
| 士林國小小 | 士林國小環境 | 漢珍劍橋電子書 | 1879791915 |
| 蕨地任務 | 台灣教師專業 | 芝山岩風雲 | 1803902961 |
| 士林國小小 | 動物星球小百 | 校園中的有毒植物 | 1565980606 |
| 士林國小小 | 交通安全網頁 | 士林阿芬 | 536383245 |
| 校內 Spedtest | 士林阿芬 | 修繕網站 | 760834913 |
| | 士林國小校外 | 校內公播影音平台 | 349513008 |
| | 校內公播影音 | 我們的社區 | 2007880705 |
| | 雲之奧妙 | 樂器中的女王-小提琴 | 1676437710 |
| | 士林國小蝴蝶 | 士林國小鄉土教育網 | |

執行中 hotspring.slps.tp.edu.tw

執行中 icancount.slps.tp.edu.tw

執行中 map.slps.tp.edu.tw

執行中 outteach.slps.tp.edu.tw

執行中 phyedu.slps.tp.edu.tw

執行中 puppet.slps.tp.edu.tw

執行中 rep-mis.slps.tp.edu.tw

執行中 sl1a.slps.tp.edu.tw

執行中 safe.slps.tp.edu.tw

執行中 school2.slps.tp.edu.tw

執行中 school98.slps.tp.edu.tw

執行中 slaf.slps.tp.edu.tw

執行中 slmarket.slps.tp.edu.tw

執行中 speedtest.slps.tp.edu.tw

執行中 swgpuppet.slps.tp.edu.tw

執行中 fbmddb.slps.tp.edu.tw

執行中 therock.slps.tp.edu.tw

執行中 tox-phyte.slps.tp.edu.tw

執行中 ttpda.slps.tp.edu.tw

執行中 vii.slps.tp.edu.tw

執行中 village.slps.tp.edu.tw

執行中 violin.slps.tp.edu.tw

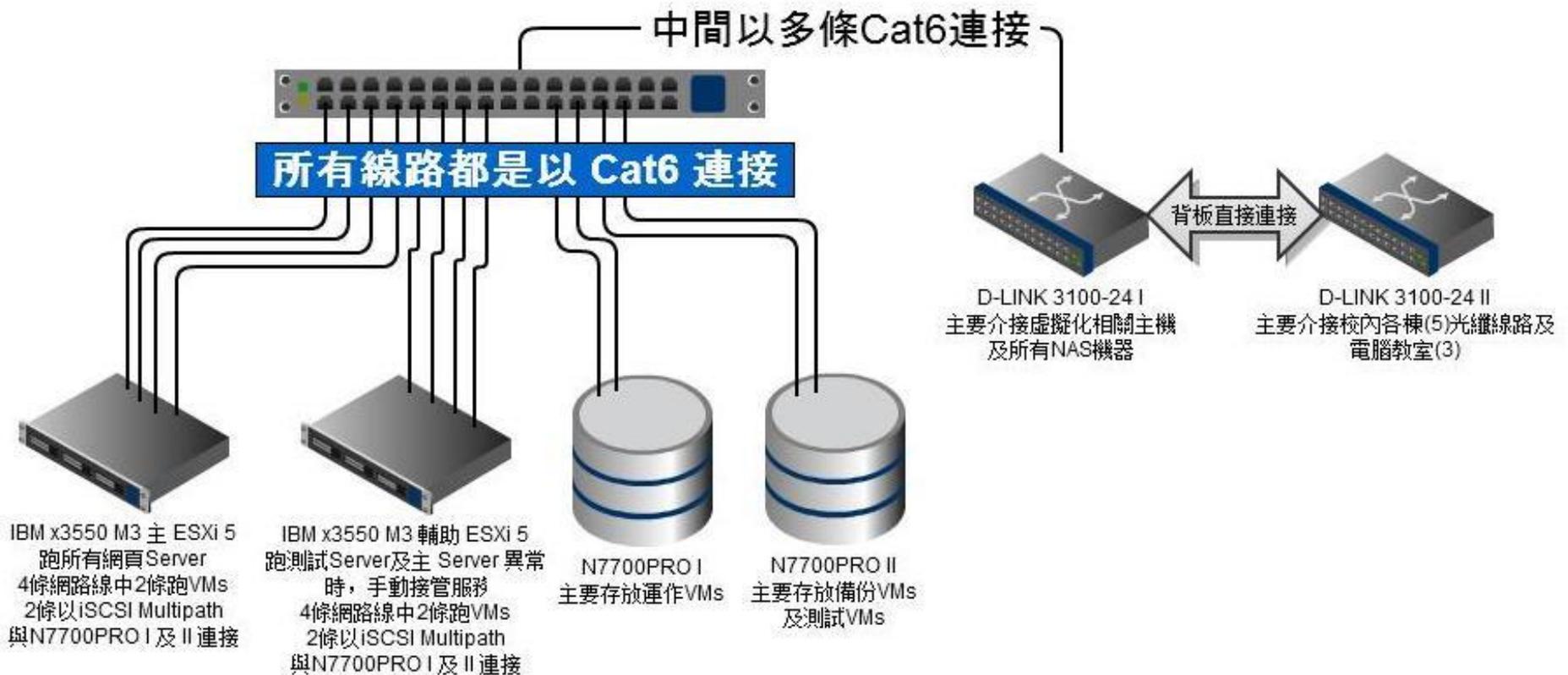
執行中 vweb.slps.tp.edu.tw

學校ESXi硬體配置

目前虛擬化硬體配置：

- IBM x3550 M3：2台
 - CPU：XEON 5620 x 2
 - RAM：24GB
 - NIC：onBoard Broadcom NetExtreme II x 2，Intel ET Dual Port
- NAS：Thecus N7700PRO 2台
 - RAM：4G
 - HD：2TB x 7，建置 RAID6(2TB x 6) + Hotspare x 1
- 主要集線器：D-Link 3100-24 2台

學校現況虛擬化圖示



實機照片



虛擬主機一

The screenshot displays the vSphere Client interface for a VMware ESXi 5.1.0 host. The main window is titled "VMware ESXi, 5.1.0, 799733" and shows a "Configuration Issues" banner indicating that SSH for the host has been enabled. The interface is divided into several sections:

- General:** Provides basic system information such as Manufacturer (IBM), Model (System x3550 M3), CPU Cores (8 CPUs x 2.4 GHz), Processor Type (Intel(R) Xeon(R) CPU E5620 @ 2.40GHz), License (VMware vSphere 5 Hypervisor), Processor Sockets (2), Cores per Socket (4), Logical Processors (16), Hyperthreading (Active), Number of NICs (5), State (Connected), Virtual Machines and Templates (11), vMotion Enabled (N/A), VMware EVC Mode (Disabled), vSphere HA State (N/A), and Host Configured for FT (N/A).
- Resources:** Shows CPU usage (734 MHz) and Memory usage (14093.00 MB). It also includes a table for Storage and Network configurations.

| Storage | Drive Type | Capacity |
|---------|------------|-----------|
| ist1 | Non-SSD | 1.95 TB |
| ist2 | Non-SSD | 2.93 TB |
| Loc | Non-SSD | 273.50 GB |
| n77 | Non-SSD | 2.91 TB |

| Network | Type |
|---------------------|---------------------|
| x3550 M3 II Gues... | Standard port group |

The interface also features a left-hand navigation pane with a tree view of folders (AS, br, ce, et, slj, Sc, te, ut, vii, w) and a bottom task bar with a "Tasks" button and a "root" indicator.

虛擬主機二

The screenshot displays the vSphere Client interface for a VMware ESXi host. The window title is "192 - vSphere Client". The navigation pane on the left shows a tree view with folders: at, Dr, fn, Fr, iFi, Id, or, ut, w., w., and W. The main content area is titled "VMware ESXi, 5.1.0, 799733" and has tabs for "Getting Started", "Summary", "Virtual Machines", "Resource Allocation", "Performance", "Configuration", "Local Users & Groups", "Events", and "Permissions".

Configuration Issues
SSH for the host has been enabled

General

| | |
|---------------------------------|---|
| Manufacturer: | IBM |
| Model: | System x3550 M3 -[7944D2... |
| CPU Cores: | 4 CPUs x 2.4 GHz |
| Processor Type: | Intel(R) Xeon(R) CPU E5620 @ 2.40GHz |
| License: | VMware vSphere 5 Hypervisor - Licensed for 1 physical CP... |
| Processor Sockets: | 1 |
| Cores per Socket: | 4 |
| Logical Processors: | 8 |
| Hyperthreading: | Active |
| Number of NICs: | 5 |
| State: | Connected |
| Virtual Machines and Templates: | 11 |
| vMotion Enabled: | N/A |
| VMware EVC Mode: | Disabled |
| vSphere HA State | Ⓜ N/A |
| Host Configured for FT: | N/A |

Resources

CPU usage: **214 MHz** Capacity: 4 x 2.4 GHz

Memory usage: **8827.00 MB** Capacity: 24532.59 MB

| Storage | Drive Type | Capacity |
|---------|------------|-----------|
| ist | Non-SSD | 1.95 TB |
| ist | Non-SSD | 2.93 TB |
| Lo | Non-SSD | 135.50 GB |
| n7 | Non-SSD | 2.91 TB |
| n7 | Non-SSD | 2.91 TB |
| n7 | Non-SSD | 2.91 TB |

Network

| Type |
|--|
| x3550 M3 I Gues... Standard port group |

Fault Tolerance

Tasks

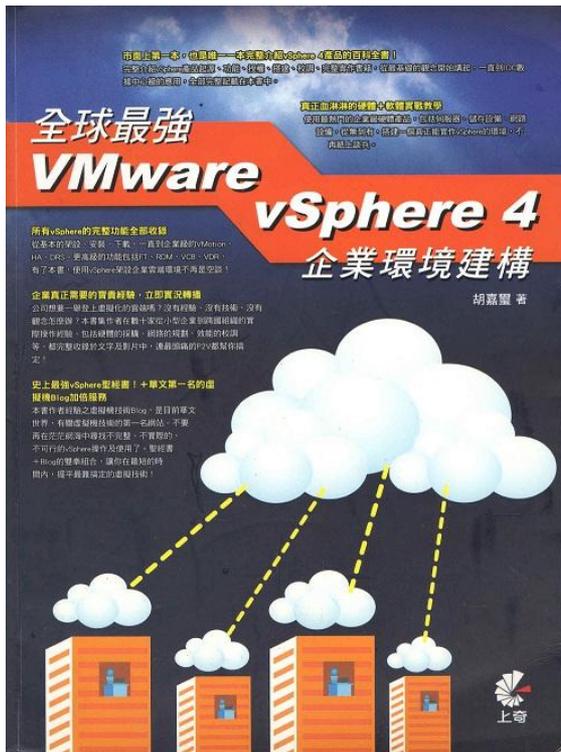
root

參考

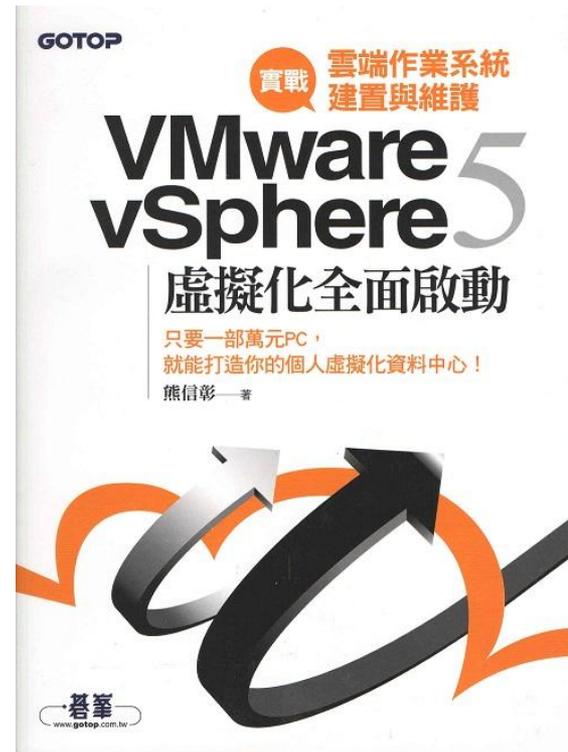


參考書籍

- 全球最強 VMware vSphere 4 企業環境建構
- VMware vSphere 5 虛擬化全面啟動



ESX/ESXi 4.0/4.1 with openfiler



ESXi 5 with Windstar

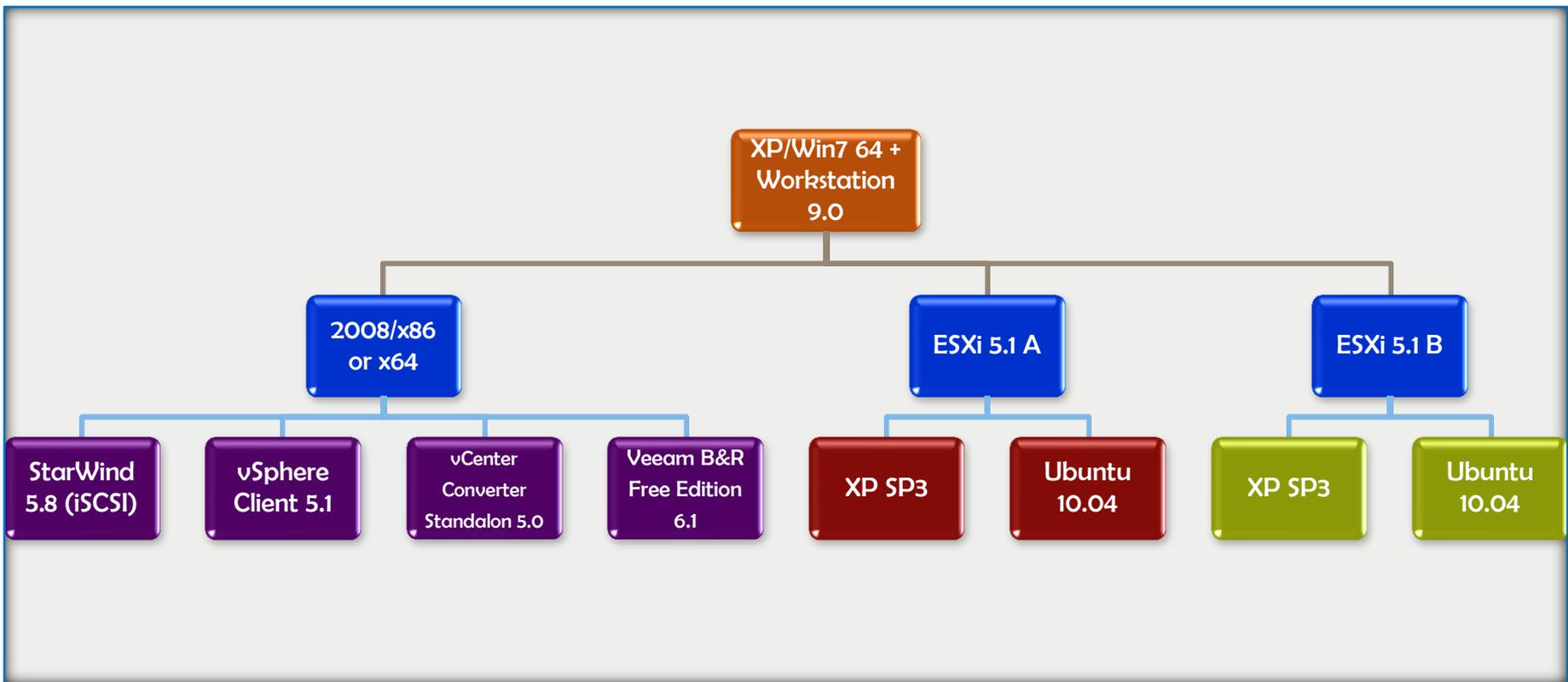
VMware 軟體下載網頁

The screenshot displays the VMware Download Center website in a browser window. The address bar shows the URL <https://my.vmware.com/web/vmwa>. The page title is "Download Center for VM...". The main content area is titled "Product Download Index" and features a legend indicating that a green checkmark icon represents a "Free Trial". The products are organized into several categories:

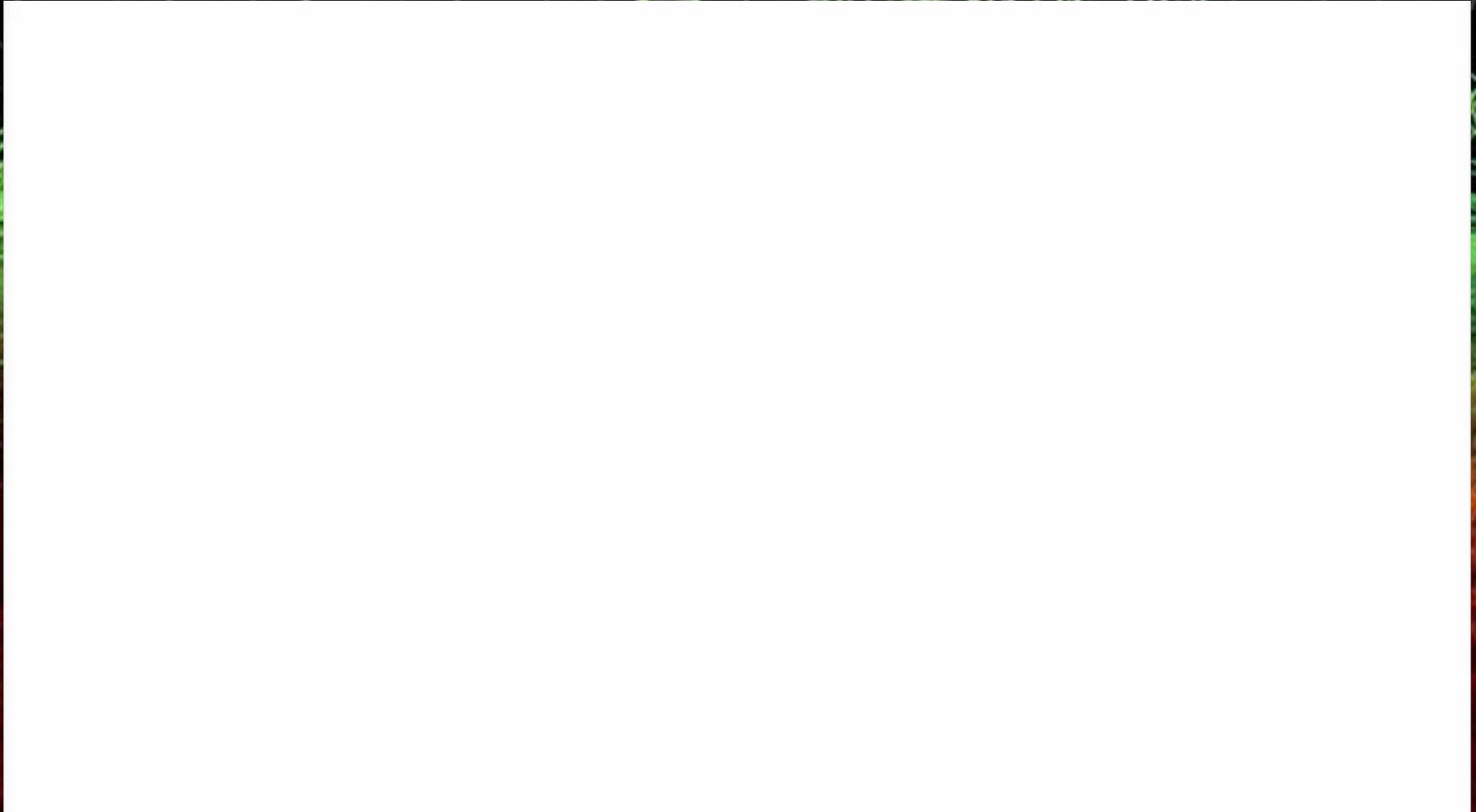
- Datacenter & Cloud Infrastructure**
 - VMware vSphere
 - VMware vSphere Hypervisor (ESXi)
 - VMware vCloud Director
 - VMware Infrastructure
- Infrastructure & Operations Management**
 - VMware vCenter Operations
 - VMware vCenter Infrastructure Navigator
 - VMware Server
 - VMware vCenter Site Recovery Manager
 - VMware vCenter Server Heartbeat
 - VMware vCenter Converter Standalone
 - VMware vCenter Configuration Manager
- Security Products**
 - VMware vShield App
 - VMware vShield Edge
 - VMware vShield Endpoint
- Application Management**
 - VMware vFabric Application Director
 - VMware vFabric Application Performance Manager
 - VMware vFabric Hyperic
 - VMware vCenter Application Discovery Manager
- Application Platform**
 - VMware vFabric
 - VMware vFabric tc Server
 - VMware vFabric GemFire
 - VMware vFabric RabbitMQ
 - VMware vFabric SQLFire
 - VMware vFabric Data Director
 - VMware vFabric Postgres
 - VMware GemStone/S
 - VMware vFabric tc Server Developer Edition
 - VMware vFabric Web Server
 - VMware vFabric Enterprise Ready Server
- IT Business Management**
 - VMware Service Manager
 - VMware vCenter Chargeback
- Desktop & End-User Computing**
 - VMware View
 - VMware vCenter Operations Manager for View
 - VMware View Clients
 - VMware ThinApp
 - VMware Workstation
 - VMware Fusion
 - VMware Player
 - VMware Horizon Application Manager
- Other**
 - VMware VMmark
 - Serengeti

At the bottom of the page, there is a section for archived software: "Looking for archived VMware software?" with a dropdown menu currently set to "- Select an archive -". The browser's status bar at the bottom right shows a zoom level of 100%.

vSphere in a box 概念

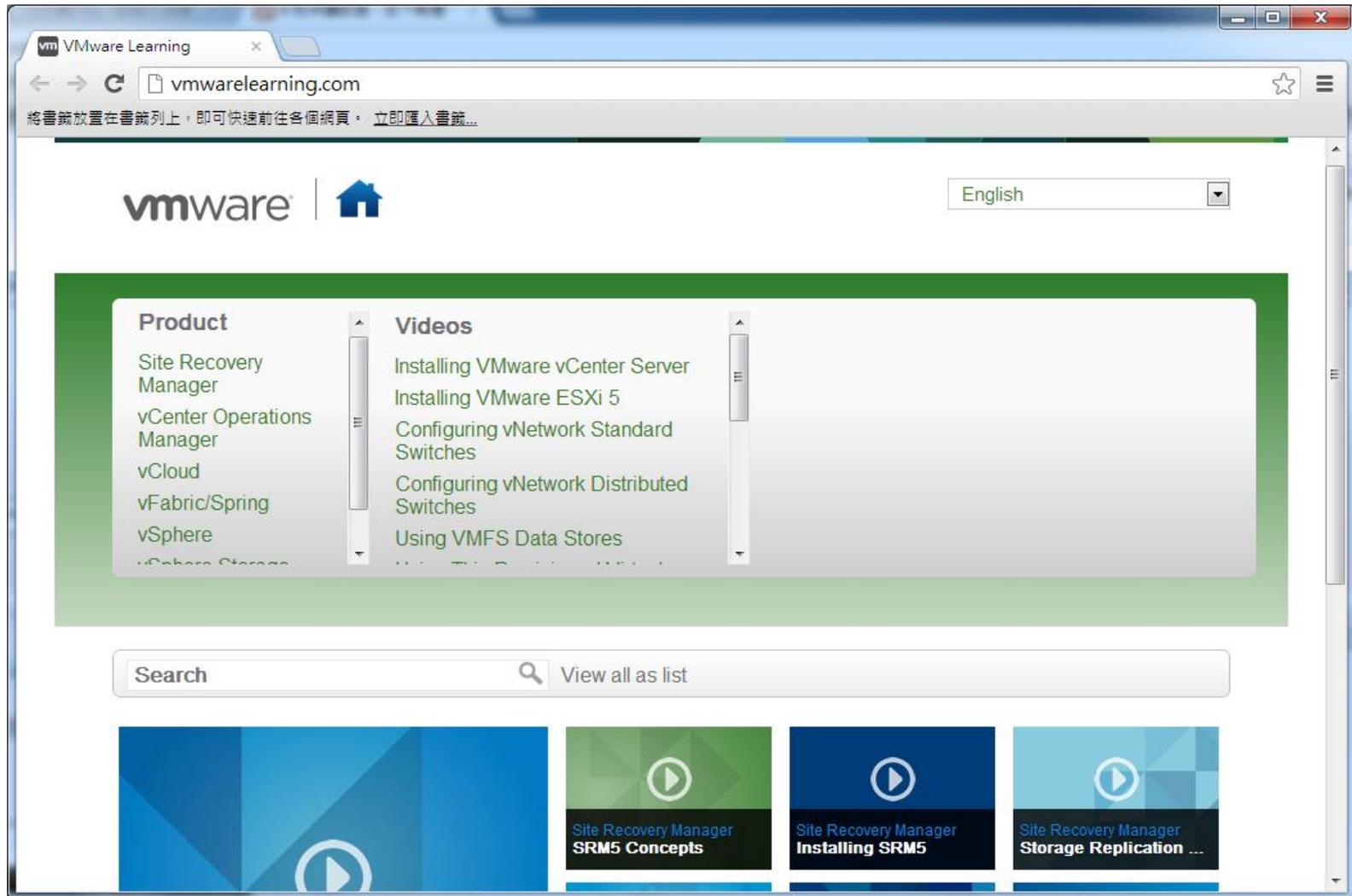


VMware vSphere in a box video



You can go there even though it doesn't exist.

VMware 線上 Video 網站



相關參考網站

- ☞ [天空之城](#)
- ☞ [虛擬先生](#)
- ☞ [不自量力のWeithenn](#)
- ☞ [\[賴榮樞\]的軟體資訊誌](#) → [Virtualization](#)
- ☞ [NetAdmin網管](#) → VMware 虛擬化技術實作問答([上](#))([下](#))
- ☞ [來上電腦課！](#)
- ☞ [國北教大實小資訊組網頁](#)

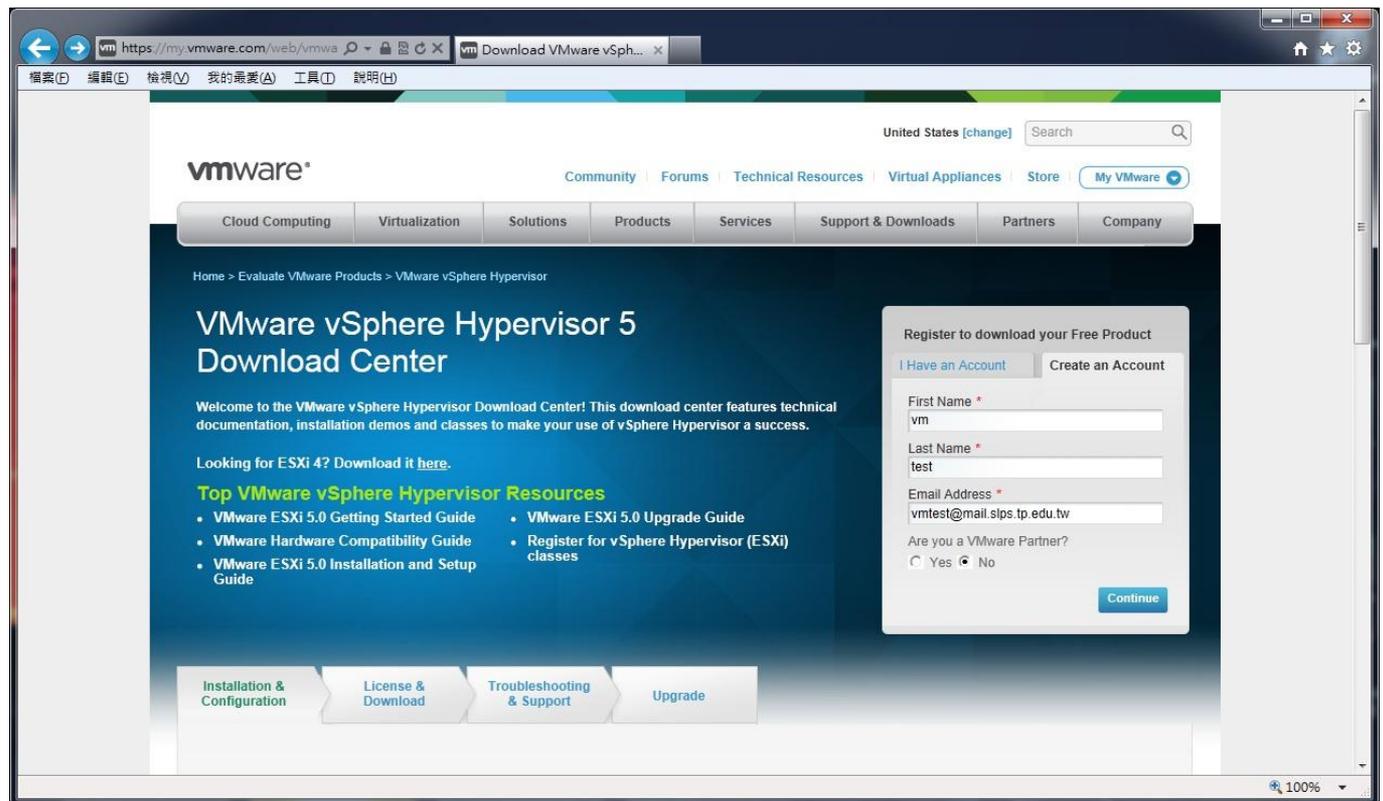
實做



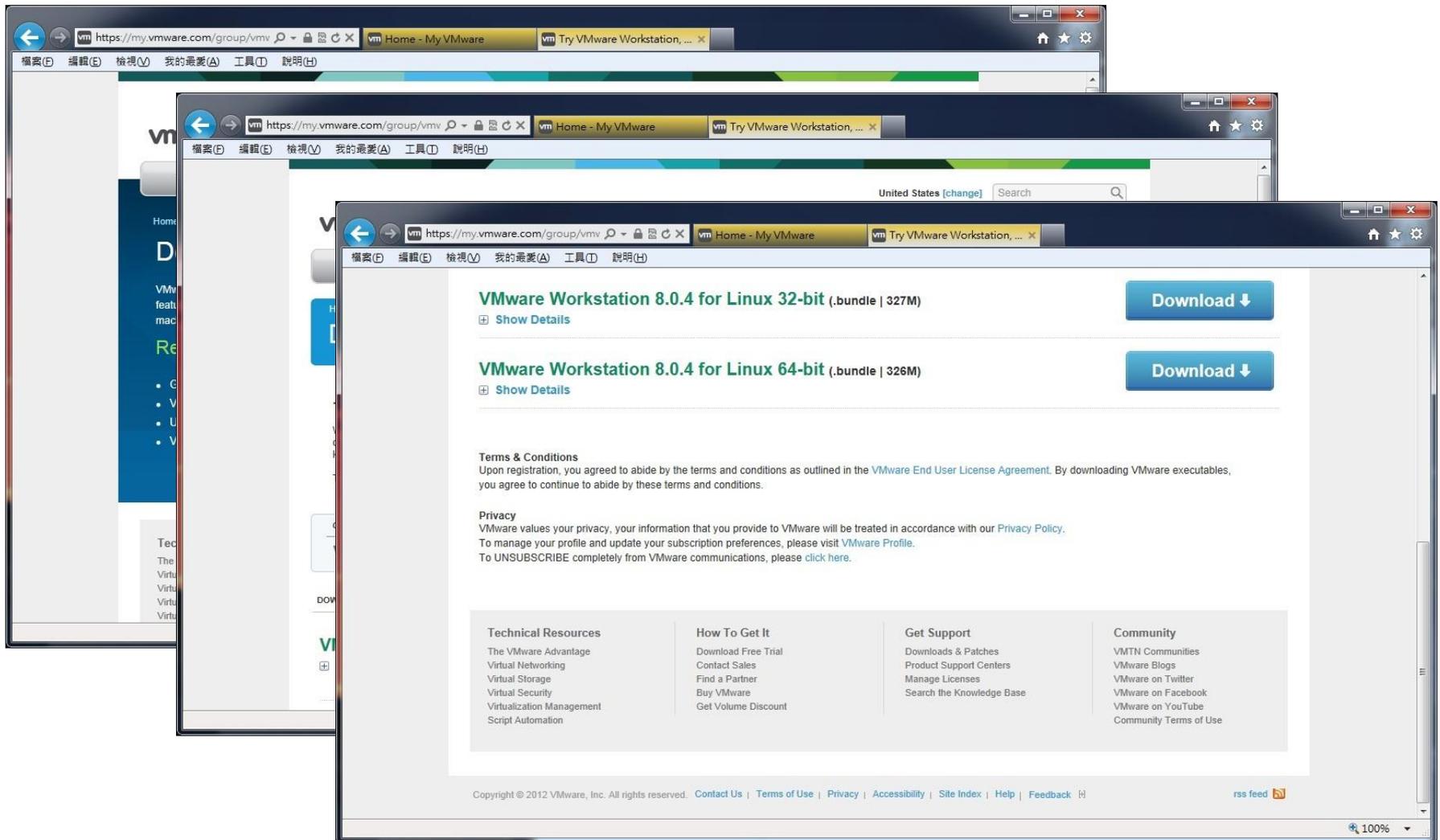
下載及安裝

VMware vSphere Hypervisor(ESXi 5) & Workstation 8 下載及安裝。

- 免費註冊



Workstation 8 下載



Workstation 8 設定更改

The image shows two overlapping windows from VMware Workstation 8. The background window is the 'Virtual Network Editor' for VMnet8, and the foreground window is the 'Preferences' dialog.

Virtual Network Editor (VMnet8):

| Name | Type | External Connection | Host Connection |
|--------|-----------|---------------------|-----------------|
| VMnet0 | Bridged | Auto-bridging | - |
| VMnet1 | Host-only | - | Connected |
| VMnet8 | NAT | NAT | Connected |

VMnet Information:

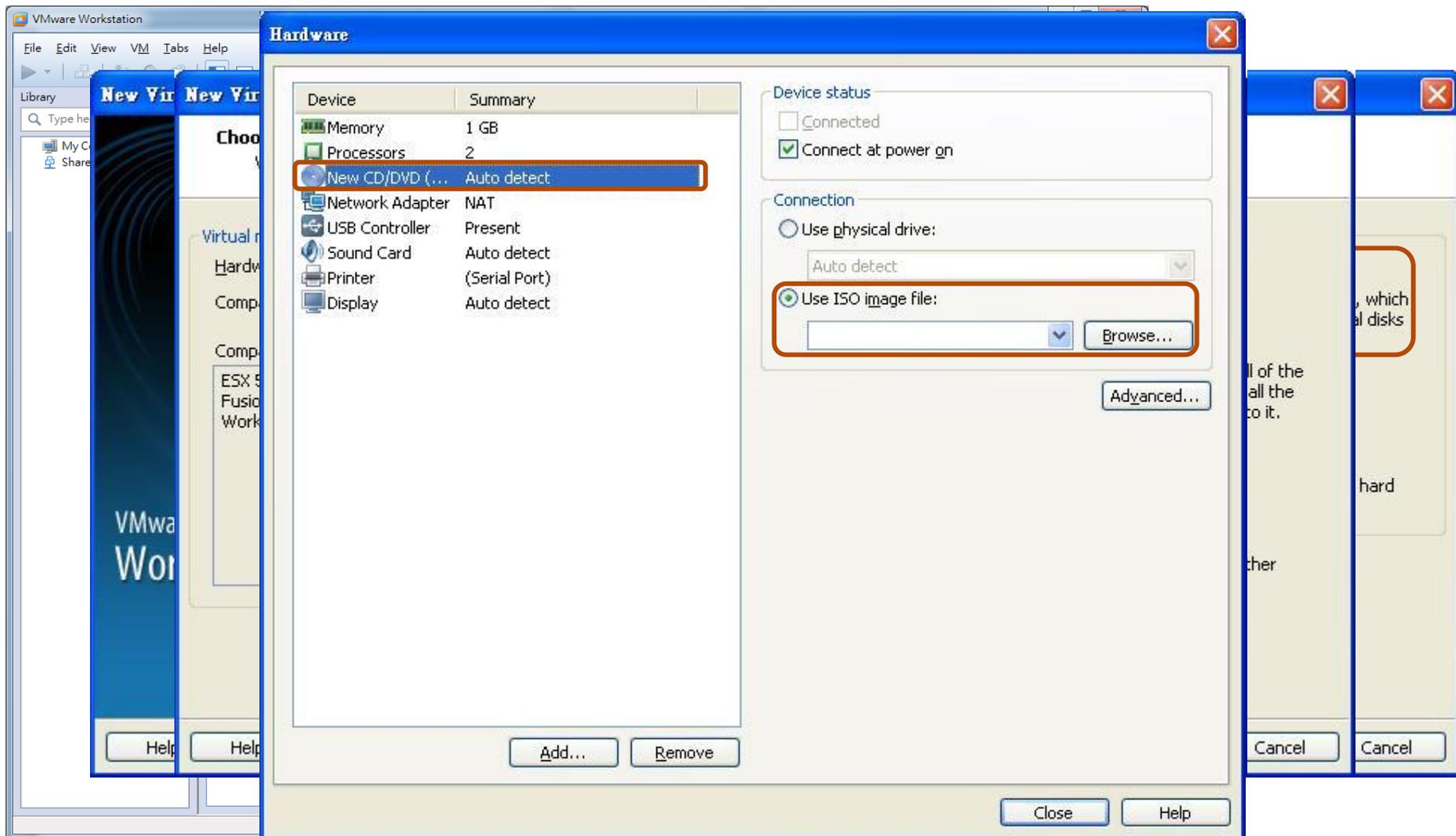
- Bridged (connect VMs directly to the external network)
Bridged to: Automatic
- NAT (shared host's IP address with VMs)
- Host-only (connect VMs internally in a private network)
- Connect a host virtual adapter to this network
Host virtual adapter name: VMware Network Adapter VMnet8
- Use local DHCP service to distribute IP address to VMs

Subnet IP: 192.168.88.0 Subnet mask: 255.255.255.0

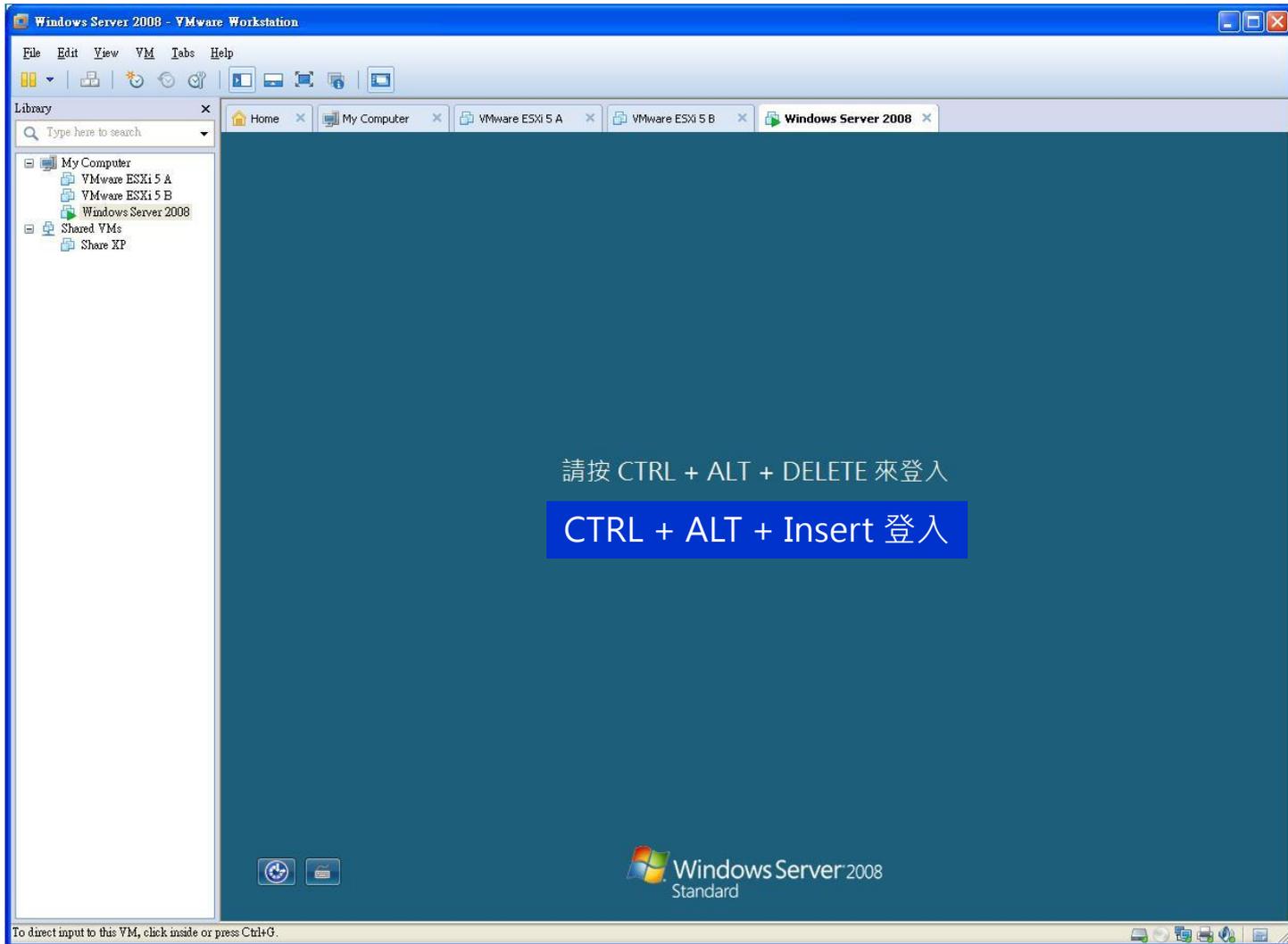
Preferences:

- Default location for virtual machines: C:\VMs
- Virtual machines:
 - Remember opened tabs between sessions
 - Keep VMs running after Workstation closes
 - Enable all shared folders by default
 - Show Aero Peek thumbnails for open tabs
- Show tray icon: Always
- Default hardware compatibility: Workstation 8
Compatible with: ESX Server
- Seconds between powering on multiple VMs: 10
- Save screenshots to:
 - Clipboard
 - File: Save to Desktop
- Privacy:
 - Offer to save login information for remote hosts

虛擬機 Windows 2008 設置



虛擬機 Windows 2008 安裝



ESXi 5 安裝

The screenshot shows the ESXi 5.1.0 installation screen. On the left, there is a navigation menu with options: Sys, Cor, Res, Tes, Net, Cor, Tro, Vie, Vie, Res. The main display area shows the following system information:

```
VMware ESXi 5.1.0 (VMKernel Release Build 799733)
VMware, Inc. VMware Virtual Platform
2 x Intel(R) Xeon(R) CPU E31260L @ 2.40GHz
2 GiB Memory
```

Below the system information, there are links to download tools to manage the host:

```
Download tools to manage the host
http://192.168.88.129/ (DHCP)
http://lfe80::20c:29ff:fe9...
```

A dialog box titled "Shut Down/Restart" is displayed in the center. It contains the following text:

Remote management software is recommended to safely shut down or restart this host.

Shutting down or restarting now will power off, suspend, or shut down running virtual machines according to the current system shutdown policy. By default, virtual machines will be powered off.

At the bottom of the dialog box, there are three options:

<F2> Shut Down <F11> Restart <Esc> Cancel

At the bottom of the screen, there are additional navigation options:

<F2> <F2> <U> <U> <U> <F2> Customize System/View Logs <F12> Shut Down/Restart

ESXi 5 iSCSI 功能開啟

The screenshot displays the VMware vSphere Client interface for a VMware ESXi 5.1.0 host. The main window shows the configuration page for the host, with the 'Storage Adapters' section expanded. The 'Storage Adapters' section contains a table listing the installed adapters:

| Device | Type | WWN |
|--|------------|--------------------|
| iSCSI Software Adapter | | |
| vmhba33 | iSCSI | iqn.1998-01.com.vm |
| PIIX4 for 430TX/440BX/MX IDE Controller | | |
| vmhba0 | Block SCSI | |
| vmhba32 | Block SCSI | |
| 53c1030 PCI-X Fusion-MPT Dual Ultra320 SCSI | | |
| vmhba1 | SCSI | |

Below the table, the 'Details' section for the selected 'vmhba33' adapter is shown:

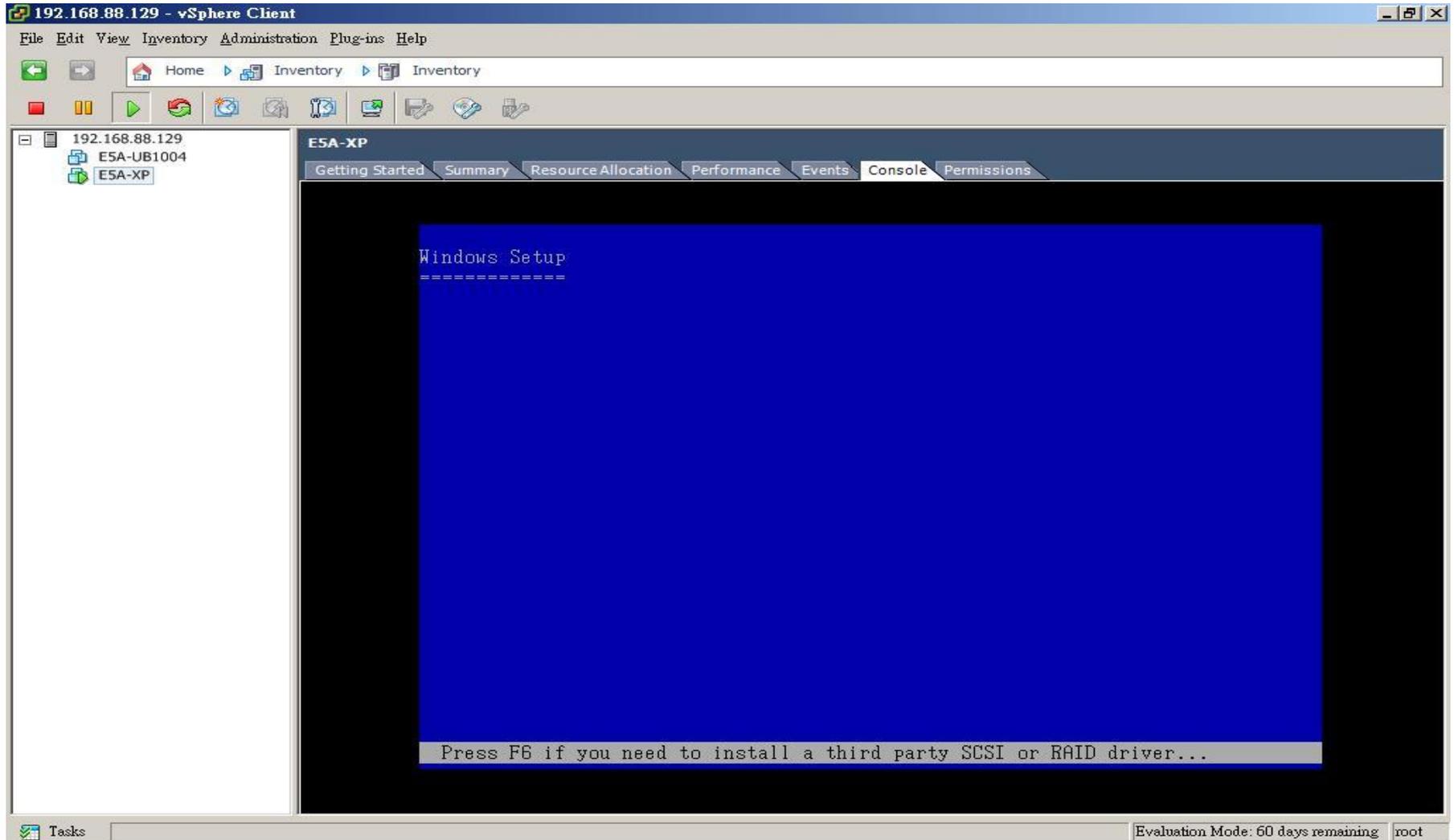
vmhba33 Properties

Model: iSCSI Software Adapter
iSCSI Name: iqn.1998-01.com.vmware:localhost-1b88e29d
iSCSI Alias:
Connected Targets: 0 Devices: 0 Paths: 0

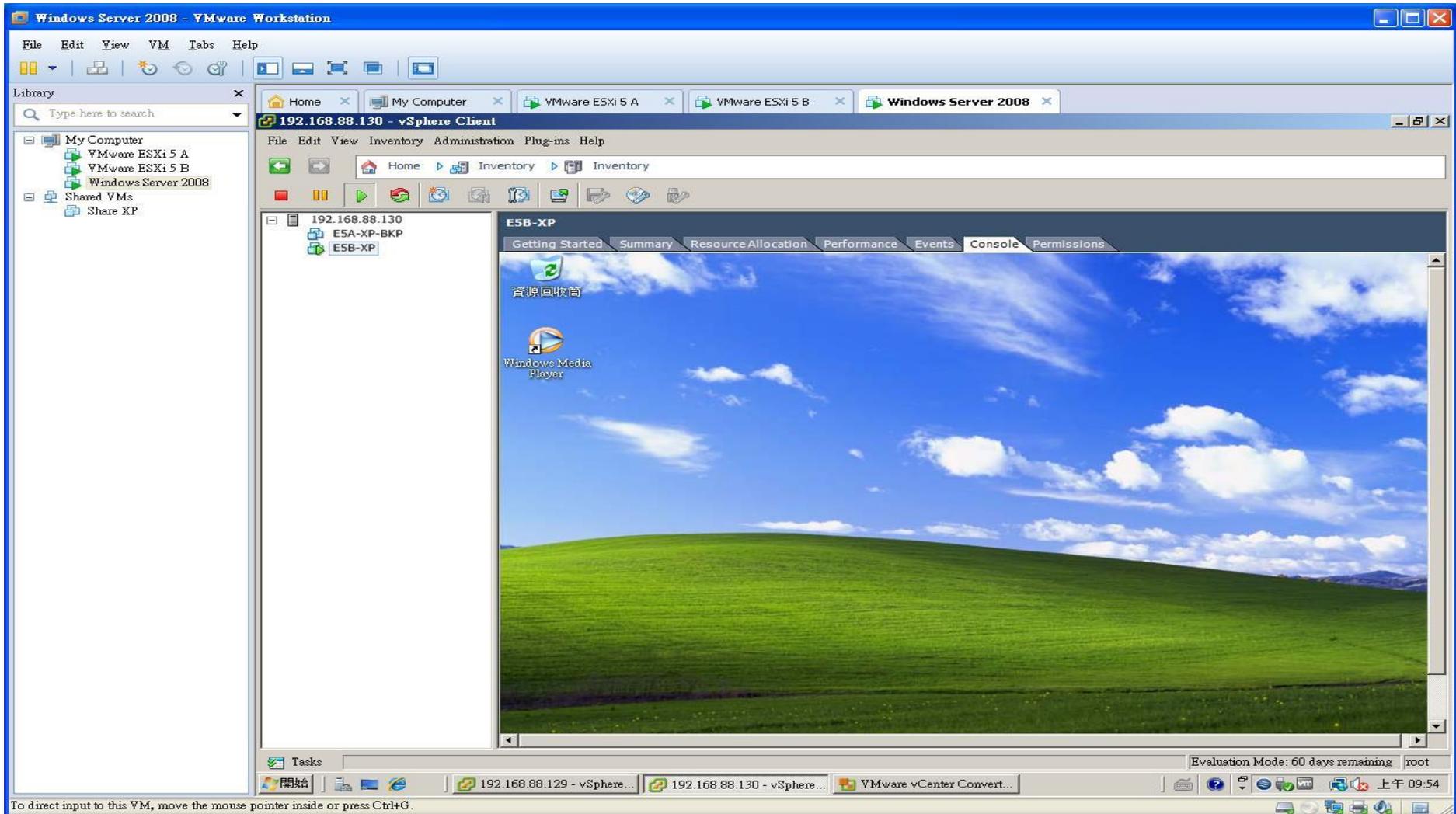
View: Devices Paths

At the bottom of the window, the status bar indicates 'Evaluation Mode: 60 days remaining' and the user 'root' is logged in.

ESXi 5 A 安裝 XP(2)



vSphere vCenter Converter



設定 ESXi 5 SSH 功能開啟

The screenshot shows the 'Firewall Properties' dialog box in ESXi 5. The 'Remote Access' section is active, and the 'SSH Server' service is checked under 'Required Services'. The 'Firewall' option is also checked in the left-hand navigation pane.

Remote Access

By default, remote clients are prevented from accessing services on this host, and local clients are prevented from accessing services on remote hosts.

Select a check box to provide access to a service or client. Daemons will start automatically when their ports are opened and stop when all of their ports are closed, or as configured.

| Label | Incoming Ports | Outgoing Ports | Protocols | Daemon |
|---|----------------|-------------------|-----------|---------|
| Required Services | | | | |
| Secure Shell | | | | |
| <input checked="" type="checkbox"/> SSH Server | 22 | | TCP | N/A |
| <input type="checkbox"/> SSH Client | | 22 | TCP | N/A |
| Simple Network Management Protocol | | | | |
| Ungrouped | | | | |
| <input checked="" type="checkbox"/> DNS Client | 53 | 53 | UDP,TCP | N/A |
| <input type="checkbox"/> VM serial port connected to vSPC | | 0-65535 | TCP | N/A |
| <input type="checkbox"/> NTP Client | | 123 | UDP | Stopped |
| <input checked="" type="checkbox"/> Fault Tolerance | 8100,8200,8300 | 80,8100,8200,8300 | TCP,UDP | N/A |

Service Properties

General

Service: SSH Server

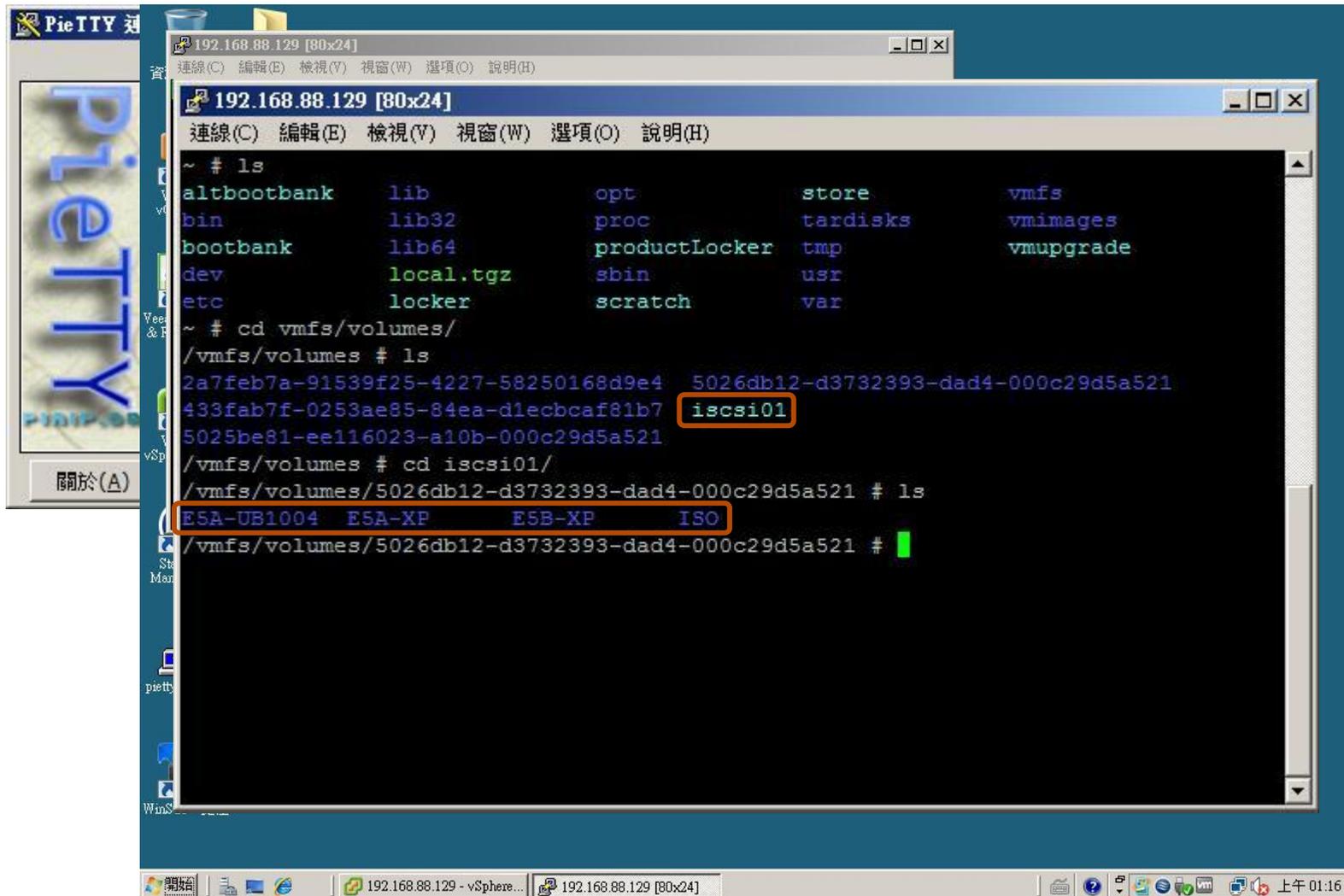
Package Information:

Firewall Settings

Allowed IP Addresses: All

Buttons: Firewall..., Options...

Pietty 中文版連接 ESXi 5



The screenshot shows a PiTTY terminal window connected to an ESXi 5 host at IP 192.168.88.129. The terminal displays the following commands and output:

```
~ # ls
altbootbank  lib          opt          store        vmfs
bin          lib32       proc         tardisks     vmimages
bootbank     lib64       productLocker tmp          vmupgrade
dev          local.tgz   sbin        usr
etc          locker      scratch     var

~ # cd vmfs/volumes/
/vmfs/volumes # ls
2a7feb7a-91539f25-4227-58250168d9e4  5026db12-d3732393-dad4-000c29d5a521
433fab7f-0253ae85-84ea-d1ecbcaf81b7  iscsi01
5025be81-ee116023-a10b-000c29d5a521

/vmfs/volumes # cd iscsi01/
/vmfs/volumes/5026db12-d3732393-dad4-000c29d5a521 # ls
E5A-UB1004  E5A-XP      E5B-XP      ISO

/vmfs/volumes/5026db12-d3732393-dad4-000c29d5a521 #
```

The terminal window has a menu bar with options: 連線(C), 編輯(E), 檢視(V), 視窗(W), 選項(O), 說明(H). The PiTTY logo is visible on the left side of the window.

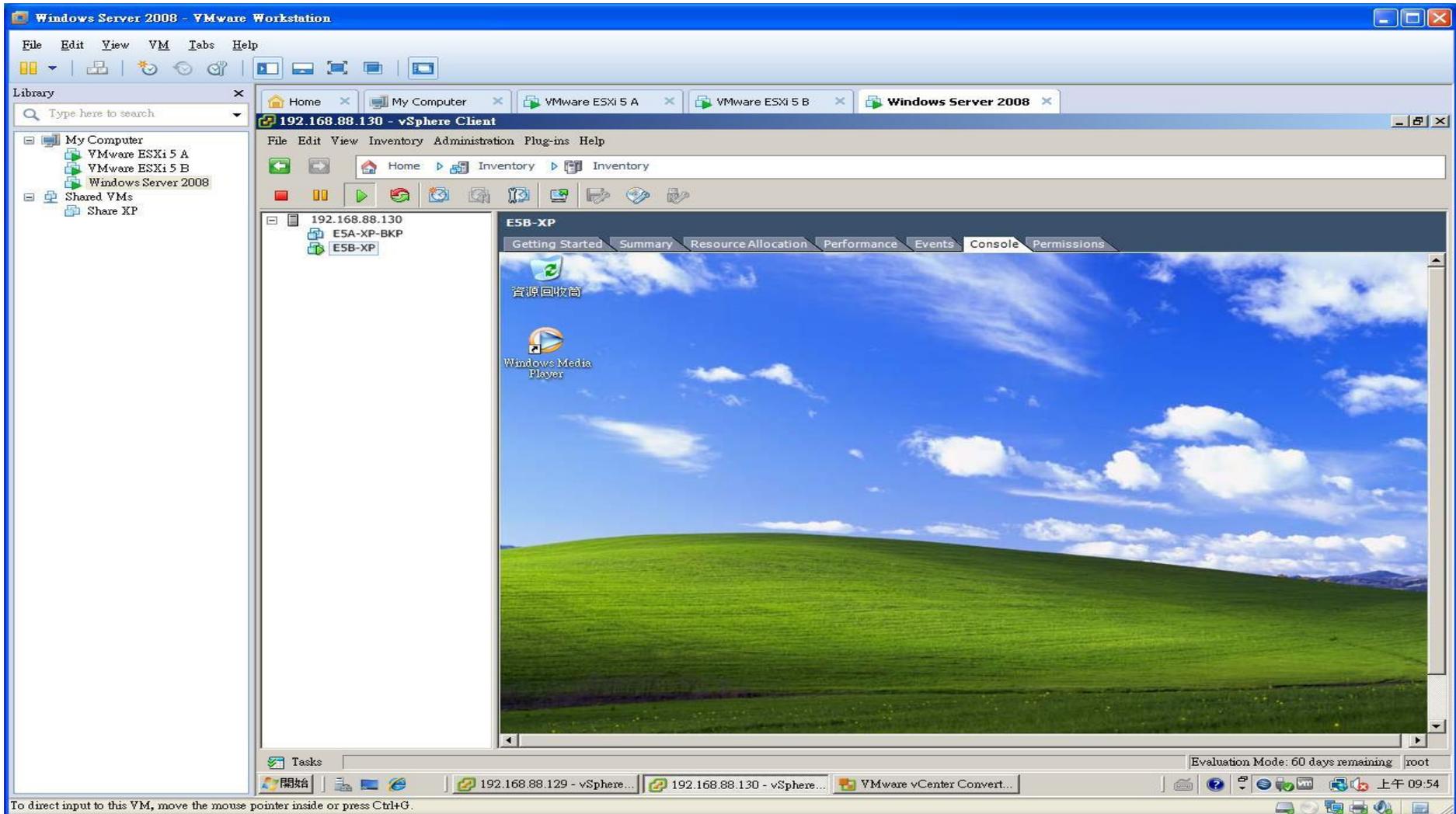
WinSCP 連接 ESXi 5

The screenshot displays the WinSCP interface connected to an ESXi 5 host. The local file explorer on the left shows the 'Datastore Browser - [iscsi01]' window, which lists folders including 'ISO', 'E5A-UB1004', 'ESB-XP', and 'E5A-XP'. The remote file explorer on the right shows the path '/vmfs/volumes/5026db12-d3732393-dad4-000c29d5a5' and lists files with their sizes and modification dates. A table in the center provides a detailed view of the files, with a red box highlighting the following entries:

| Name | Size | Type | P |
|--------------|-----------------|---------------------|-----|
| E5A-XP.vmx | 2.38 KB | Virtual Machine | [i] |
| E5A-XP.nvram | 8.48 KB | Non-volatile me... | [i] |
| E5A-XP.vmdk | 8,388,608.00 KB | Virtual Disk | [i] |
| vmware.log | 92.26 KB | Virtual Machine ... | [i] |
| E5A-XP.vmx | 2.85 KB | File | [i] |
| E5A-XP.vmsd | 0.04 KB | File | [i] |

The taskbar at the bottom shows the active windows: '192.168.88.129 - vSp...', 'Datastore Browser - [is...', '192.168.88.129 [80x2...', and 'E5A-XP - root@192.1...'. The system clock indicates the time is 上午 01:20.

vSphere vCenter Converter



Veeam B&R Free 6.1 設置

The screenshot displays the Veeam Backup & Replication 6.1 interface. The top menu bar includes 'Home', 'View', and 'Server'. Below the menu is a toolbar with icons for 'Add Server', 'Edit Server', 'Remove Server', 'Rescan', and 'Upgrade'. The main area is divided into two panes. The left pane, titled 'Virtual M Virtual M Virtual M Virtual M Virtual M Virtual Machines', shows a tree view of infrastructure objects. A red box highlights two IP addresses, '192.168.88.129' and '192.168.88.130', under the 'VMware vSphere' folder. The right pane shows a table of virtual machines with columns for Name, Used Size, Provisioned Size, Folder, and Host.

| Name | Used Size | Provisioned Size | Folder | Host |
|------------|-----------|------------------|--------|-----------------|
| E5A-UB1004 | 8.0 GB | 8.4 GB | vm | E5A.localdomain |
| E5A-XP | 8.0 GB | 8.4 GB | vm | E5A.localdomain |

At the bottom of the interface, there is a status bar showing 'License: Free Edition, Period: No expiration' and the Veeam logo. The Windows taskbar at the very bottom shows several open windows, including '192.168.88.129 - vSphere...' and 'Veeam Backup & Replica...'. The system clock in the bottom right corner indicates the time as '上午 01:04'.

Veeam B&R Free 6.1 備份

The screenshot displays the Veeam Backup & Replication interface. A file explorer window is open, showing a backup file named 'Backup_E5A-XP_2012-08-16T010832' with a size of 900,532 KB. Below it, a job progress window for 'E5A-XP_2012-08-16T010832 (Full)' is shown, indicating a successful completion for 1 of 1 VMs.

Job progress: Completed successfully 1 of 1 VMs

| Summary | Data | Status |
|--------------------------|----------------------------|--------------|
| Duration: 0:02:57 | Processed: 8.0 GB (100%) | Success: 1 ✓ |
| Processing rate: 46 MB/s | Read: 7.6 GB | Warnings: 0 |
| Bottleneck: Source | Transferred: 872.2 MB (9x) | Errors: 0 |

| VM name | Status |
|----------|---------|
| ✓ E5A-XP | Success |

| Action | Duration |
|---|----------|
| ✓ Job started at 2012/8/16 上午 01:08:32 | |
| ✓ Building VM list | 0:00:17 |
| ✓ VM size: 8.0 GB | |
| ✓ Changed block tracking is disabled | |
| ✓ Preparing next VM for processing | |
| ✓ Processing 'E5A-XP' | 0:02:33 |
| ✓ All VMs have been processed | |
| ✓ Backup file C:\Backup\Backup_E5A-XP_2012-08-16T010832.... | |
| ✓ Load: Source 99% > Proxy 46% > Network 5% > Target 25% | |
| ✓ Primary bottleneck: Source | |
| ✓ Job finished at 2012/8/16 上午 01:11:29 | |

Taskbar: 開始 | 192.168.88.129 - vSphere... | Veeam Backup & Replica... | Backup | 上午 01:11

Veeam B&R Free 6.1 還原

The screenshot displays the Veeam Backup & Replication console. The top navigation bar includes 'Home', 'View', and 'Server' tabs. Below this is a 'Server Tools' ribbon with buttons for 'Add Server', 'Edit Server', 'Remove Server', 'Rescan', and 'Upgrade'. The main area is titled 'Virtual Machines' and contains a search bar and a table of virtual machines.

| Name | Used Size | Provisioned Size | Folder | Host |
|------------|-----------|------------------|--------|-----------------|
| E5A-UB1004 | 8.0 GB | 8.4 GB | vm | E5A.localdomain |

A context menu is open over the 'E5A-UB1004' entry, showing options: 'Rescan', 'Remove', 'Properties...', and 'Refresh F5'. The left sidebar shows a tree view with 'Infrastructure', 'VMware vSphere', and 'Microsoft Hyper-V'. The bottom status bar indicates '1 virtual machine' and 'License: Free Edition, Period: No expiration'. The Windows taskbar at the bottom shows the time as 上午 01:18.

ghettoVCB.sh 備份 VMs

- ☞ 這個部分主要有使用到 `pietty` & `WinSCP` 等做綜合操作，請參考「[ESXi 5 下 ghettoVCB.sh 安裝及操作過程](#)」
- ☞ 因為這個操作必須要以SSH登入 ESXi Server，然後以 `linux` 命令列方式進行 `script` 的撰寫，可能對不熟悉 `linux` (包括我本人)命令列模式，可以使用在 Windows 下的 `MKSBackup` 程式配合 Windows 的排程工作做定期的 VMs 備份。
- ☞ `MKSBackup` 基本可以參考「[Windows 下使用 MKSBackup 結合 ghettoVCB.sh 做線上排程自動備份不停機](#)」，比較詳細的可以參考「[福星國小黃老師的文章](#)」。

Quick Migration

- ☞ 這個功能主要是把 ESXi Server 下的 VMs 以手動方式移轉到另一台 ESXi Server，如 ESXi 5 A → ESXi 5 B。
- ☞ 可以參考：
 - [免費虛擬化備份軟體 Veeam Backup Free Edition 參考資料](#)
 - [11. 免費虛擬化備份軟體 \(11 Quick Migration-上\) – Veeam Backup Free Edition](#)
 - [12. 免費虛擬化備份軟體 \(12 Quick Migration-下\) – Veeam Backup Free Edition](#)

ESXi 5 手動移轉 VMs

The image displays two side-by-side screenshots of the vSphere Client interface, illustrating the process of manual VM migration between ESXi hosts.

Left Screenshot (192.168.88.129 - vSphere Client):

- Host: 192.168.88.129
- Inventory: ESA-UB1004, ESA-XP
- Host Name: ESA.localdomain VMware ESXi, ...
- Content: "What is a Host?" section, "Basic Tasks" (Deploy from VA Marketplace, Create a new virtual machine), and "Recent Tasks" table.

Right Screenshot (192.168.88.130 - vSphere Client):

- Host: 192.168.88.130
- Inventory: ESB-XP
- Host Name: ESB.localdomain VMware ESXi, ...
- Content: "What is a Host?" section, "Basic Tasks" (Deploy from VA Marketplace, Create a new virtual machine), and "Recent Tasks" table.

Recent Tasks Table (Visible in both screenshots):

| Name | Target | Status | Details | Initiated By |
|---------------|--------|-----------|---------|--------------|
| Auto power On | | Completed | | root |

The bottom status bar of both windows indicates "Evaluation Mode: 60 days remaining" and "root" user.

結束



ESXi 也有當機畫面

```
VMware ESXi 5.0.0 [Releasebuild-623860 x86_64]
#GP Exception 13 in world 2840:vprobed @ 0x41802cce3484
ESXi in VM cr0=0x80010031 cr2=0x0 cr3=0x1aaba000 cr4=0x12c
frame=0x4122012c7b28 ip=0x41802cce3484 err=0 rflags=0x10002
rax=0x4032c rbx=0x4100032db930 rcx=0x1
rdx=0x80010031 rbp=0x4122012c7c80 rsi=0x4122012e5000
rdi=0x41220c625000 r8=0xf66cd1c3c3db r9=0x4
r10=0x5 r11=0x0 r12=0x1
r13=0xf66cd1c3c3db r14=0x4122012e5000 r15=0x41220c625000
*PCPU1:2840/vprobed
PCPU 0: ISU
Code start: 0x41802cc00000 VMK uptime: 0:22:11:11.342
0x4122012c7c80: [0x41802cce3484]World_Switch@vmkernel#nover+0x403 stack: 0x1
0x4122012c7e20: [0x41802cdf65ef]CpuSchedChooseAndSwitch@vmkernel#nover+0x16fa stack: 0x0
0x4122012c7e90: [0x41802cdf6bab]CpuSchedDispatch@vmkernel#nover+0x50e stack: 0x0
0x4122012c7f00: [0x41802cdf6f59]CpuSchedWait@vmkernel#nover+0x228 stack: 0x41000328d4c0
0x4122012c7f60: [0x41802cdf73a7]CpuSched_MicroSleep@vmkernel#nover+0x176 stack: 0x4122012c7fa8
0x4122012c7ff0: [0x41802ce01a4d]MemSchedPShareEstLoop@vmkernel#nover+0x58 stack: 0x0
0x4122012c7ff8: [0x0]<unknown> stack: 0x0
base fs=0x0 gs=0x418040400000 Kgs=0x0
2012-08-17T23:49:26.359Z cpu1:2675)Logs are stored on non-persistent storage. Consult product documentation to configure a sysl
og server or a scratch partition.
2012-08-17T23:49:26.359Z cpu1:2675)Logs are stored on non-persistent storage. Consult product documentation to configure a sysl
og server or a scratch partition.
Coredump to disk. Slot 1 of 1. 987654
```

全面啟動 ← → 虛擬化

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