



VMware on a Budget

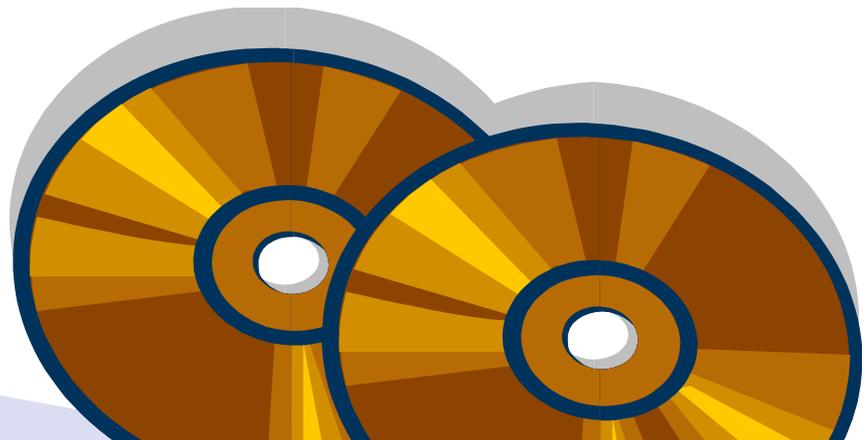
Charles Crichton, John Peachey
Oxford University Computing Laboratory
Jeremy Chalk
Oxford Vaccine Group



UNIVERSITY OF
OXFORD

Demo: Install VMware ESXi Server 4.0

- ▶ Can be downloaded from vmware.com
- ▶ Requires registration
- ▶ Free bare-bones hypervisor
- ▶ Business model: can be upgraded to “paid for” version with extra features.
- ▶ The license sent on registration should be applied within first 60 days, or it will stop working!



SharePoint/InfoPath systems

Case Report Forms - Windows Internet Explorer
https://vaccines.comlab.ox.ac.uk/

Informed consent form signed? no yes
Participant meets main inclusion and exclusion criteria? no yes

Medical History		
Diagnosis	Start Date	Comments

Insert item

Gestational Age Weeks: * Days: *

Birth weight (if known) * OR Check if birth weight unknown

Medical Examination	
Temperature pre-vaccination axillary :	<input type="text"/> * °C

- ACWY Study
<10 subjects
- Hepatitis B Booster Study
<100 subjects
- The 10 Valent
Pneumococcal Vaccine
Study
<400 subjects

- Created using the CancerGrid metadata tools
- <https://cancergrid.org>

Study N

Visit 1 20

Informed consent form signed? Yes No

Participant meets main inclusion and exclusion criteria? Yes No

Medical History	
Diagnosis:	Start date:

Gestational age: Weeks Days

Birth weight: . Kg or Unknown

Medical Examination	
Temperature pre vaccine	Axillary: <input type="text"/> . <input type="text"/> °C
Length: <input type="text"/> : <input type="text"/> cm	Weight: <input type="text"/> : <input type="text"/> Kg
	Head Circumfer

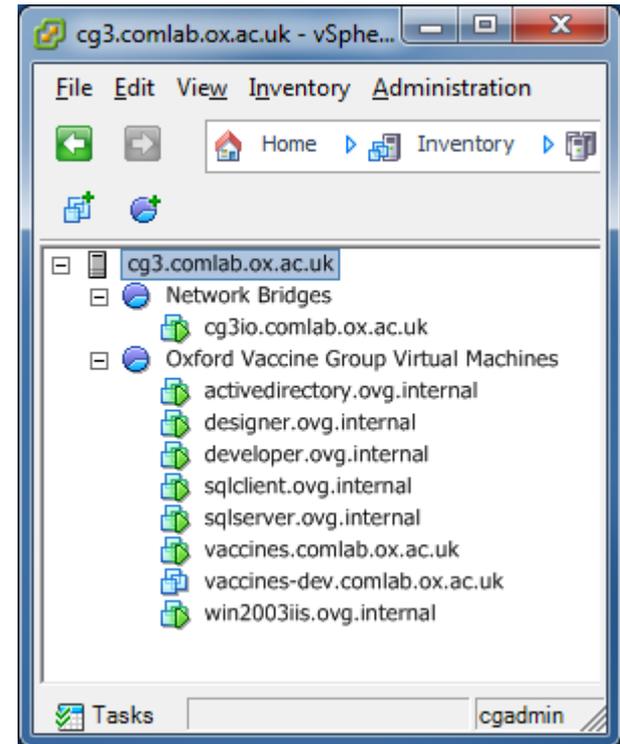
Patan Hospital, Kathmandu, Nepal



© Patan Hospital

Virtual Machines

- ▶ 10 virtual machines
 - 4 Production,
 - 6 Development and testing
- ▶ vSphere Client used for “pair programming” of studies
 - Jeremy on Churchill Site
 - Charlie at Computing Laboratory
- ▶ Hopefully to be used on future studies



Accessing the ESXi Server

Welcome to VMware ESXi 4 - Windows Internet Explorer

https://cg3.comlab.ox.ac.uk Certificate Error Bing

★ Favorites Welcome to VMware ESXi 4

VMware ESXi 4 Welcome

Getting Started

If you need to access this host remotely, use the following program to install vSphere Client software. After running the installer, start the client and log in to this host.

- [Download vSphere Client](#)

To streamline your IT operations with vSphere, use the following program to install vCenter. vCenter will help you consolidate and optimize workload distribution across ESX hosts, reduce new system deployment time from weeks to seconds, monitor your virtual computing environment around the clock, avoid service disruptions due to planned hardware maintenance or unexpected failure, centralize access control, and automate system administration tasks.

- [Download VMware vCenter](#)

If you need more help, please refer to our documentation library:

For Administrators

vSphere Remote Command Line

The Remote Command Line allows you to use command line tools to manage vSphere from a client machine. These tools can be used in shell scripts to automate day-to-day operations.

- [Download the Virtual Appliance](#)
- [Download the Windows Installer \(exe\)](#)
- [Download the Linux Installer \(tar.gz\)](#)

Web-Based Datastore Browser

Use your web browser to find and download files (for example, virtual machine and virtual disk files).

- [Browse datastores in this host's inventory](#)

Demo: How to enable SSH for ESXi



A specific “incantation” needs to be typed into the console at the host to enable SSH.

It is fairly easy, but would be impossible to guess:

- Press ALT-F1, then type “unsupported” and press Enter. ***None of this text appears!***
- Enter the root password when prompted.
- Once a command prompt appears, the /etc/inetd.conf file needs to be edited to remove ‘#’ from the line starting ‘#ssh’.
- Restart

Demo: How to backup a VM using ghettoVCB.sh

- ▶ Edit ghetto.sh to set backup location
- ▶ Edit ghetto.sh to set VM_BACKUP_ROTATION_COUNT
- ▶ Edit file 'backuplist' to list the Virtual Machines to backup.
- ▶ Test the configuration using:
ghettoVCB.sh backuplist -dryrun
- ▶ Run the backup
ghettoVCB.sh backuplist



VMServer: Dell PowerEdge T710

- ▶ 48GB RAM
- ▶ 8 Cores in 2 Xeon Processors
- ▶ ESXi Server 4
- ▶ 8 Network Ports
- ▶ Dual PSU
- ▶ Cost **£3000 inc VAT**



Storage: Netgear ReadyNAS Pro

Each unit:

- 2Tb
- Dual Network adapters

£ £2750

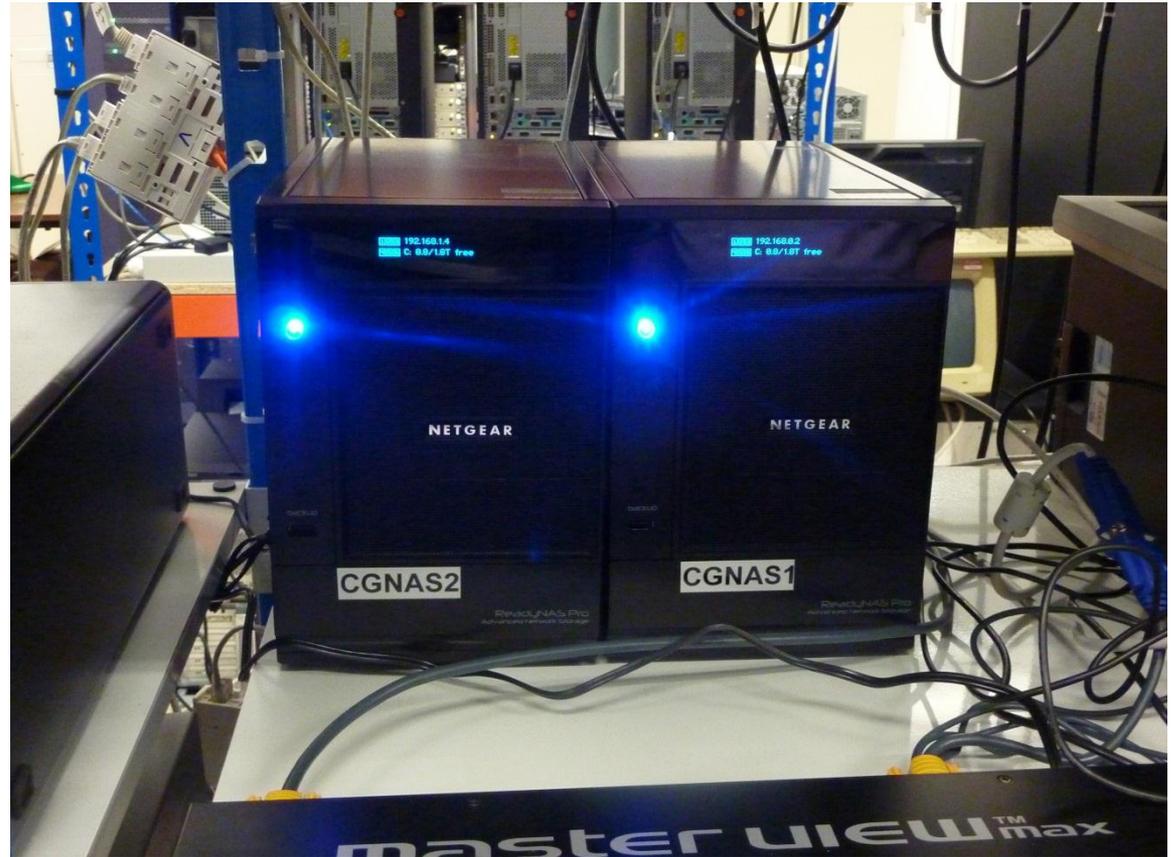
Other hardware

- UPS
- UPS Network Card

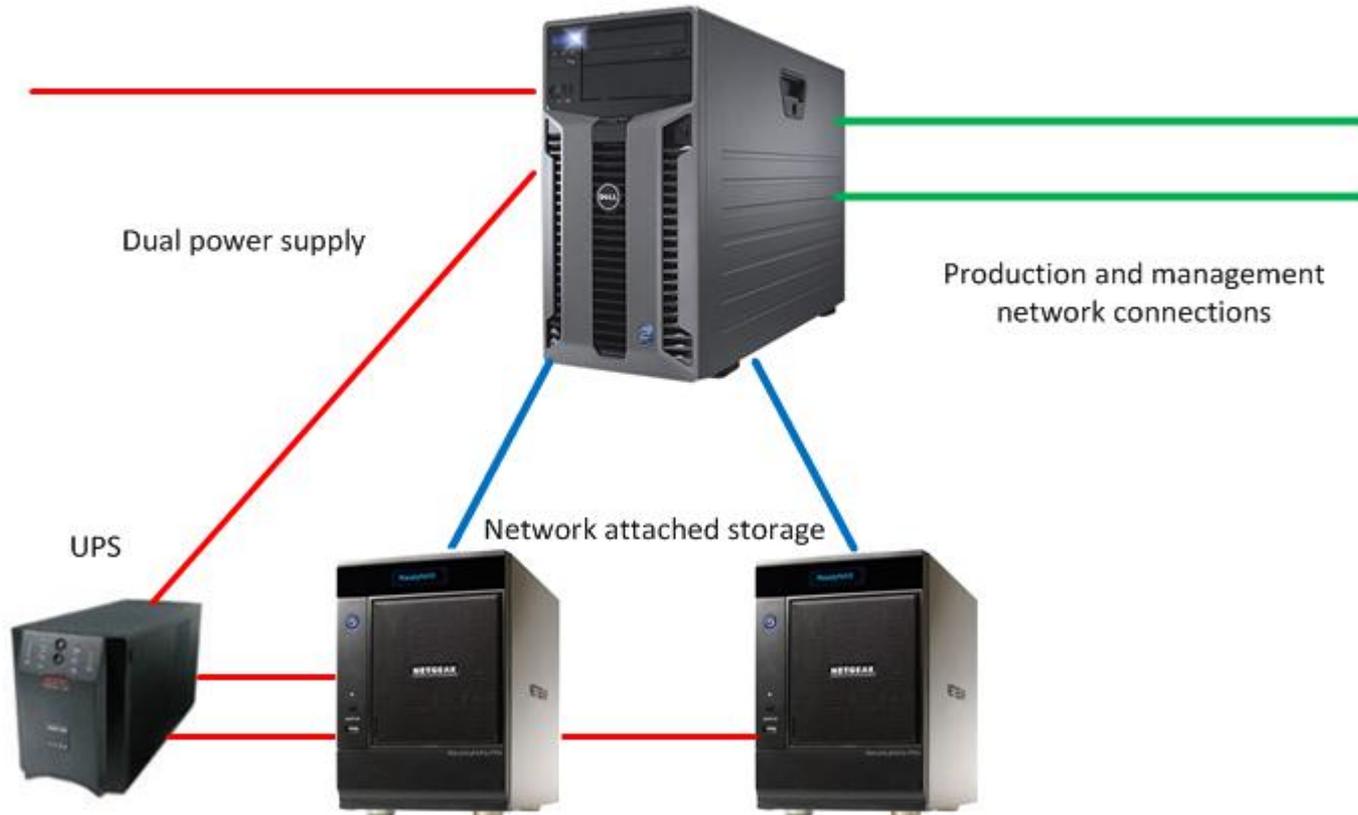
£ £375

£ £160

Total cost: £6285
(inc VAT)



Hardware connections

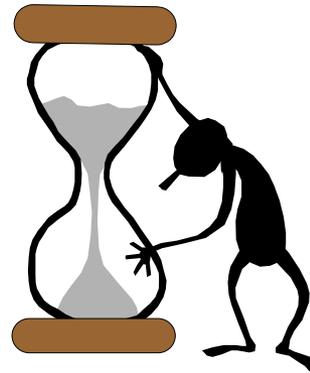


Demo: How to restore a VM using ghettoVCB-restore.sh

- ▶ Create a text file called 'restorelist' containing the names of virtual machines to be restored, one per line:

```
/vmfs/volumes/datastore1/backups/testxp/testxp-2010-03-09-1; /vmfs/volumes/datastore1;1  
Source VM PATH Target VM Path Kind
```

- ▶ Execute script:
ghettoVCB-restore.sh -c restorelist
- ▶ Restart Virtual Machine in vSphere Client



Demo: Automating backup

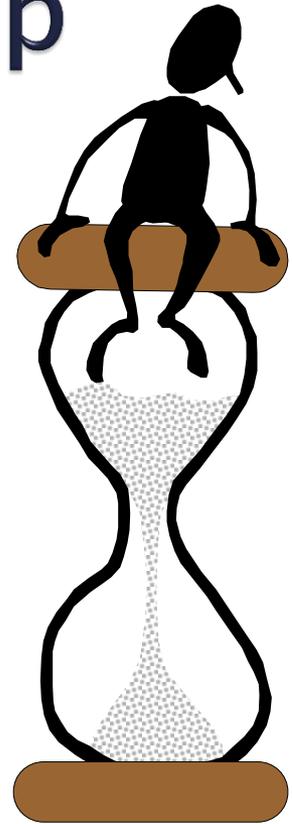
- ▶ Use CRON to automate backup
- ▶ Add entry to crontab file of form:

```
0 0 * * 1 5 ghettoVCB.sh -f backuplist > my.log
```

- ▶ Restart the CRON daemon

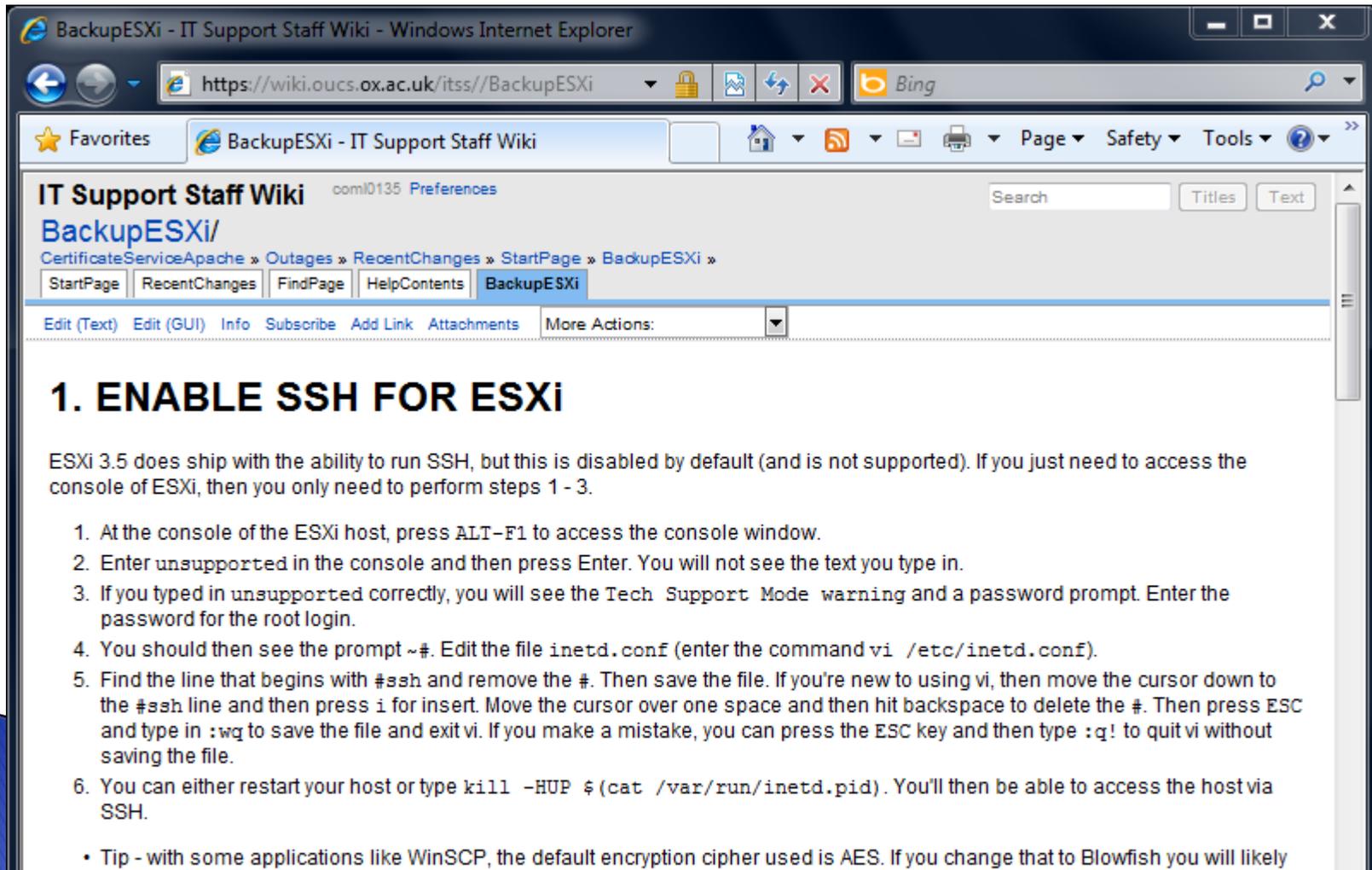
```
kill $(cat /var/run/crond.pid)  
crond
```

- ▶ There are instructions on the wiki to make this persistent between reboots.



All available on the ITSS Wiki

▶ <https://wiki.oucs.ox.ac.uk/itss/BackupESXi>



BackupESXi - IT Support Staff Wiki - Windows Internet Explorer

<https://wiki.oucs.ox.ac.uk/itss/BackupESXi>

IT Support Staff Wiki coml0135 Preferences

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1. ENABLE SSH FOR ESXi

ESXi 3.5 does ship with the ability to run SSH, but this is disabled by default (and is not supported). If you just need to access the console of ESXi, then you only need to perform steps 1 - 3.

1. At the console of the ESXi host, press `ALT-F1` to access the console window.
2. Enter `unsupported` in the console and then press `Enter`. You will not see the text you type in.
3. If you typed in `unsupported` correctly, you will see the `Tech Support Mode` warning and a password prompt. Enter the password for the root login.
4. You should then see the prompt `~#`. Edit the file `inetd.conf` (enter the command `vi /etc/inetd.conf`).
5. Find the line that begins with `#ssh` and remove the `#`. Then save the file. If you're new to using `vi`, then move the cursor down to the `#ssh` line and then press `i` for insert. Move the cursor over one space and then hit `backspace` to delete the `#`. Then press `ESC` and type in `:wq` to save the file and exit `vi`. If you make a mistake, you can press the `ESC` key and then type `:q!` to quit `vi` without saving the file.
6. You can either restart your host or type `kill -HUP $(cat /var/run/inetd.pid)`. You'll then be able to access the host via SSH.

- Tip - with some applications like WinSCP, the default encryption cipher used is AES. If you change that to Blowfish you will likely

Demo: VMware Converter

- ▶ Used to convert physical machines to virtual machines and vice-versa
- ▶ We have also used it to move virtual machines from one ESXi Server to another ESXi Server



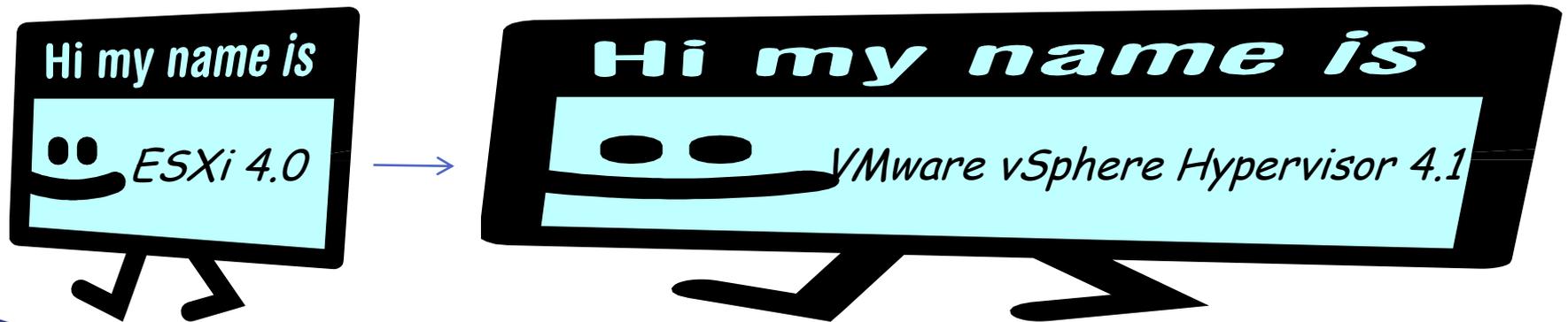
HFS still used for disaster recovery

- ▶ Our local solution gives reasonable ability to handle small scale failures
- ▶ HFS is required for larger scale issues which can only be resolved by an off-site store
- ▶ Currently handled by automated weekly copying of SharePoint backup files to an external physical machine which is on HFS.



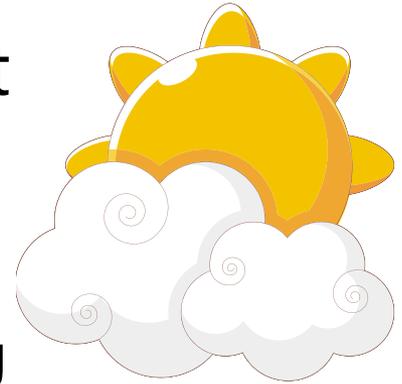
VMware Latest Version

- ▶ The work here was done with ESXi Server 4.0
- ▶ Version 4.1 – *released yesterday* – seems to rename this to “VMware vSphere Hypervisor”
- ▶ We believe that the ghettoVCB scripts should work with 4.1, but we have not had time to try!



Alternatives

- ▶ Cloud based versions of SharePoint
 - Disadvantages that you can't currently change the software for research purposes
 - SharePoint 2010 Sandbox is interesting
 - ...
- ▶ Solutions other than VMware
 - Citrix XenServer,
 - Microsoft Virtual Server, Microsoft Hyper-V
 - ...



Links

- ▶ Wiki Instructions
 - <https://wiki.oucs.ox.ac.uk/itss/BackupESXi>
- ▶ Ghetto scripts
 - <http://communities.vmware.com/docs/DOC-8760>
- ▶ CancerGrid
 - <https://cancergrid.org>
- ▶ Vaccine Group
 - <http://www.paediatrics.ox.ac.uk/ovg>