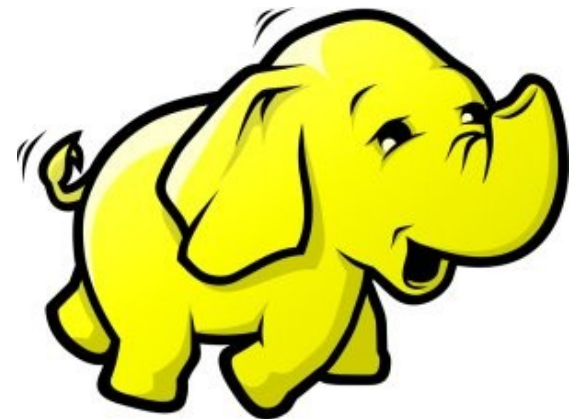




使用 DRBL 與 Clonezilla 佈署資料探勘 Hadoop 環境

Jazz Wang
Yao-Tsung Wang
jazz@nchc.org.tw



WHO AM I ? 這傢伙是誰啊? JAZZ ?

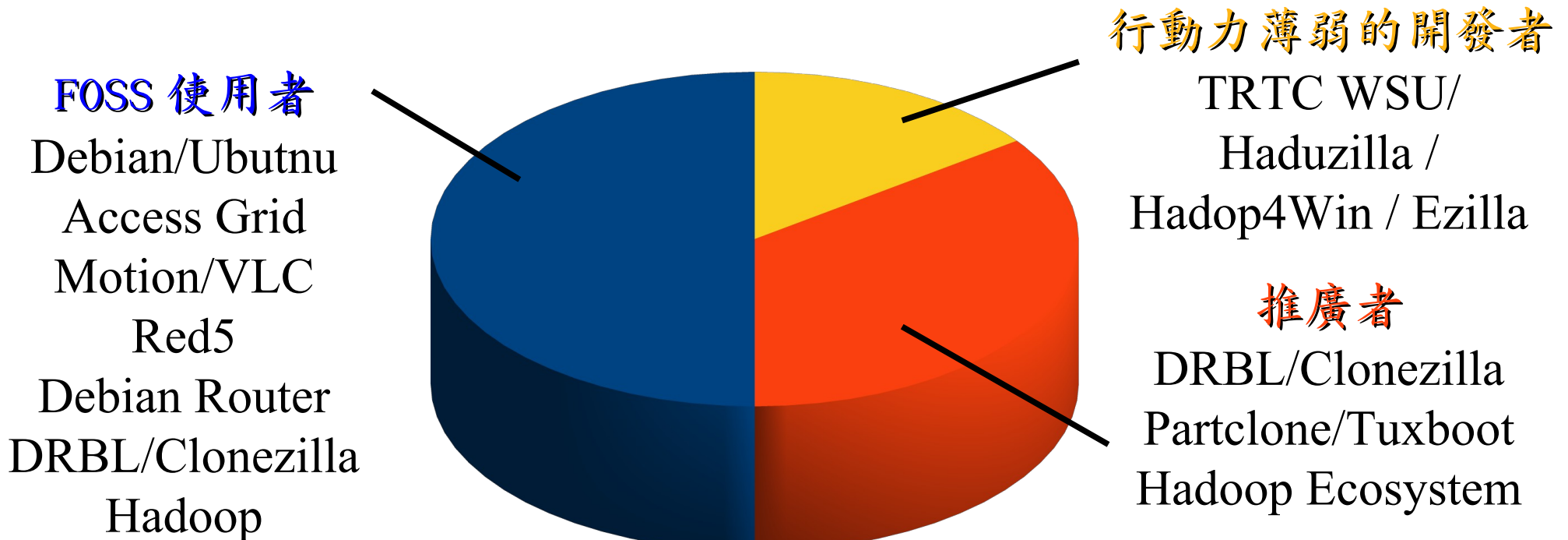
- 講者介紹：

- 國網中心 王耀聰 副研究員 / 交大電控八九級碩士
- jazz@nchc.org.tw



- 所有投影片、參考資料與操作步驟均在網路上

- <http://trac.nchc.org.tw/cloud>
- 由於雲端資訊變動太快，愛護地球，請減少不必要之列印。



使用 DRBL 與 Clonezilla 佈署資料探勘 Hadoop 環境

PART 1 :

從雲端、巨量資料趨勢談為何學 Hadoop

PART 2 :

運用企鵝龍佈署資料探勘平台的經驗分享

PART 3 :

運用再生龍從小硬碟搬家到大硬碟

The Wisdom of Clouds (Crowds)

雲端序曲：雲端的智慧始終來自於群眾的智慧

2006年8月9日

Google 執行長施密特 (Eric Schmidt) 於 SES'06 會議中首次使用「雲端運算 (Cloud Computing) 」來形容無所不在的網路服務

2006年8月24日

Amazon 以 Elastic Compute Cloud 命名其虛擬運算資源服務

THE WISDOM OF
CLOUDS

What you need to know
about cloud computing



Why are they named by “ SMART ” ?!

智慧打哪兒來？！

Smart Phone

智慧手機

Smart Car

智慧車輛

Smart Grid

智慧電網

SMART ?

哪裡長
智慧了？

Smart City

智慧城市

Smart Home

智慧家庭

Smart Meter

智慧電錶

資料

Data

知識

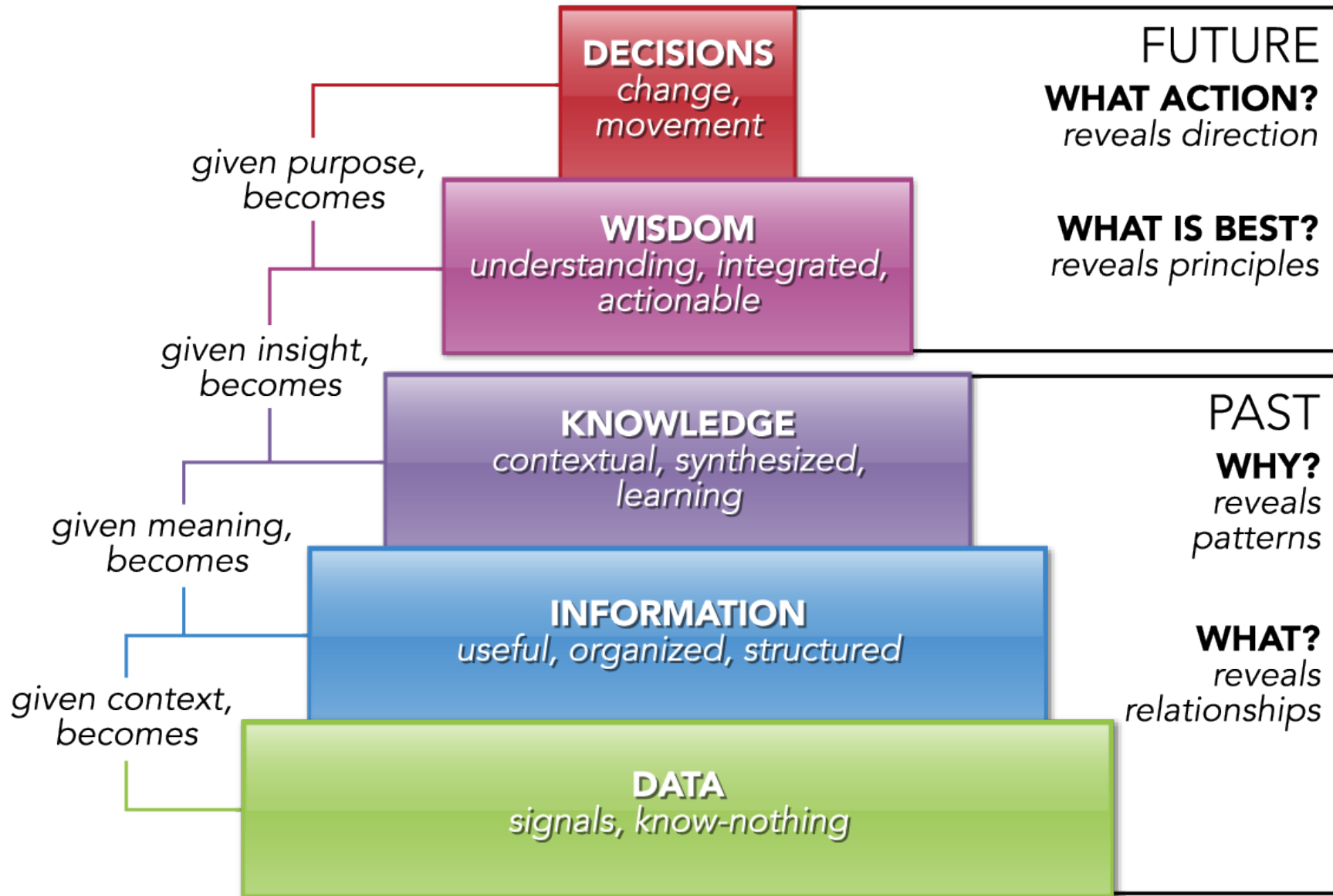
Knowledge

智慧

Wisdom

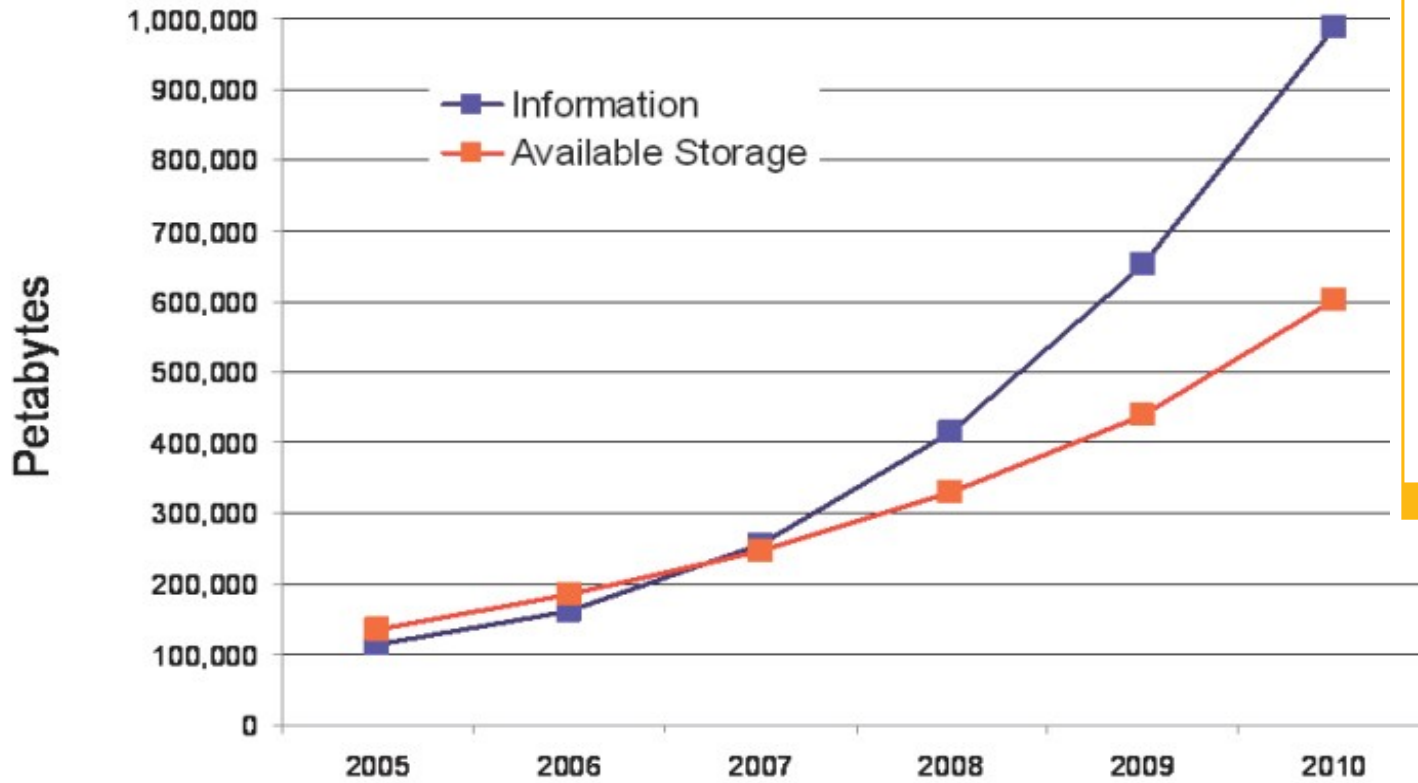
Data, Information, Knowledge, Wisdom

知識管理模型：資料、資訊、知識與智慧



Data Explosion!! 始於 2007 的「資料大爆炸」時代

Information Versus Available Storage

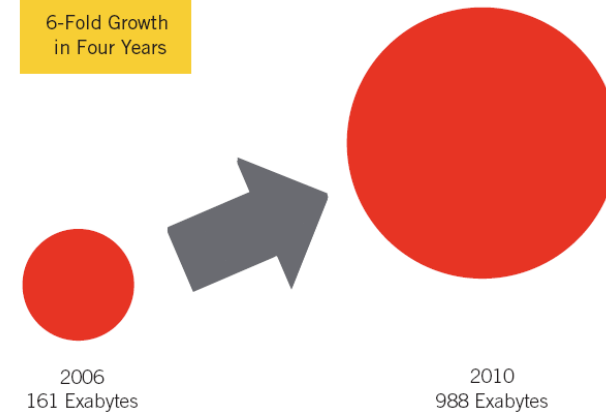


Source: IDC, 2007

Figure 1

Information Created, Captured and Replicated

6-Fold Growth
in Four Years



Source: IDC, 2007

2007 年，IDC 預估
2010 年會成長**六倍**！
(相較 2006 年)

2006 161 EB
2010 988 EB (預測)

出處：The Expanding Digital Universe,
A Forecast of Worldwide Information Growth Through 2010,
March 2007, An IDC White Paper - sponsored by EMC
<http://www.emc.com/collateral/analyst-reports/expanding-digital-idc-white-paper.pdf>

What is Big Data?! 何謂『海量資料』？

海量資料泛指資料大小已無法用一般軟體擷取、管理與處理；
單一資料集大小介於數十 TB 至數 PB 的資料。

'Big Data' = few dozen TeraBytes to PetaBytes in single data set.

Definition

[edit]

Big data is a term applied to data sets whose size is beyond the ability of commonly used software tools to capture, manage, and process the data within a tolerable elapsed time. Big data sizes are a constantly moving target currently ranging from a few dozen terabytes to many petabytes of data in a single data set.

In a 2001 research report^[14] and related conference presentations, then META Group (now Gartner) analyst, Doug Laney, defined data growth challenges (and opportunities) as being three-dimensional, i.e. increasing volume (amount of data), velocity (speed of data in/out), and variety (range of data types, sources). Gartner continues to use this model for describing big data.^[15]

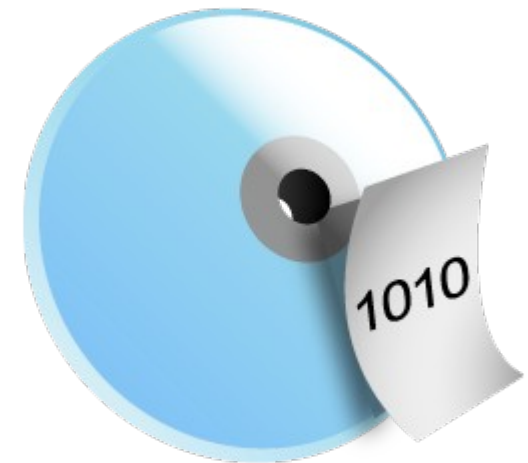
出處：http://en.wikipedia.org/wiki/Big_data



多個檔案，容量 100TB



一個資料庫，容量 100TB



一個檔案，容量 100TB

New IT Architecture toward Cloud Computing !!

用雲掌握資料，加以分析，形成智能給端用



雲

資料中心
提供服務

雲端設計新思維：端的智能來自於雲的服務

Devices share the wisdom of Cloud

端



各類裝置
存取服務

4. 下載最佳路徑

1. 上傳行進軌跡

6. 上傳最佳路徑執行狀態
(判斷是否需要修正)

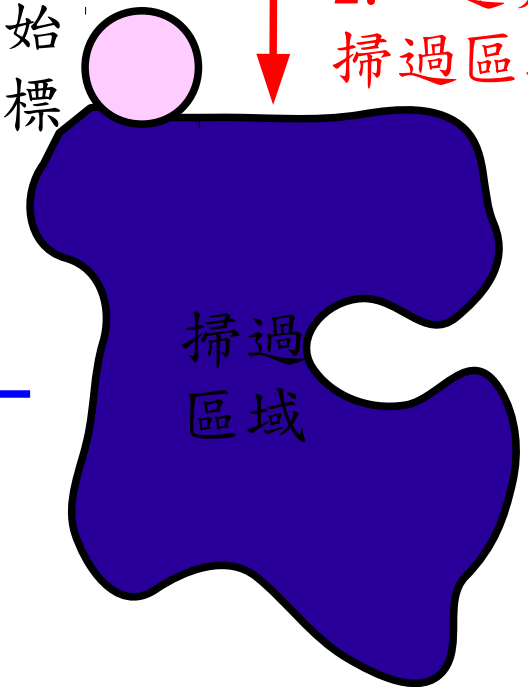
3. 運算
最佳路徑

5. 執行
最佳路徑



起始
座標

2. 運算
掃過區域



曾經有人問道：我是學電機的，那電機與控制跟雲端有甚麼關聯性？

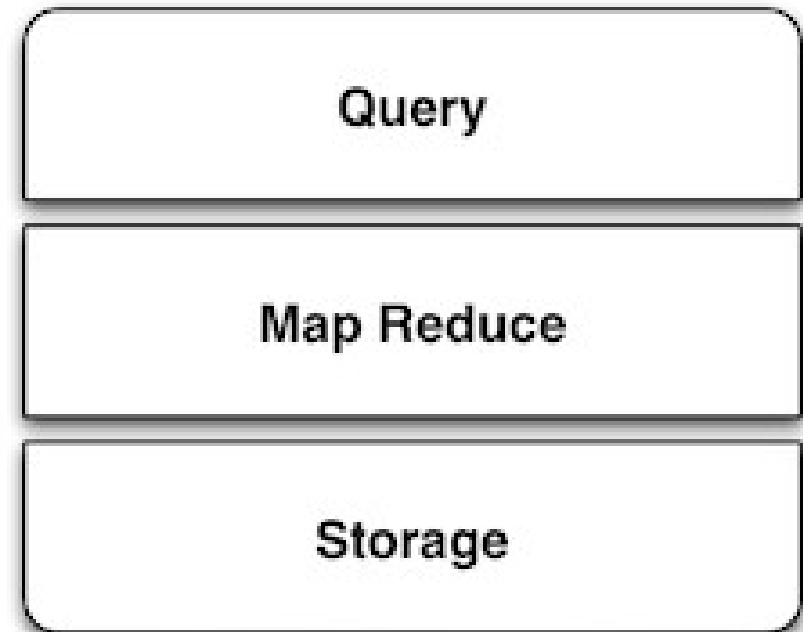
The SMAQ stack for big data

海量資料處理的資訊架構

做網頁相關的人可能聽過 LAMP



未來處理海量資料的人必需知道
SMAQ (Storage, MapReduce and Query)



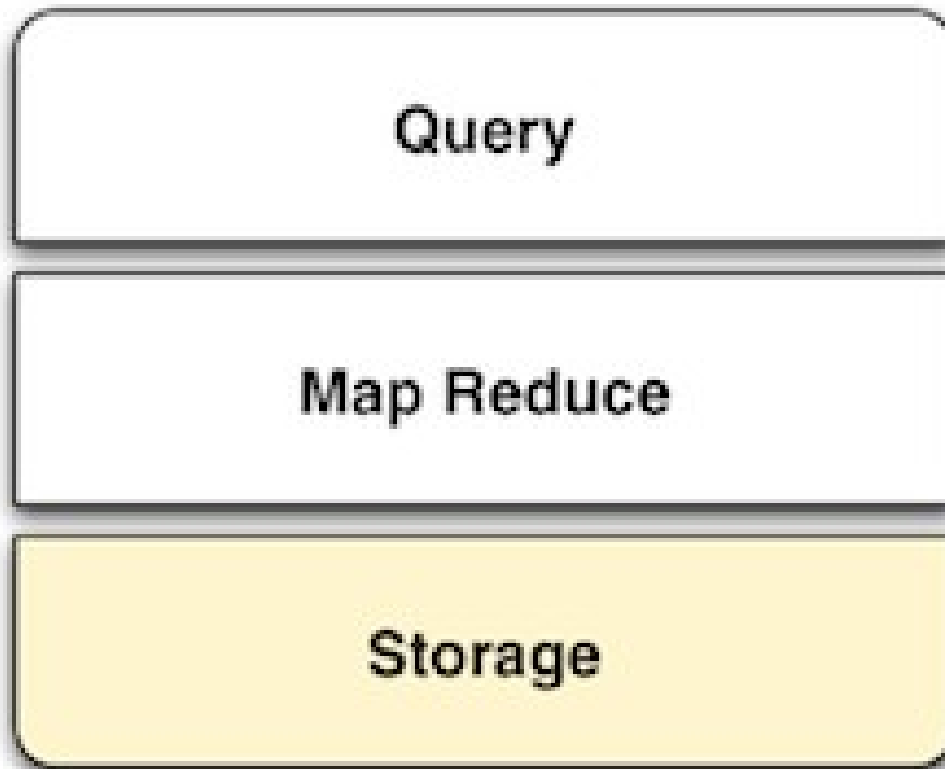
參考來源：The SMAQ stack for big data，Edd Dumbill，22 September 2010，

<http://radar.oreilly.com/2010/09/the-smaq-stack-for-big-data.html>

圖片來源：<http://smashingweb.ge6.org/wp-content/uploads/2011/10/apache-php-mysql-ubuntu.png> 11

The SMAQ stack for big data

海量資料處理的資訊架構



用來儲存分散、沒有關聯
的非結構化資料

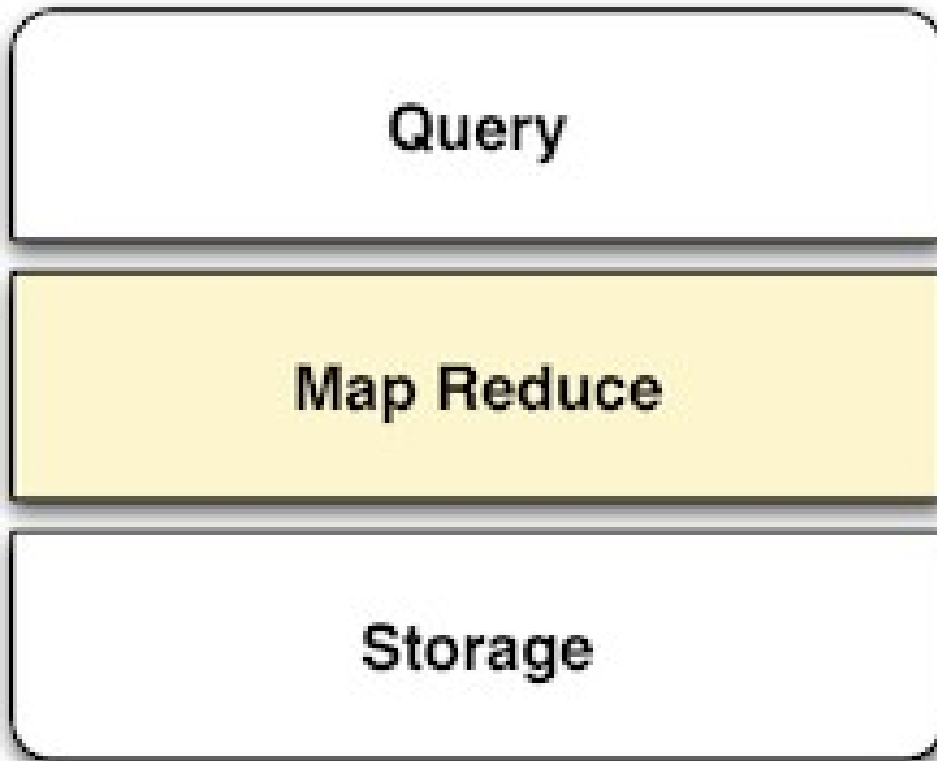
Key features

- Distributed
- Non-relational or unstructured

The SMAQ stack for big data

海量資料處理的資訊架構

運用批次處理的方式，將
運算工作平均分散到許多
的伺服器做運算。

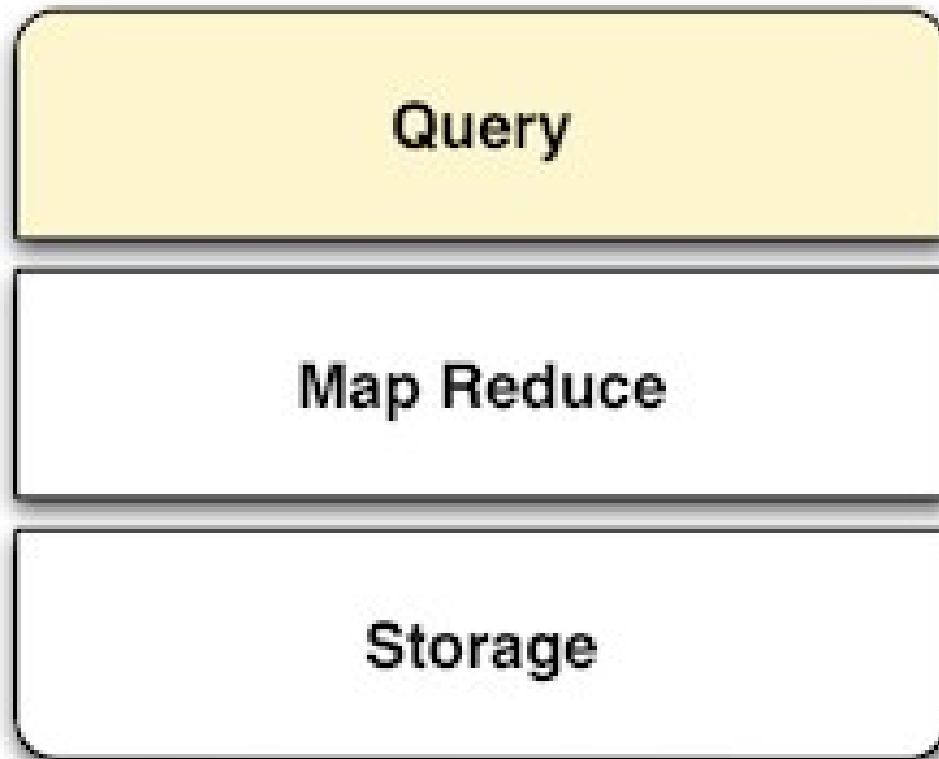


Key features

- Distributes computation over many servers
- Batch processing model

The SMAQ stack for big data

海量資料處理的資訊架構



Key features

- Efficient way of defining computation
- Platform for user friendly analytical systems

將算完的結構化資料儲存到可供查詢的資料庫系統

Three Core Technologies of Google

Google 的三大關鍵技術

- Google 在一些會議分享他們的三大關鍵技術
- Google shared their design of web-search engine
 - SOSP 2003 :
 - “The Google File System”
 - <http://labs.google.com/papers/gfs.html>
 - OSDI 2004 :
 - “MapReduce : Simplified Data Processing on Large Cluster”
 - <http://labs.google.com/papers/mapreduce.html>
 - OSDI 2006 :
 - “Bigtable: A Distributed Storage System for Structured Data”
 - <http://labs.google.com/papers/bigtable-osdi06.pdf>



Open Source Mapping of Google Core Technologies

Google 三大關鍵技術對應的自由軟體

Google 三大關鍵技術

自由軟體對應解決方案

Q = Query
BigTable

A huge key-value datastore

HBase, Hypertable
Cassandra,

MapReduce

To parallel process data

Hadoop MapReduce API
Sphere MapReduce API, ...

S = Storage

Google File System

To store petabytes of data

Hadoop Distributed File System (HDFS)
Sector Distributed File System

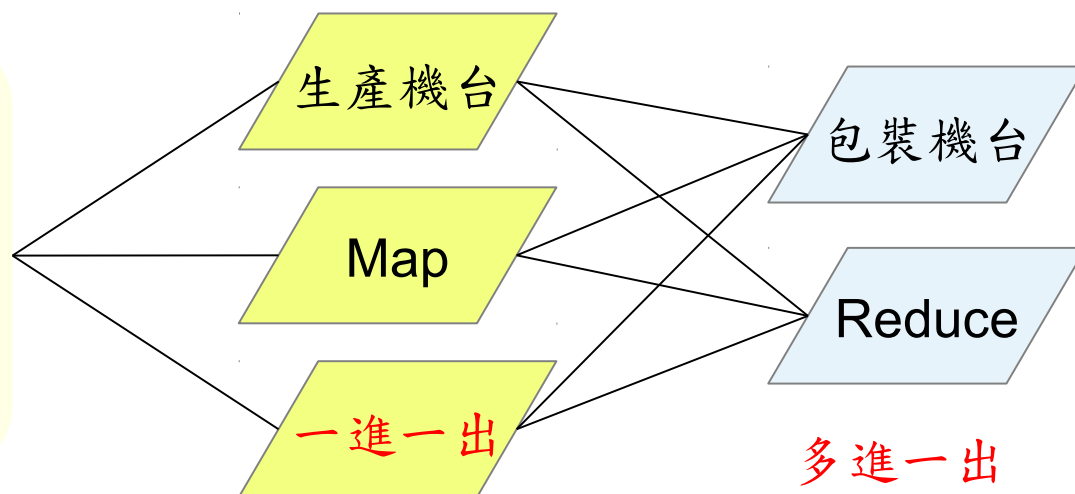
Hadoop 簡介

Hadoop 是一個讓使用者簡易撰寫並執行處理海量資料應用程式的軟體平台。

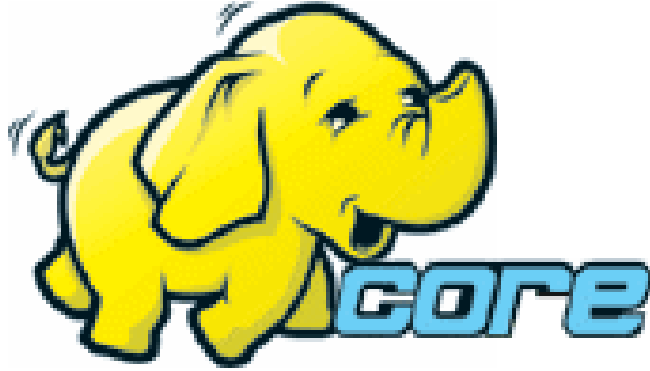
亦可以想像成一個處理海量資料的生產線，只須學會定義 **map** 跟 **reduce** 工作站該做哪些事情。

就像工廠的倉庫
存放生產原料跟待售貨物

HDFS 存放
待處理的**非結構化資料**
與處理後的**結構化資料**

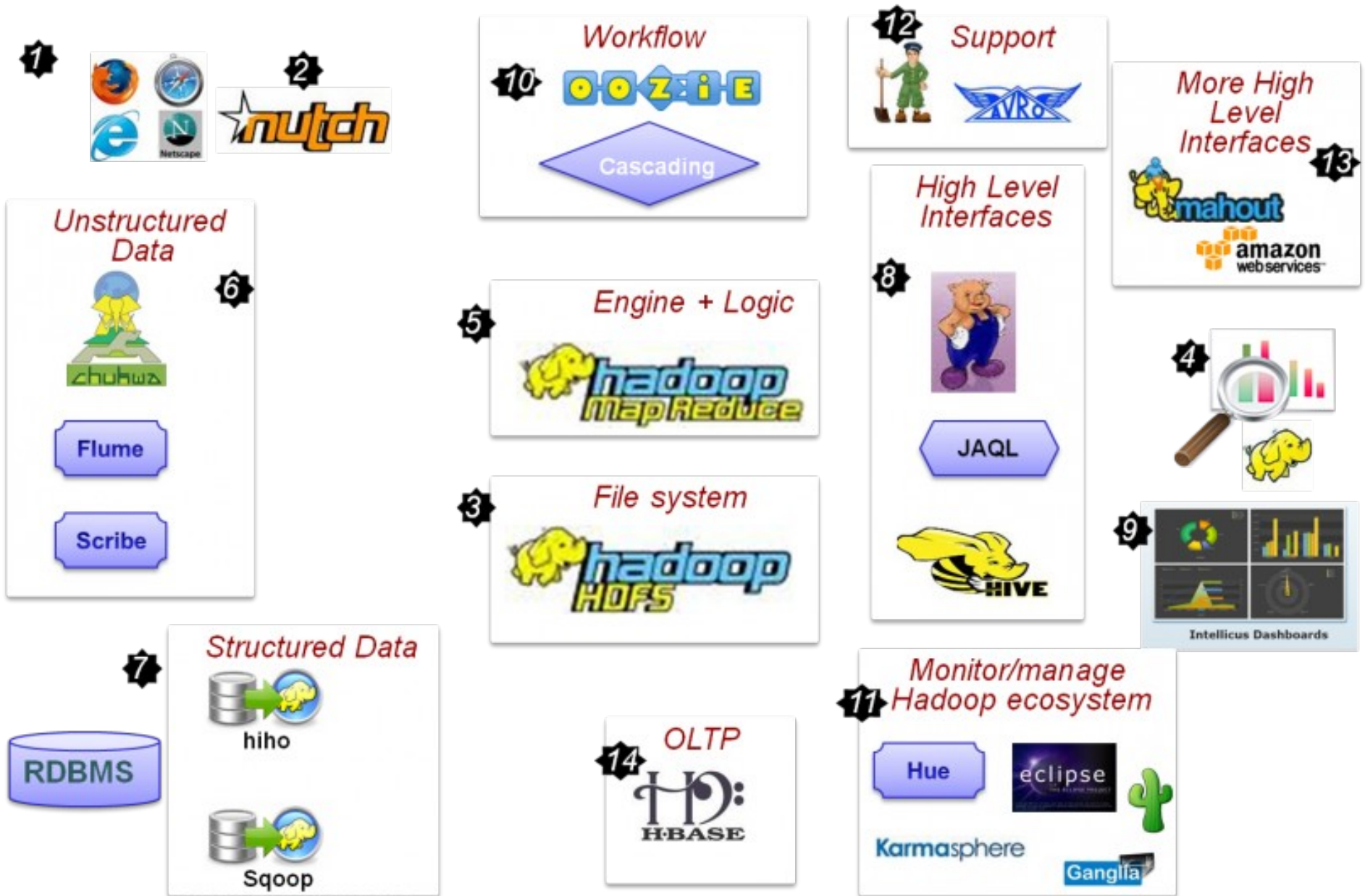


Hadoop

- <http://hadoop.apache.org>
 - Hadoop 是 Apache Top Level 開發專案
 - **Hadoop is Apache Top Level Project**
 - 目前主要由 Yahoo! 資助、開發與運用
 - **Major sponsor is Yahoo!**
 - 創始者是 Doug Cutting，參考 Google Filesystem
 - **Developed by Doug Cutting, Reference from Google Filesystem**
 - 以 Java 開發，提供 HDFS 與 MapReduce API。
 - **Written by Java, it provides HDFS and MapReduce API**
 - 2006 年使用在 Yahoo 內部服務中
 - **Used in Yahoo since year 2006**
 - 已佈署於上千個節點。
 - **It had been deploy to 4000+ nodes in Yahoo**
 - 處理 Petabyte 等級資料量。
 - **Design to process dataset in Petabyte**
- 
- Facebook、Last.fm
、Joost are also
powered by Hadoop**

Why we choice Hadoop? Good Ecosystem!

豐富的生態系建構出處理海量資料的工具庫



使用 DRBL 與 Clonezilla 佈署資料探勘 Hadoop 環境

PART 1 :

從雲端、巨量資料趨勢談為何學 Hadoop

PART 2 :

運用企鵝龍佈署資料探勘平台的經驗分享

PART 3 :

運用再生龍從小硬碟搬家到大硬碟

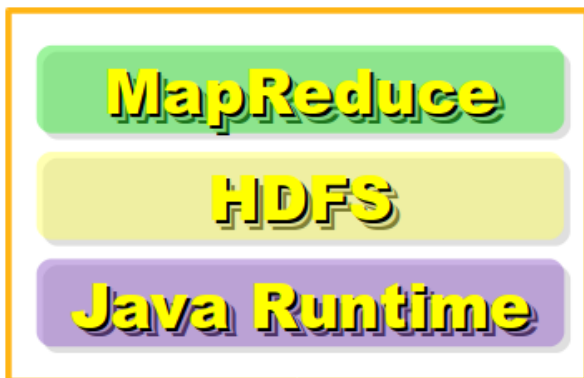
關於 hadoop.nchc.org.tw

- **DRBL Server – 1 台 (hadoop)** ,
加大 `/home` 與 `/tftpboot` 空間。
- **DRBL Client – 20 台**
(hadoop101~hadoop120)
- 使用 **Cloudera** 的 **Debian** 套件
- 使用 **drbl-hadoop** 的設定
跟 **init.d script** 來協助部署
- 使用 **hadoop-register** 來提供
使用者註冊與 **ssh applet** 介面

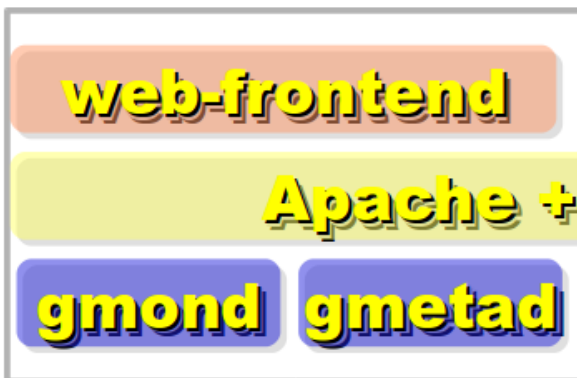


DRBL+Hadoop=Haduzilla 黑肚龍系統架構

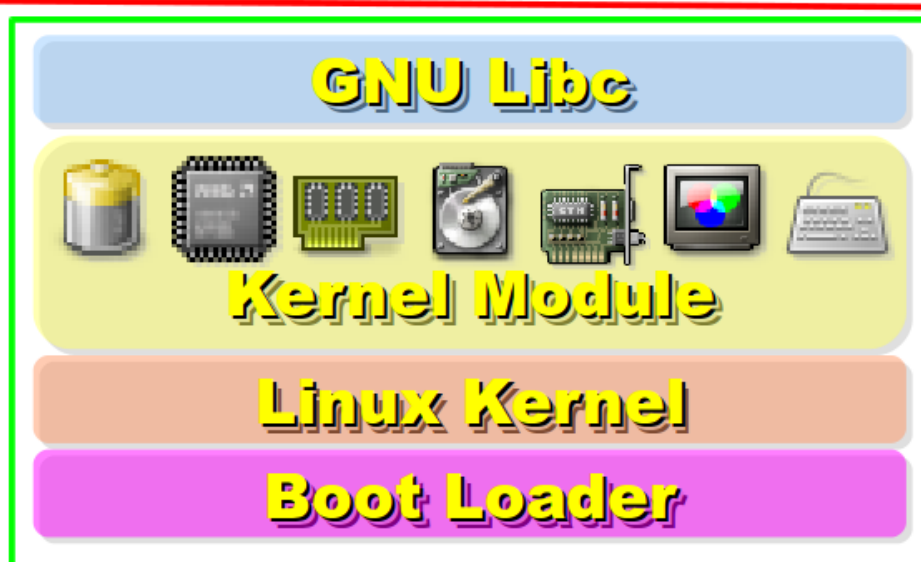
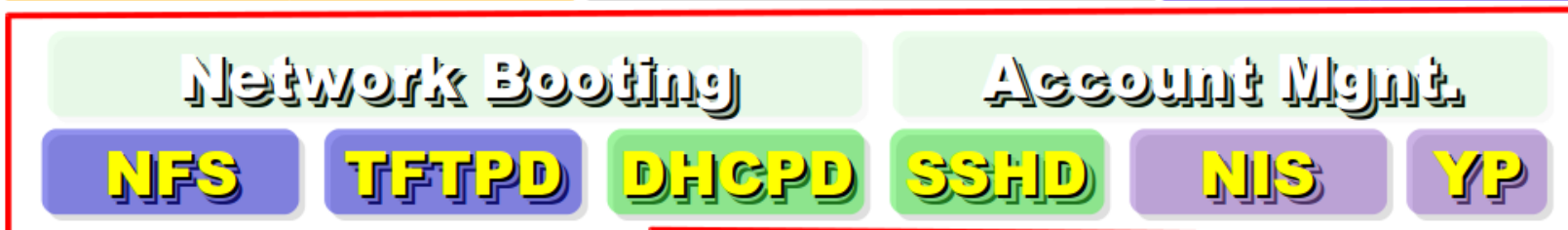
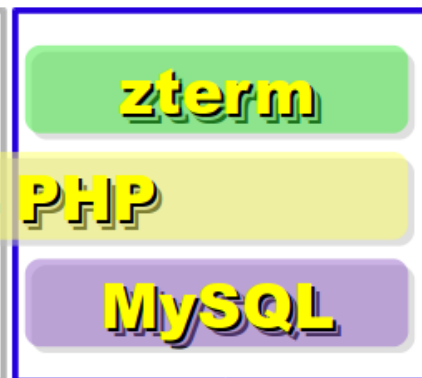
Hadoop



Ganglia



Register



DRBL

Linux

使用 DRBL 佈署 Hadoop

- 仍在開發中，待整理套件
- **drbl-hadoop** – 掛載本機硬碟給 **HDFS** 用

```
svn co http://trac.nchc.org.tw/pub/grid/drbl-hadoop-0.1/
```

- **hadoop-register** – 註冊網站與 **ssh applet**

```
svn co http://trac.nchc.org.tw/pub/cloud/hadoop-register
```



root / **drbl-hadoop-0.1**

Name ▲
↑ ../
📄 drbl-hadoop
📄 drbl-hadoop-mount-disk



root / **hadoop-register**

Name ▲	Size	Rev	Age	Last
↑ ../				
▶ 📁 etc		103	4 weeks	wa
📄 adduser.php	1.3 kB	85	6 weeks	wa
📄 check_activate_code.php	2.2 kB	85	6 weeks	wa
📄 check_user_identification.php	2.9 kB	85	6 weeks	wa

使用者註冊頁面

Hadoop-Register

Hadoop 帳號申請

帳號:

密碼:

登入

重填

[新增帳號](#) [忘記密碼](#) [操作問題回報](#)

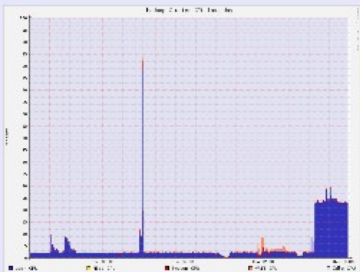
[歡迎加入討論群組](#)，以利接收即時公告事宜

家目錄空間吃緊中，請盡量上傳至HDFS後，
清除家目錄檔案，謝謝！

註冊人數：1460 / 1999 人

[MapReduce 狀態](#) | [HDFS 狀態](#)

[過去 24 小時 CPU 負載](#) - [查詢完整系統負載](#):



Running Jobs

[Quick Links](#)

Jobid	Priority	User	Name	Map % Complete	Map Total	Maps Completed	Reduce % Complete
job_201104290234_0905	NORMAL	h1196	PA: Local Apriori over input: n/1mpy54 /input, with minSup: 15000, ep: 0.5	100.00%	10	10	100.00%
			PA: Local Apriori over				

網站帳號 jazzwang E-mail 姓名 王耀聰 電話 0 單位 0 用途 0 主機帳號 h998 主機密碼 登出

NameNode

[檔案\(F\)](#) [編輯\(E\)](#) [檢視\(V\)](#) [歷史\(Y\)](#) [工具\(T\)](#) [說明\(H\)](#)

1. hadoop.nchc.org.tw

Started:	F
Version:	0
Compiled:	S
Upgrades:	T

[Browse the filesystem](#)
[Namenode Logs](#)

Cluster Summary

2079646 files and

WARNING: There are

Configured Cap
DFS Used
Non DFS Used

```
Linux hadoop 2.6.32-5-amd64 #1 SMP Wed Jan 12 03:40:32 UTC 2011 x86_64
```

```
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.
```

```
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.
```

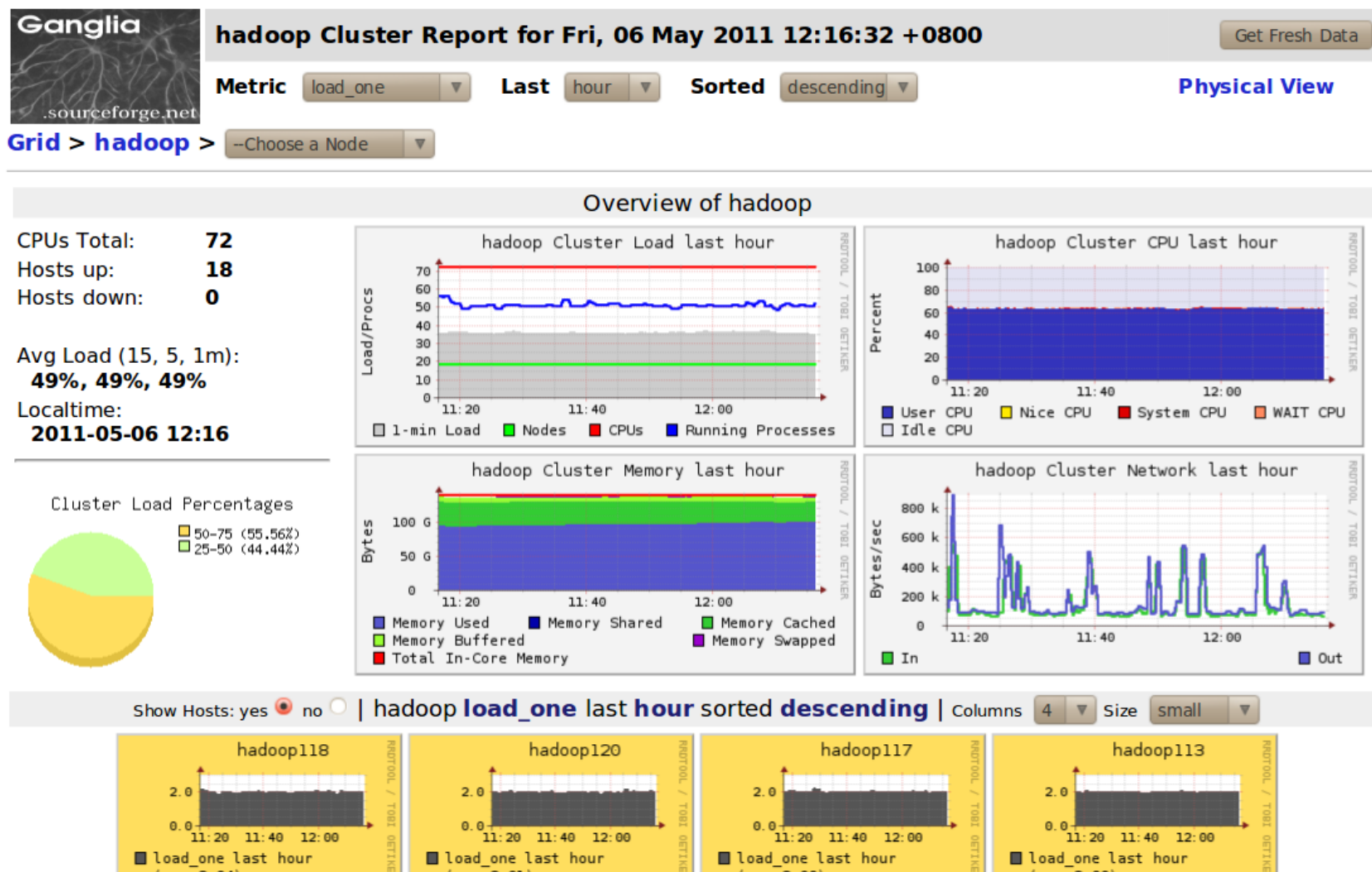
```
Last login: Tue Apr 26 15:45:44 2011 from nat235.dynamic.cs.nctu.edu.tw  
h998@hadoop:~$
```

Powered by Zterm

<http://zhouer.org/ZTerm/>

系統狀態監控 Ganglia

- 採用自由軟體 **Ganglia** 來蒐集電腦叢集的負載狀態
- <http://ganglia.sourceforge.net/>

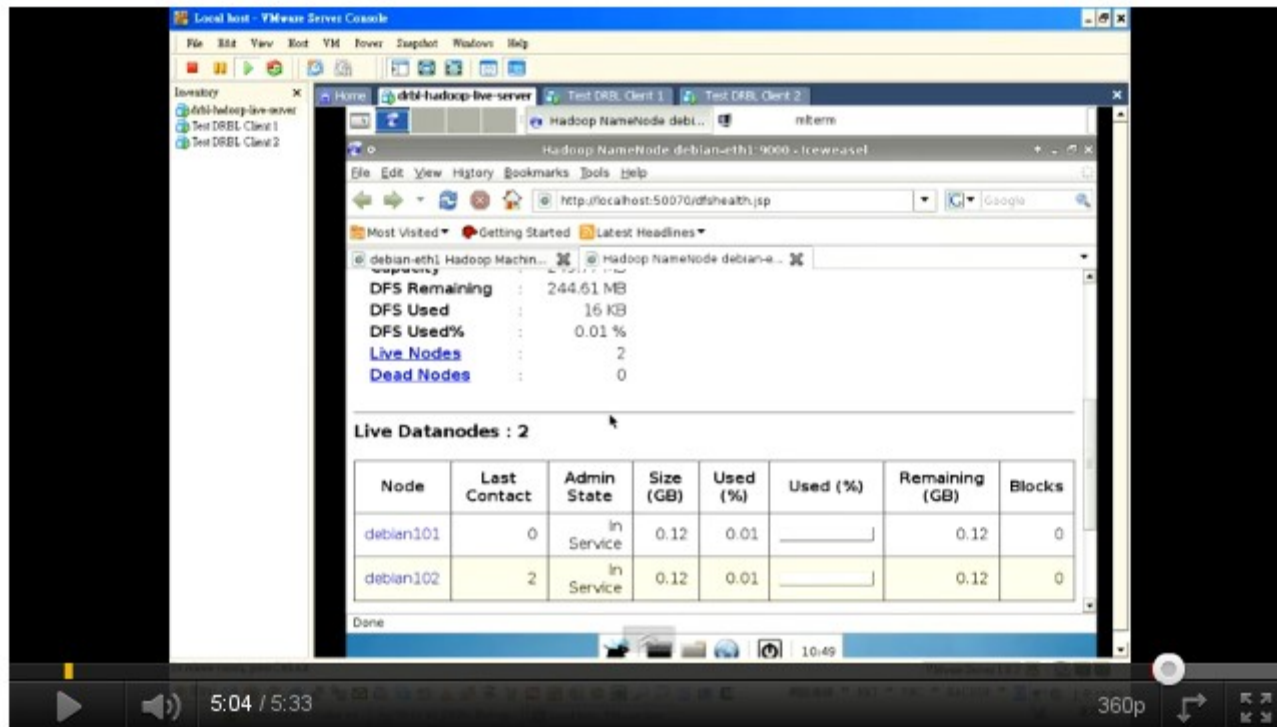
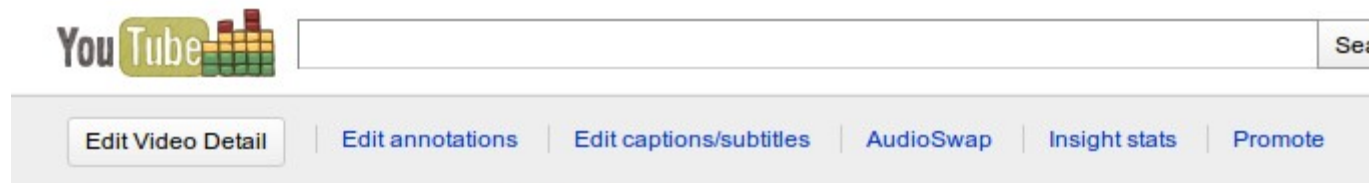


有什麼方法搭建像
hadoop.nchc.org.tw
一樣的多入環境
給學生們上課用？

雛型開機光碟 DRBL-Hadoop Live CD

舊影片：http://www.youtube.com/watch?hl=en&v=Ix4WigGvE_A

下載點：<http://drbl-hadoop.sf.net>



The screenshot shows a VM console window titled 'Local host - VMware Server Console'. The main window displays the Hadoop NameNode status page for 'debian-eth1:9000 - (rewnasel)'. The page shows the following statistics:

- DFS Remaining : 244.61 MB
- DFS Used : 16 KB
- DFS Used% : 0.01 %
- Live Nodes : 2
- Dead Nodes : 0

Below the statistics, it indicates 'Live Datanodes : 2' and provides a table with the following data:

Node	Last Contact	Admin State	Size (GB)	Used (%)	Used (%)	Remaining (GB)	Blocks
debian101	0	In Service	0.12	0.01		0.12	0
debian102	2	In Service	0.12	0.01		0.12	0

The video player interface at the bottom shows a progress bar at 5:04 / 5:33 and a resolution of 360p.

可是我們希望
把企鵝龍裝到
硬碟裏面
做營運哩～
該怎麼做？

感謝 4\$ 大大分享 Debian 6.0 自動化安裝

FourDollars Blog

GNU/Linux, Debian/Ubuntu, Mac OS X, Free Software/Open Source Software, Freeware, and Programming.

首頁

Software Development

Debian Package

2011年2月11日星期五

\$4 的 Debian 6.0 自動化安裝

製作可開機安裝 Debian 6.0 的 USB Stick

首先去下載 `debian-6.0.2.1-i386-businesscard.iso` (46M) 回來
然後再準備一個 USB Stick 接上電腦，如果 mount 在 Linux 系統上的話記得先 `umount` 掉
以 root 權限執行 (這裡假設 USB Stick 的 Device Node 位於 `/dev/sdc`)

```
# cat debian-6.0.2.1-i386-businesscard.iso > /dev/sdc
```

這樣就可以製作出可開機安裝 Debian 6.0 的 USB Stick 沒錯就是這樣製作的
這是 Debian 6.0 以後的新功能 hybrid CD/DVD image 不過只有在 i386/amd64 上面有作用

準備好要安裝的電腦跟可以透過有線網路 DHCP 上網的網路環境

現在這隻 USB Stick 可以接上任何可以使用 USB Stick 開機的電腦上開機就會看到：

訂閱

發表文章

留言

企鵝星球

Source: <http://fourdollars.blogspot.tw/2011/02/4-debian-60.html>



BIOS PXE



BIOS PXE



BIOS PXE

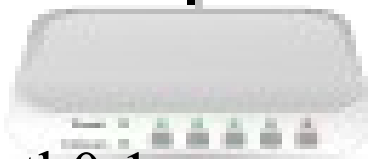


BIOS PXE



WAN

iptables



tap0

192.168.125.254

eth0:1

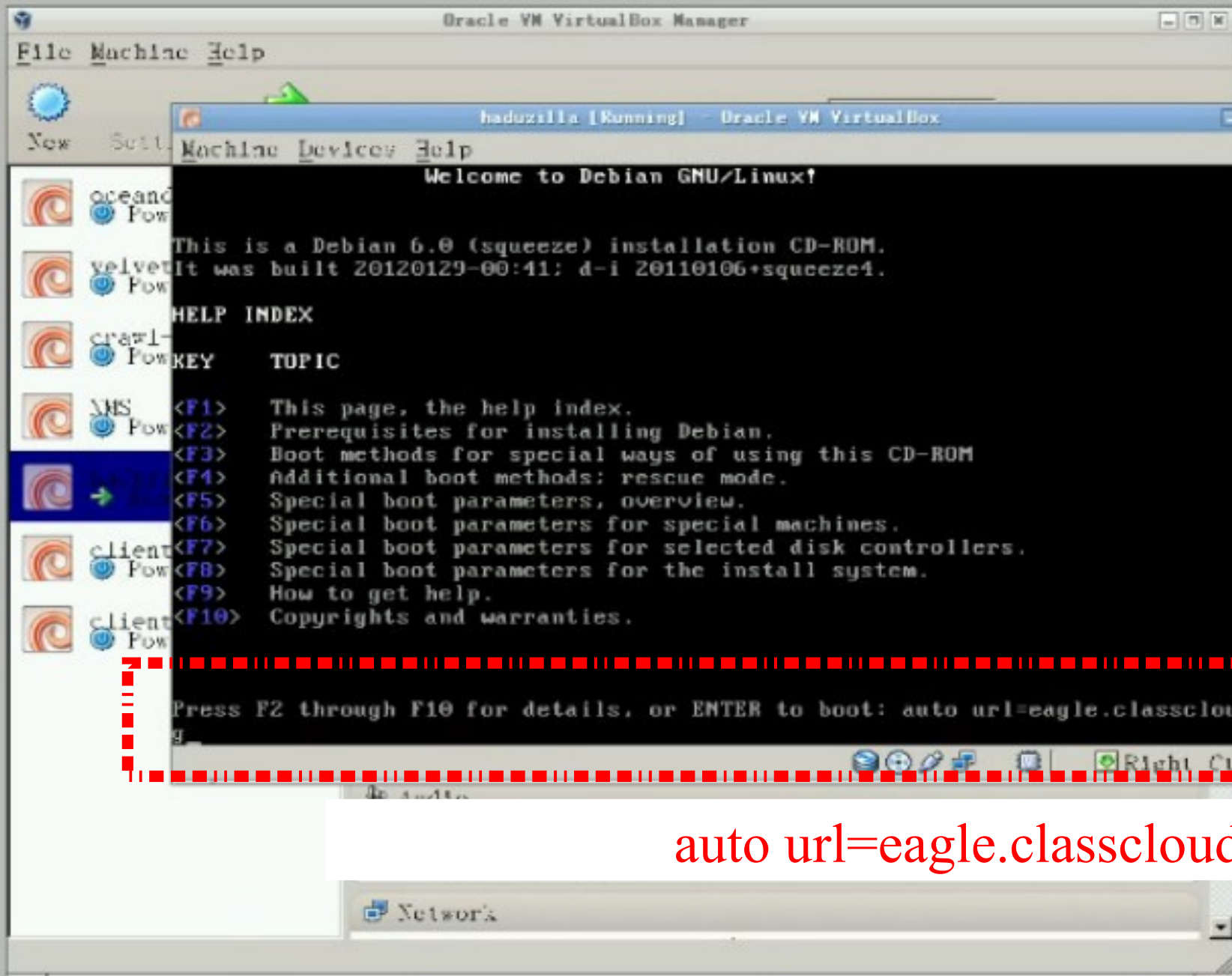
10.0.0.254

eth0

192.168.125.5



**Debian
netinst
CD**



[auto url=eagle.classcloud.org](http://eagle.classcloud.org)

File Machine Help



New

Settings

Machine Devices Help

oceanic
Powervelvet
Powercrawling
PowerMMS
Powerclient
Powerclient
Powerclient
Power

haduzilla [Running] - Oracle VM VirtualBox

[!] Configure the network

From here you can choose to retry DHCP network autoconfiguration (which may succeed if your DHCP server takes a long time to respond) or to configure the network manually. Some DHCP servers require a DHCP hostname to be sent by the client, so you can also choose to retry DHCP network autoconfiguration with a hostname that you provide.

Network configuration method:

Retry network autoconfiguration
Retry network autoconfiguration with a DHCP hostname
Configure network manually

Do not configure the network at this time

<Go Back>

<Tab> moves; <Space> selects; <Enter> activates buttons



Right Ctrl

File Machine Help



New

Settings

Machine Devices Help

haduzilla [Running] - Oracle VM VirtualBox



ocean Power



velvet Power



crawling Power



MMS Power



Client Power



client Power



client Power

[!] Configure the network

The IP address is unique to your computer and consists of four numbers separated by periods. If you don't know what to use here, consult your network administrator.

IP address:

192.168.125.5

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



Right Ctrl

File Machine Help



New

Settings

Machine Devices Help

haduzilla [Running] - Oracle VM VirtualBox



ocean Power



velvet Power



crawling Power



MMS Power



Client Power



client Power



client Power

[!] Configure the network

The netmask is used to determine which machines are local to your network. Consult your network administrator if you do not know the value. The netmask should be entered as four numbers separated by periods.

Netmask:

255.255.255.0

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



Right Ctrl

File Machine Help



New

Settings

Machine Devices Help

haduzilla [Running] - Oracle VM VirtualBox



ocean Power



velvet Power



crawling Power



MMS Power



Client Power



client Power



client Power

[!] Configure the network

The gateway is an IP address (four numbers separated by periods) that indicates the gateway router, also known as the default router. All traffic that goes outside your LAN (for instance, to the Internet) is sent through this router. In rare circumstances, you may have no router; in that case, you can leave this blank. If you don't know the proper answer to this question, consult your network administrator.

Gateway:

192.168.125.254

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



Right Ctrl

File Machine Help



New Settings

Machine Devices Help

haduzilla [Running] - Oracle VM VirtualBox



ocean Power



velvet Power



crawling Power



VMS Power



client Power



client Power



client Power

[!] Configure the network

The name servers are used to look up host names on the network. Please enter the IP addresses (not host names) of up to 3 name servers, separated by spaces. Do not use commas. The first name server in the list will be the first to be queried. If you don't want to use any name server, just leave this field blank.

Name server addresses:

3.8.8.8

<Go Back>

<Continue>

<Tab> moves; <Space> selects; <Enter> activates buttons



Right Ctrl


```
Machine Device Help
Checking initscripts... installed.
Checking tftpd-hpa... installed.
Checking nfs-kernel-server... installed.
Checking nis... installed.
Checking curl... installed.
Checking lftp... installed.
Checking iptables... installed.
Checking libdigest-sha1-perl... installed.
Checking memtest86+... installed.
Checking ntfs-3g... installed.
Checking clonezilla... installed.
Checking mkswap-uuid... installed.
Checking partclone... installed.
Checking drbl-chntpw... installed.
Checking mkpxenitrd-net... installed.
Checking ipxe... installed.
Checking freedos... installed.
Checking udev... installed.
*****
*****
*****
Installing kernel for clients... ..
The kernel for client is copied from server.
Installing kernel 2.6.32-5-686 for clients...
It might take several minutes to install this kernel, please be patient... ..
```

- File Machine Settings
- New Settings
- oceancb Powered
- velvet Powered
- crawl-dev Powered
- MMS Powered
- client1 Powered
- client2 Powered

(48.00 MB)	
SATA Controller	
SATA Port 0:	haduzilla.vdi (Normal, 10.00 GB)
Audio	
Host Driver: ALSA Audio Driver	
Controller: ICH AC97	
Networks	


```
Machine Devices Help
Syncing /lib/modules/2.6.32-5-686 to client's common root...
Syncing /boot/*-2.6.32-5-686* to client's common root...
Generating the /tftpboot/node_root/lib/modules/2.6.32-5-686/modules.dep
Syncing /lib/firmware/ to client's common root...
Copying the directory /etc/ to clients common root /tftpboot/node_root...
Cleaning the ssh key file ssh_host_dsa_key copied from server... done!
Cleaning the ssh key file ssh_host_dsa_key.pub copied from server... done!
Cleaning the ssh key file ssh_host_rsa_key copied from server... done!
Cleaning the ssh key file ssh_host_rsa_key.pub copied from server... done!
Commenting the TCPWrapper related file /tftpboot/node_root/etc/hosts.deny copied
from server... done!
Commenting the TCPWrapper related file /tftpboot/node_root/etc/hosts.allow copie
d from server... done!
Warning! Unable to find the fine-tune file /opt/drbl/setup/files/DBN/DBN6.0.5/fi
rstboot.DBN6.0.5.drbl, use /opt/drbl/setup/files/DBN/firstboot.default-DBN.drbl
as /etc/init.d/firstboot for DRBL clients!
This may cause some problems to DRBL clients!
The startup services for DRBL client are:
firstboot portmap nis nfs-common ssh dbus kbd acpid drblthincli mkswapfile arm-w
ol sendsigs umountfs
Using udev for clients... The default display manager is NOT found! We can NOT s
et text or graphic mode for Debian DRBL client.
Deleting the accounts (except root) in the clients common root template... done!
Enabling the NIS client in the common root template... done!
Creating some necessary files in the clients common root template.....
Right Ctrl
```

SATA Controller (48.00 MB)
SATA Port 0: haduzilla.vdi (Normal, 10.00 GB)

Audio
Host Driver: ALSA Audio Driver
Controller: ICH AC97

Networks

- File Machine
- New Settings
- oceanCb Powered
- velvet Powered
- crawl-Cev Powered
- MMS Powered
- client1 Powered
- client2 Powered

```

Machine Device Help
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-192 10.0.0.92... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-193 10.0.0.93... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-194 10.0.0.94... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-195 10.0.0.95... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-196 10.0.0.96... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-197 10.0.0.97... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-198 10.0.0.98... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-199 10.0.0.99... Pseudo client is created for DRBL
SSI or clonezilla box mode! done!
Creating DRBL client: debian0-1100 10.0.0.100... Pseudo client is created for DR
BL SSI or clonezilla box mode! done!
Template client for DRBL SSI, Clonezilla box mode or Clonezilla live client is 1
0.0.0.1
Using template host /tftpboot/nodes/10.0.0.1
Generating SSH host keys for client 10.0.0.1 if they do not exist... done!
Generating the files for DRBL single system image template... root... etc... var
    
```

(48.00 MB)

SATA Controller
SATA Port 0: haduzilla.vdi
(Normal, 10.00 GB)

Audio
Host Driver: ALSA Audio Driver
Controller: ICH AC97

Networks

- General
- System
- Display
- Storage
- Audio
- Network**
- Serial Ports
- USB
- Shared Folders

Network

Adapter 1 | Adapter 2 | Adapter 3 | Adapter 4

Enable Network Adapter

Attached to: Bridged Adapter

Name: tap0

Advanced

Adapter Type: PCnet-FAST III (Am79C973)

Mac Address: 086027F28189

Cable connected

Port Forwarding

Select a settings category from the list on the left-hand side and move the mouse over a settings item to get more information.

OK Cancel Help

File Machine Help

New Settings

- oceanic Power
- velvet Power
- crawfish Power
- VMS Power
- haduzilla *Running*
- client1** *Running*
- client2 Power

Machine Devices Help

DRBL (<http://drbl.nchc.org.tw>, <http://drbl.sf.net>)

Debian 6.0.5 Linux (DRBL mode, mostly local resources)

Local operating system (if available)

Memory test using Memtest86+

Press [Tab] to edit options

Automatic boot in 7 seconds...

- DRBL version: 1.10.99-1drbl. (C) 2003-2012, NCHC, Taiwan
- Disclaimer: DRBL comes with ABSOLUTELY NO WARRANTY

DRBL

Free Software Labs NCHC, Taiwan
 自由軟體實驗室 國家高速網路與計算中心



Ctrl

USB

Show me the Source Code !

<http://eagle.classcloud.org/d-i/squeeze/>

New versions will be at github ...

<http://github.com/jazzwang>

使用 DRBL 與 Clonezilla 佈署資料探勘 Hadoop 環境

PART 1 :

從雲端、巨量資料趨勢談為何學 Hadoop

PART 2 :

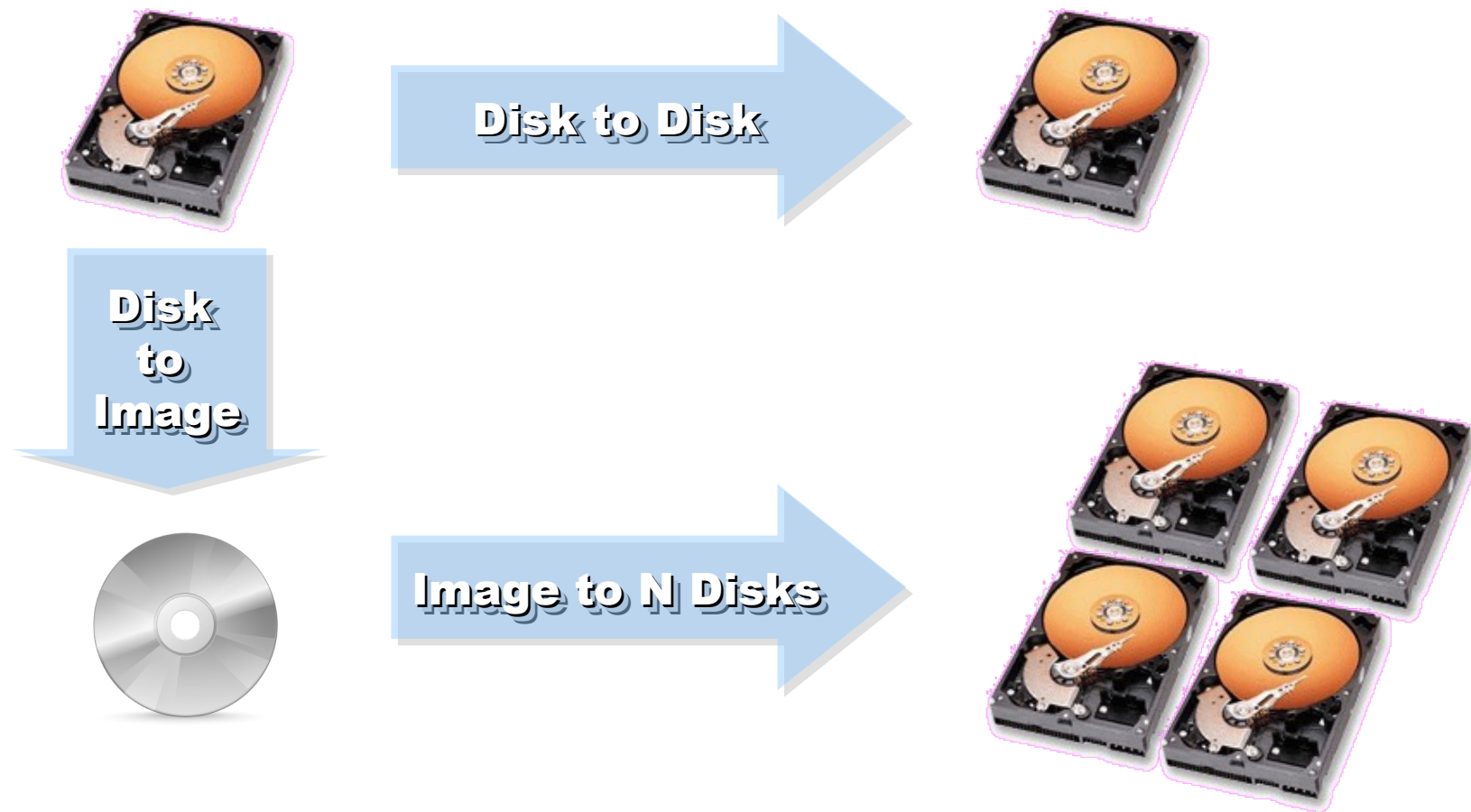
運用企鵝龍佈署資料探勘平台的經驗分享

PART 3 :

運用再生龍從小硬碟搬家到大硬碟

何謂再生龍 Clonezilla ??

- **Clone** (複製) + **zilla** = **Clonezilla** (再生龍)
- 裸機備分還原工具
- **Norton Ghost** 的自由軟體版替代方案
- <http://clonezilla.nchc.org.tw> , <http://clonezilla.org>



您也用得上的再生龍功能！！

我要怎樣才能把小一點的硬碟複製到大一點的硬碟上？

http://drbl.nchc.org.tw/fine-print.php?path=./faq/1_DRBL_common/34_resize.faq#34_resize.faq

```
國網中心自由軟體貢獻至 - 臺灣生龍額外的進階參數 | 模式: testofe-disk |
設定進階參數(可複選)。如果你不知道選用哪些的話，建議你就保留預設值，不要修改任何選項，直接按
Enter。(使用空白鍵來標示你的選擇，被標示選到的部份會出現星號(*))

[*] -g auto 用戶端重新安裝grub開機管理程式(找到grub設定檔才會執行)
[*] -e1 auto 如果NTFS開機分割區存在，自動調整檔案系統的CHS值
[*] -e2 用戶端執行sfdisk時強迫使用EDD的硬碟CHS值(用於非grub開機管理程式)
[*] -x 在群播還原時使用全雙工網路
[ ] -hn0 PC 復原後修改用戶端硬碟中的MS win主機名稱(基於IP位址)
[ ] -hn1 PC 復原後修改用戶端硬碟中的MS win主機名稱(基於MAC位址)
[ ] -v 顯示詳細資訊(尤其是udpcast的訊息)
[ ] -nogui 只顯示文字結果，不用圖形顯示結果，
[ ] -c 用戶端電腦在開始複製前會再次確認是否要執行
[ ] -u 在用戶端的電腦選擇印象檔來還原(只適用點播還原)
[ ] -t 用戶端電腦不再復原MBR(Master Boot Record)
[ ] -t1 用戶端電腦使用syslinux提供的bootloader(僅適用於Windows)
[*] -r 嘗試在用戶端調整檔案系統符合分割區大小
[ ] -ns ntfsclose執行時，暫存檔放在伺服器印象檔目錄中
[ ] -e 用戶端電腦執行sfdisk時強迫使用印象檔中的硬碟CHS值
[ ] -icrc 略去執行partclone時的CRC檢查
[ ] -j1 印象檔回存完畢後，再度回復MBR(512 bytes)(不適用分割區大小不同於印象檔中的)
[*] -j2 複製介於MBR與第一個分割區中的隱藏資料

<確定> <取消>
```



Questions?

Slides - <http://trac.nchc.org.tw/cloud>

Jazz Wang
Yao-Tsung Wang
jazz@nchc.org.tw

