connect your device to application

軟體又熱又平又擠

淺談開放原始碼軟體衝擊下的新思維

Jim Huang (黃敬群) "jserv"
Blog: http://blog.linux.org.tw/jserv/

成功大學資訊工程系 / Dec 23, 2011

Rights to copy

http://0xlab.org/

contact@0xlab.org

Corrections, suggestions, contributions and translations are welcome!

Latest update: Dec 23, 2011

軟體：熱

先看一段影片

Pranav Mistry 是 MIT Media Lab 的博士候選人及研究助理，為穿戴式姿勢感應界面的主要研發人員。加入 MIT Media Lab 前，曾是 Microsoft 的研究員

http://www.youtube.com/watch?v=qC3H3JOtvSs


objects
gestures
那就是動作

objects ~ gestures

我們如何操作物品

objects ~ gestures

如何在日常生活中使用


How can we leverage our knowledge about everyday objects and how we use them to our interaction with the digital world?
我們對日用品和手勢的知識

How can we leverage our knowledge about everyday objects and how we use them to our interaction with the digital world?

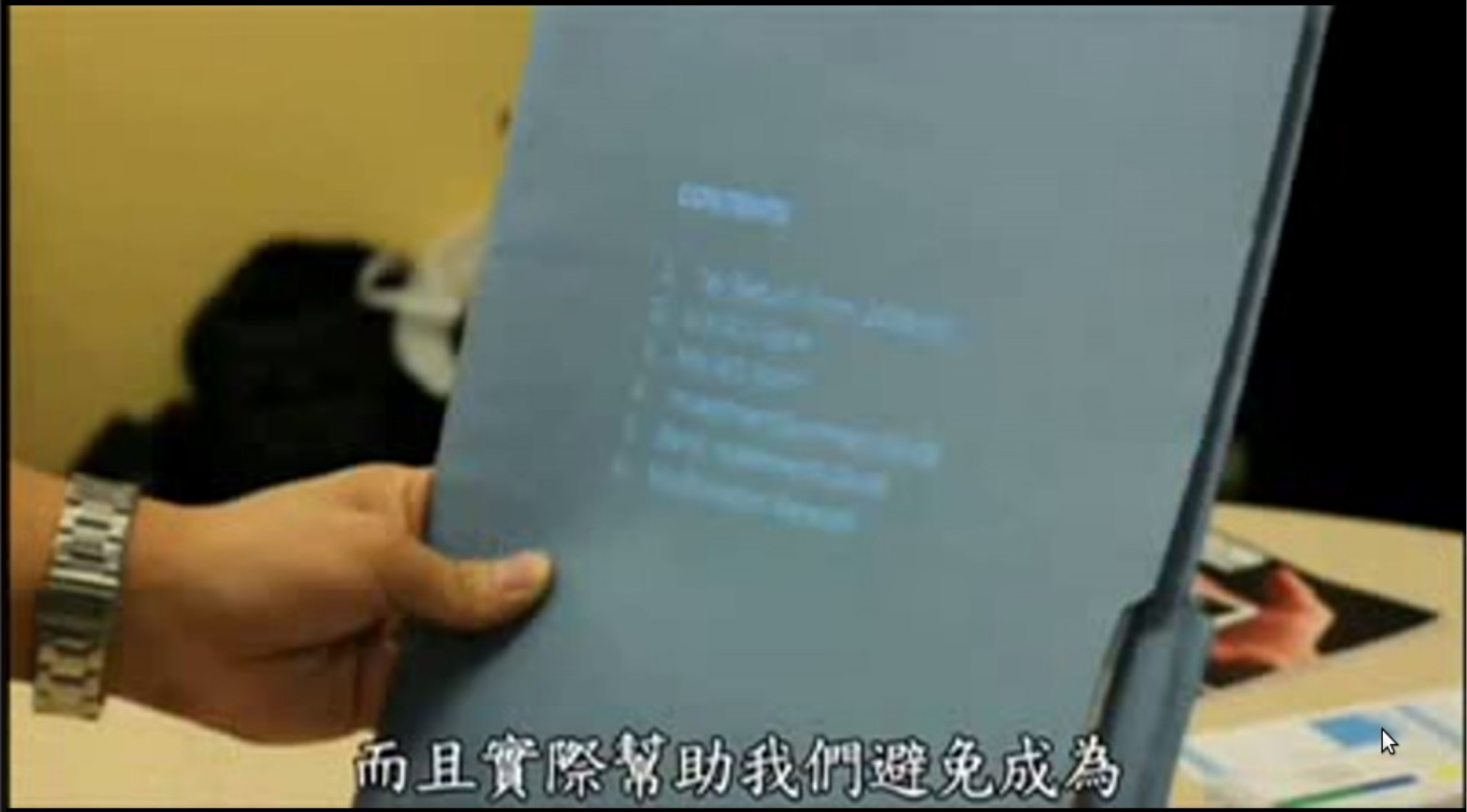
以及東西的使用方式

How can we leverage our knowledge about everyday objects and how we use them to our interaction with the digital world?

可以如何應用在數位世界的互動上


617
835
4030
1
2
3
4
5
6
7
8
9
*
0
現在我用手按電話號碼

你的報紙將顯示即時的天氣變化


而且實際幫助我們避免成為

坐在機器前面的機器

http://www.pranavmistry.com/


我想試著讓更多人能使用這科技


讓任何人都能開發自己的第六感裝置


因為硬體並不難製造

http://code.google.com/p/sixthsense/

自由軟體 / 開放原始碼

（注意：此處不特別強調其分野）

只是將原始程式碼釋出？再看另一段

Johnny Chung Lee 是 CMU 的博士生，被網羅到 Microsoft 作人機介面研發 – Kinect 。代表作： Wii Remote Project
http://johnnylee.net/projects/wii/

Tracking Your Fingers with the Wiimote

Using an LED array and some reflective tape, you can use the infrared camera in the Wii remote to track objects, like your fingers, in 2D space. This lets you interact with your computer simply by waving your hands in the air similar to the interaction seen in the movie "Minority Report". The Wiimote can track upto 4 points simultaneously. The multipoint grid software is a custom C# DirectX program.

Software

To run the grid program you see in the video:

1. First, follow this walkthrough on using the wiimote with C#. You may need to download a copy of Visual C# Express to compile/run this sample if you don't have it yet.

2. Download a copy of the DirectX SDK. You may not need this to simply run the sample grid program, but you will need it if you want to make any changes to it.

3. Download the Wiimote Multipoint Grid sample program. Make sure your wiimote is connected via bluetooth, and then run the ".exe" shortcut in the main folder.

A visit to this project's **FAQ and Advanced Discussion** post may be very englightening. You may also find the official discussion forums for my wiimote projects helpful: **WiimoteProject.com**

Low-Cost Multi-point Interactive Whiteboards Using the Wiimote

Since the Wiimote can track sources of infrared (IR) light, you can track pens that have an IR led in the tip. By pointing a wiimote at a projection screen or LCD display, you can create very low-cost interactive whiteboards or tablet displays. Since the Wiimote can track upto 4 points, up to 4 pens can be used. It also works great with rear-projected displays.

Software
The calibration and mouse cursor emulation software is available for you to download and try yourself. Note: My mouse emulation code isn't perfect. If any of you are programmers and can get it working with Alias Sketchbook, drop me a line.
1. Connect your wiimote to your PC via Bluetooth. There are a number of tutorials online on how to do this, possibly even for you specific software/hardware configuration. The Wiimote works with many (but not all) Bluetooth drivers. You can report/read about compatibility issues at **WiimoteProject.com**
2. Download the Wiimote Whiteboard software to the right. Please read the "READ ME.txt" file first! Make sure your wiimote is connected via Bluetooth, and then run the ".exe" in the main folder. NOTE: Good placement of the wiimote is key to good tracking. View the README for more info.

Multitouch: The multitouch demos are custom C# DirectX programs. You may download the sample program to the right, but this is provided for developers without support or documentation. The code is built on top of this Wiimote library. Unfortunately, multi-touch capable applications are currently extremely rare. Hopefully, that will change as more developers explore its potential.

Building pens: Here is a simple schematic of the light pen. The LEDs that I use are Vishay TSAL6400s running at 100mA, but lots of other LEDs will work too. You also might be able to jump start your experimentation by retro-fitting a mini keychain light with an IR LED. I'm currently looking into manufacturing and selling IR pens, but this may take several months.

Mac/Linux Versions: Due to personal time contraints, I probably won't be able to make a port myself. But fairly mature versions are available online. However, I haven't tried them myself. I've also created a Source Forge Project - Wiimote Whiteboard, but it does not seem to be getting much love.

A visit to this project's **FAQ and Advanced Discussion** post may be very englightening. You may also find the official discussion forums for my wiimote projects helpful: **WiimoteProject.com**

Downloads:
Windows (32-bit)
Wiimote Whiteboard* (original 12/19/07) - includes source
Wiimote Whiteboard v0.2* (updated 3/27/08) - includes source
Wiimote Whiteboard v0.3* (updated 8/20/08) - includes source

* there appear to be some issues with 64-bit machines, and BlueSoleil. Alternative Bluetooth software may work. Check the forum for more info.

Mac (Java)
You can do a quick webserach or try the version created by *uweschmidt* which is a fairly mature Java-based version for Mac.

Multitouch:source code

Fun software (mostly free) to try with this:
Mapping software: Microsoft Virtual Earth, Google Earth
Physics simulation software: Phun
Virtual Tourism: Photosynth
Media Browsing: CoolIris
Painting progams: Alias Sketchbook Pro
Note taking:One Note
Handwritting recognition: Windows Tablet PC Edition - works great if you have it, not a stand alone program to install.

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Virtual Tourism: Photosynth
Media Browsing: CoolIris
Painting progams: Alias Sketchbook Pro
Note taking:One Note
Handwritting recognition: Windows Tablet PC Edition - works great if you have it, not a stand alone program to install.

很快就出現 Linux 的移植版本

linux-whiteboard

Linux electronic whiteboard

Search projects

Summary | Updates | People

Linux electronic whiteboard

This is an effort to make a GNU/Linux port of the program seen here.

We plan to enhance the usability of the program, and make it stable enough for everyone to use, on any GNU/Linux distribution.

Code license: GNU General Public License v2

Featured downloads: Show all

whiteboard_0.3.4-0ubuntu1_amd64.deb

whiteboard_0.3.4.2-0ubuntu1_i386.deb

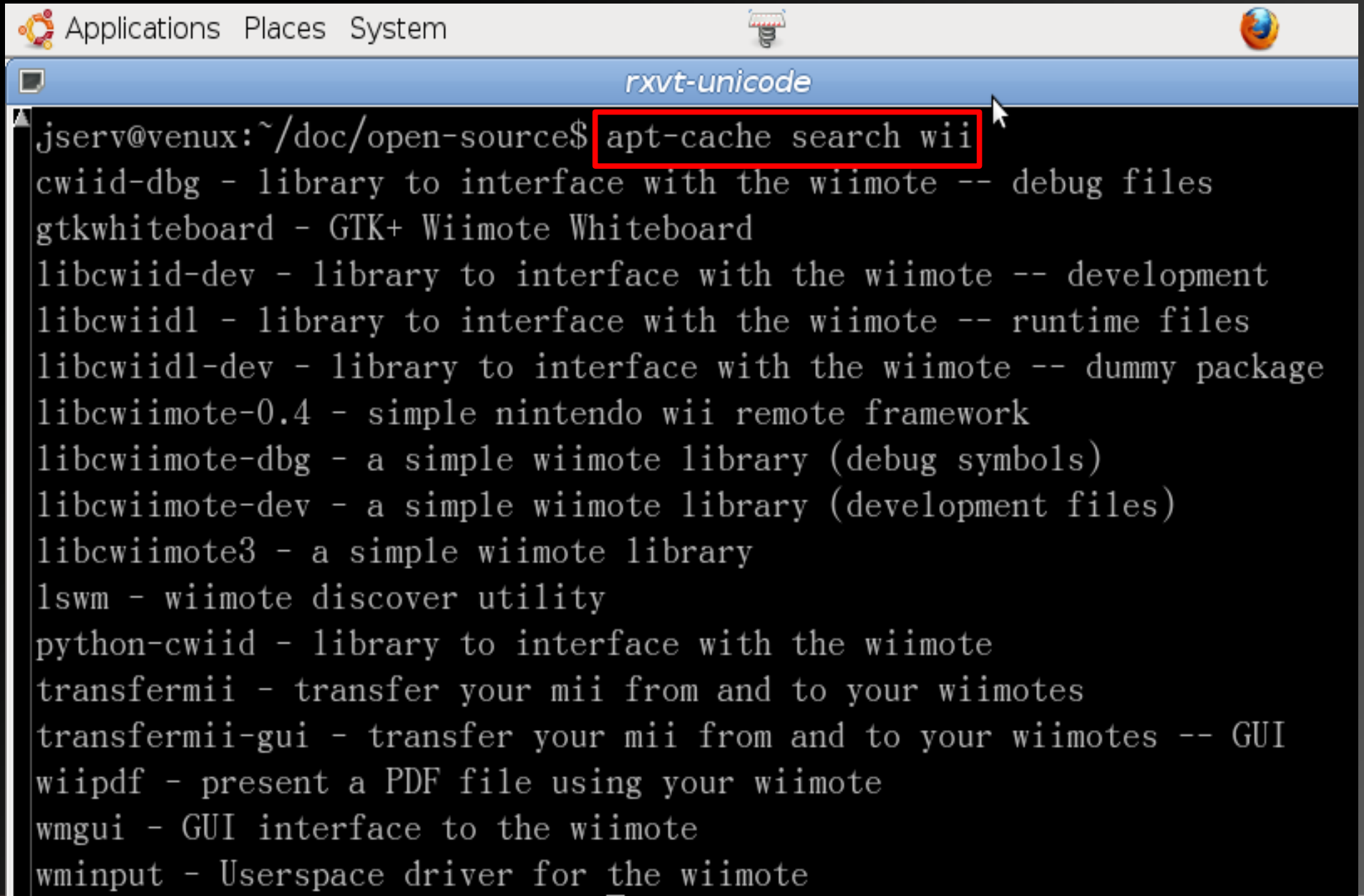
whiteboard_0.3.4.2-2ubuntu3_i386.deb

Feeds: Project feeds

Project owners: People details

pere.negre,
vanhtu1987

圍繞在 Wii 相關的函式庫與程式套件都出現了，而且同樣開放原始碼



Globalization

Scale

世界正在改變 . . . Complexity

Security

Energy

世界正在**快速改變**...

Globalization

Scale

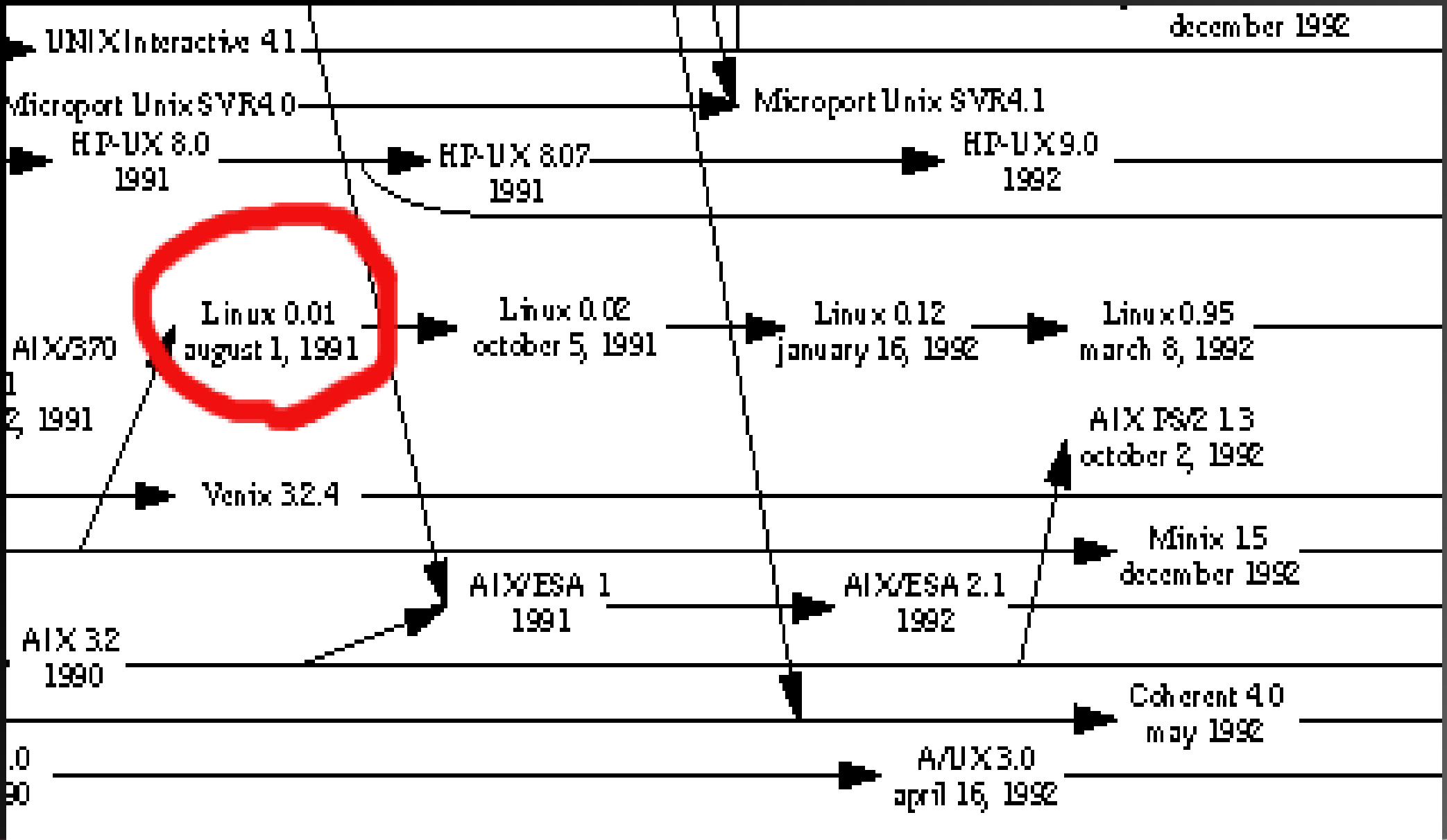
Complexity

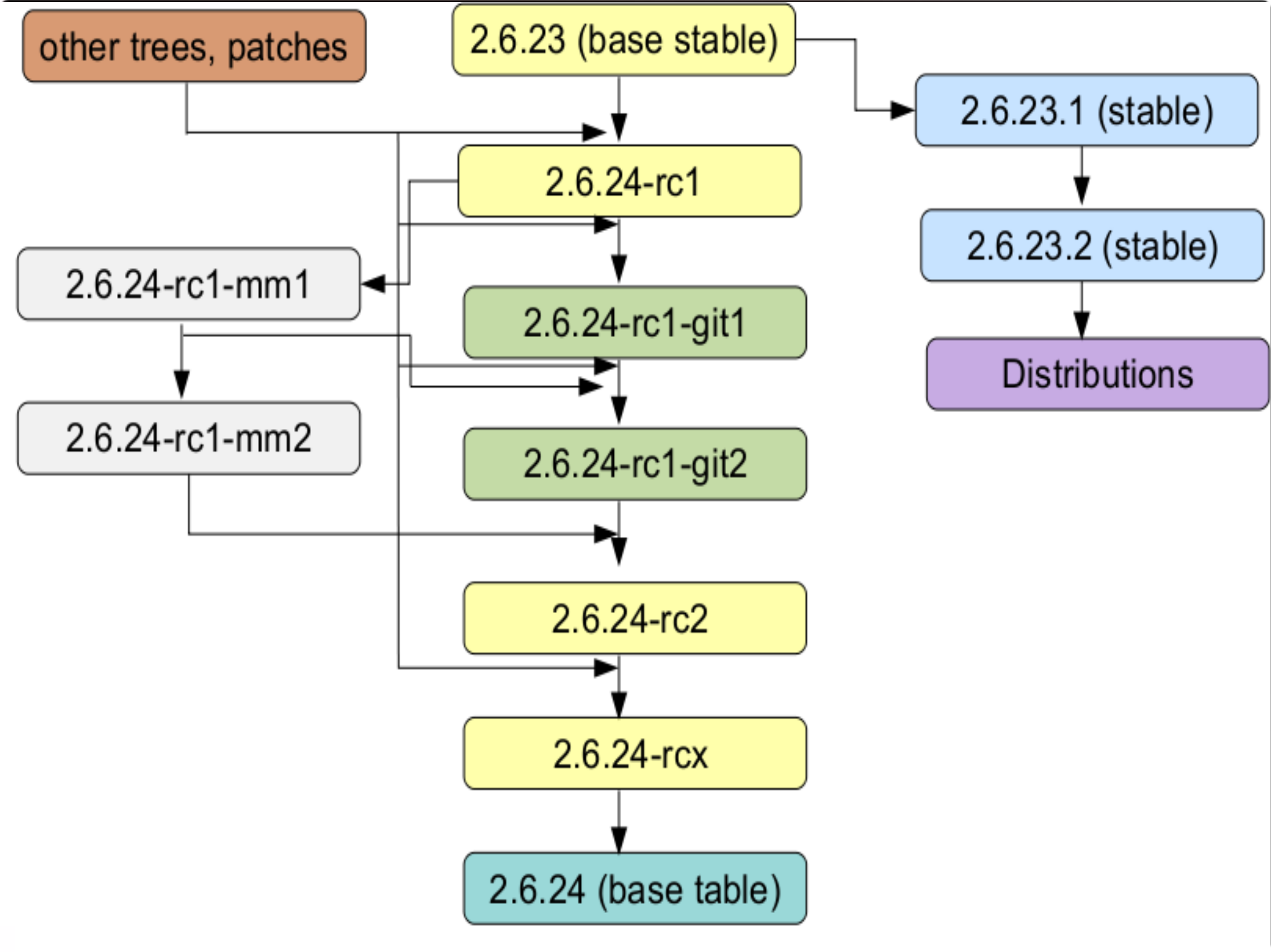
Security

Energy

芬蘭赫爾辛基大學生 Linus Trovards 於 1991 年新間組群發表所寫的 386/486 PC 用的作業系統 Linux

指標性的自由軟體




other trees, patches
2.6.23 (base stable)
2.6.23.1 (stable)
2.6.24-rc1
2.6.23.2 (stable)
2.6.24-rc1-mm1
2.6.24-rc1-git1
Distributions
2.6.24-rc1-mm2
2.6.24-rc1-git2
2.6.24-rc2
2.6.24-rcx
2.6.24 (base table)

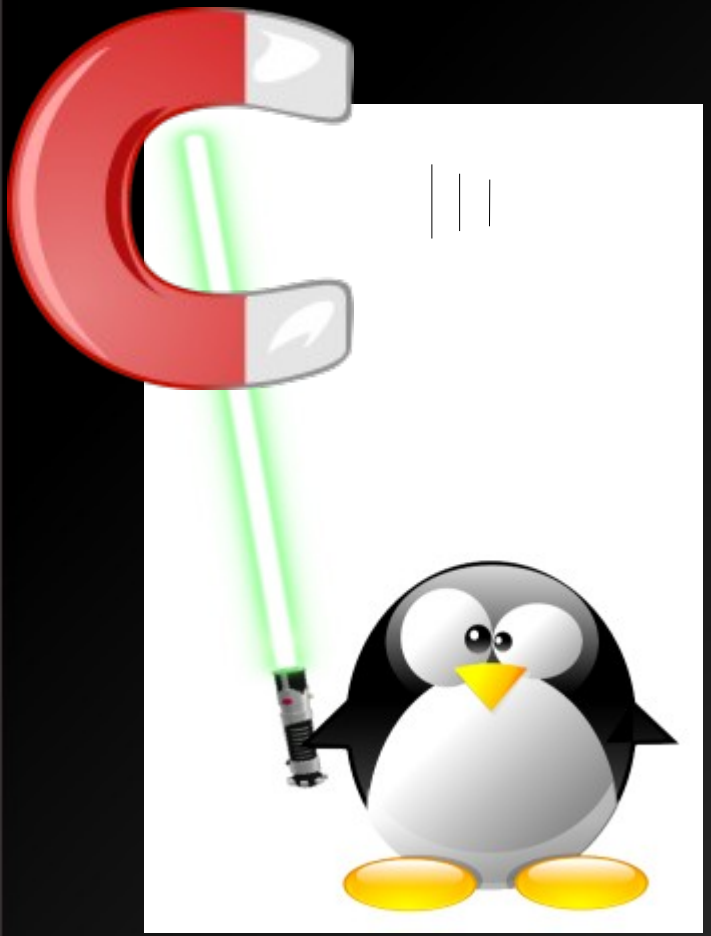
思維

Linux 不只是作業系統核心

- Free Software (Kernel:GPL)
- **創新**的引入 – No black box
- **活躍**的開發社群

伴隨**關鍵**的軟體元件

- GNU Tools
- GNU C Library, uClibc, dietlibc, ...
- busybox
- HTTP server/daemon
- ...



Use the Source, Luke!

Many resources and tricks on the Internet find you will, but solutions to all technical issues only in the Source lie.

Thanks to LucasArts

- Linux 的力量
  - 不僅有 source
  - 而且源源不絕

自由軟體 / 開放源碼本質

虛幻

Linux kernel 開發種種「傳說」

- 平均以每小時 **85.6 行** 的速度增加
- 2.6.24 版本爲例，每小時 **7 次** 更動
- 資料來源：
  - Linux Kernel Development - How Fast it is Going, Who is Doing It, What They are Doing, and Who is Sponsoring It- Greg Kroah-Hartman , OLS-2007.
  - http://tree.celinuxforum.org/gitstat/index.php

自由軟體 / 開放源碼本質

現實

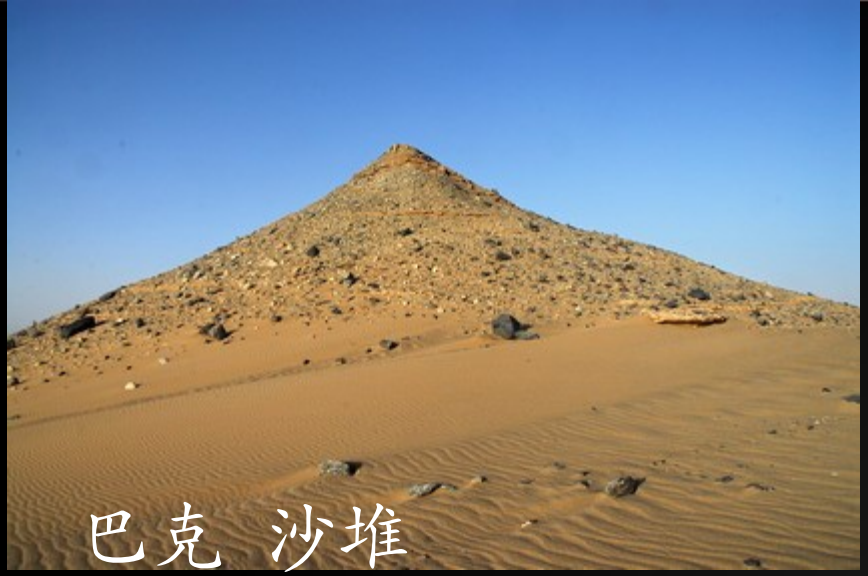
- Linux Kernel 有眾多全職開發者
  - Linux Foundation (前 OSDL)、 IBM、 RedHat、 Novell、 Google、 ...
- 《第五項修煉》 (by Peter Senge)：
  - 「透過**學習**，我們能做到以前從未做到的事情，重新認知這個世界及我們跟它的關係，以及擴展到**創造未來的能量**。」

自由軟體 =
學習與實踐 +
創造未來的力量

軟體：平

「倘若量子物理沒能讓你大吃一驚，那就表示你不了解它」

Bohr



巴克 沙堆

沙子在自行堆成小錐的初期階段後，會自動變成不穩定狀態，再加上一粒沙子就可能引發大崩塌，或者，根本沒事

http://content.edu.tw/junior/earth/tn_gz/experment/exp895313e.htm

http://xxyyll0001.blog.qhnews.com/article/119156.shtml

自由軟體精髓

社群

Community!

軟體的本質

- 軟體的工業
  - 產品應用與類型
  - 快速獲利
- 軟體的工藝
  - Problem Solving
  - 知識的累積

軟體工業的典型

「包裝」

開發華麗的介面刺激消費

提昇硬體需求以誘使系統升級迴圈

- 以專有技術與格式提高競爭門檻
- 企業惡性競爭
- 廣告包裝與行銷

軟體工藝的典型

「眞善美」

講求問題的（眞正）解決

威力強大但不以華麗爲優先考量

- Hacker/Geek 文化的復興
- 軟體工業的反動
- 自由軟體與社會運動

太抽象了？
繼續看故事

台北 101 大樓
高度： 508 公尺
工程結構設計的典範

http://i.timeinc.net/popsci/images/bown2004/engin_taipei485x569.jpg

創世界紀錄的 101 大樓

具備 67 台電梯，世界上升最快的電梯

採用世界最大的風阻尼器

坐落於地震斷層帶、颱風頻繁區正中央

師法「竹」的剛柔並濟

• • •

台 北 商 業 新 地 標

巍巍高樓與抽水馬桶 (?!)

http://www.taipei-101.com.tw/ch/Tower/index_tower.asp

思考

「台灣是全球十八個缺水國之一，按一下抽水馬桶就用掉九至十二公升水，洗一次衣服要用掉卅幾公升水，用水要儘量節省」
馬總統，2008-12-20

物理計算

質量：9公升 x 1 (水，密度)

理論來說，重物從無限高空自由落體，不計空氣阻力，由能量守恆可知

- $mgh = \frac{1}{2} mv^2$
- 所以：$v^2 = 2gh$ $v = 98.99(m/s)$
- $P = mv$

概念

不懂抽水馬桶原理，也要知道
水往哪裡流

不懂建築理論，也該知道
自己身處於多複雜的環境

破壞性技術

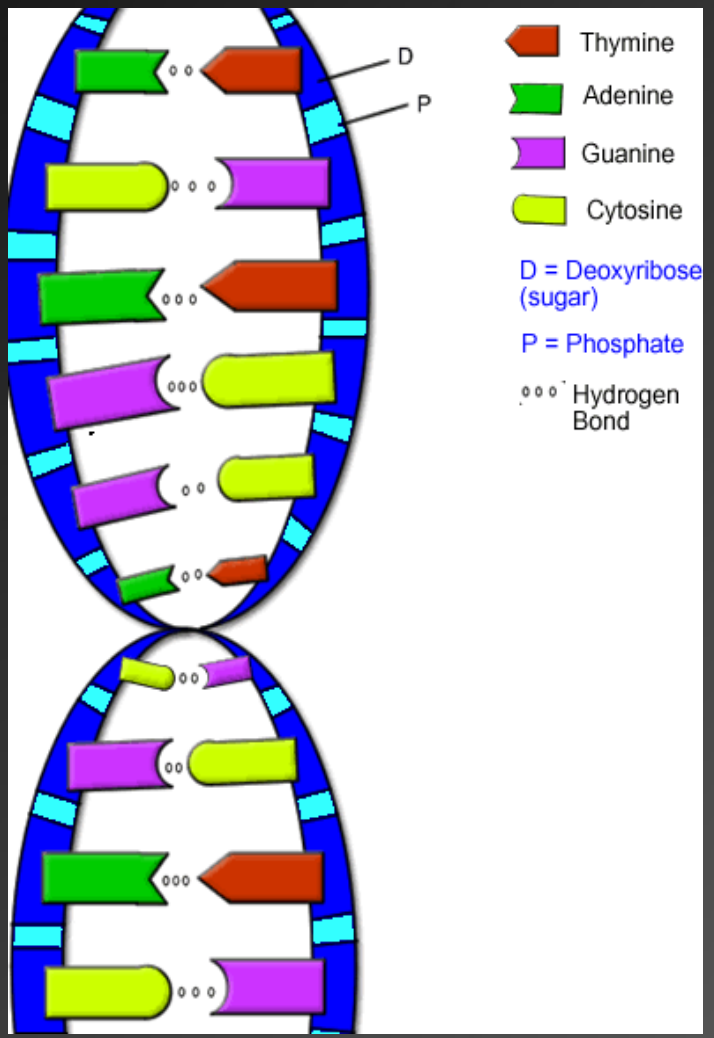
- 由經濟學家 **Clayton Christensen** 提出
- 《**創新的兩難**》(The Innovator's Dilemma)
  - 當小型系統取代大型機器
  - 工作站和伺服器取代小型系統
  - Wintel 取代傳統 Unix 工作站

- Free Software 與 Open Source Software 獲得成功正是由於大衆化
  - 新興技術最終可能擊垮業界巨擘
  - 必須採納**低價但靈活**的方案

破壞性技術

- 傳統 **Unix** 採用公司組織、財務和市場等命令機制
  - 封閉
  - 愚蠢
- 具有創造力「黑客」 (Hacker) 把我們從愚蠢中拯救出來
  - 專業
  - 奉獻

美國 James Watson 和 Francis Crick 於 1952 年根據富蘭克林 DNA X 光晶體繞射圖，提出 DNA 分子的雙螺旋模型（1962 年獲諾貝爾獎）



《世界是平的》

- **Thomas L. Friedman** 的暢銷書

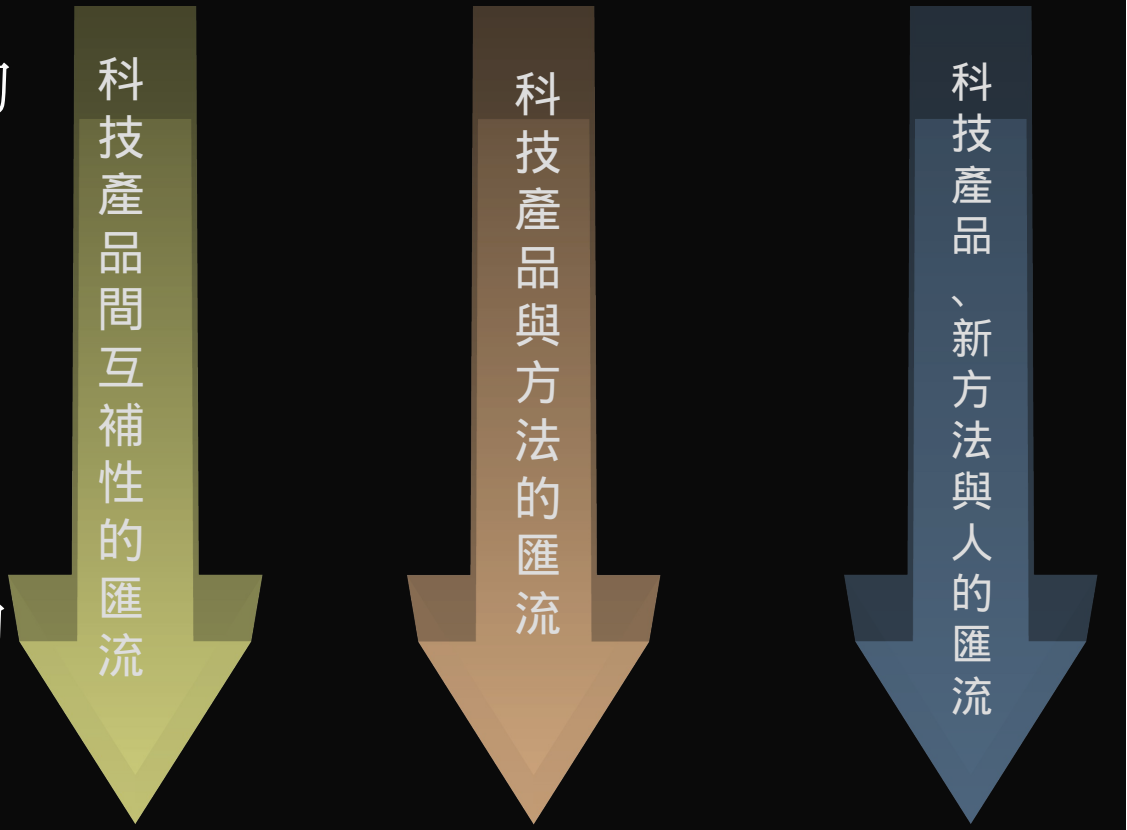
「只要有寬頻，只要有雄心，不管你在哪裡，都不會被邊緣化。因為，競爭的立足點變平等了，**小蝦米和大鯨魚可以平起平坐了。**」

「拜科技之賜，即使在家裡開一個工作室，一個人也可以和大企業搶生意。同樣的，大企業也可以比小公司更靈活，更細膩。從前做夢都沒想到的，今天不只變可能，甚至是必要了。」

全球化！

《世界是平的》

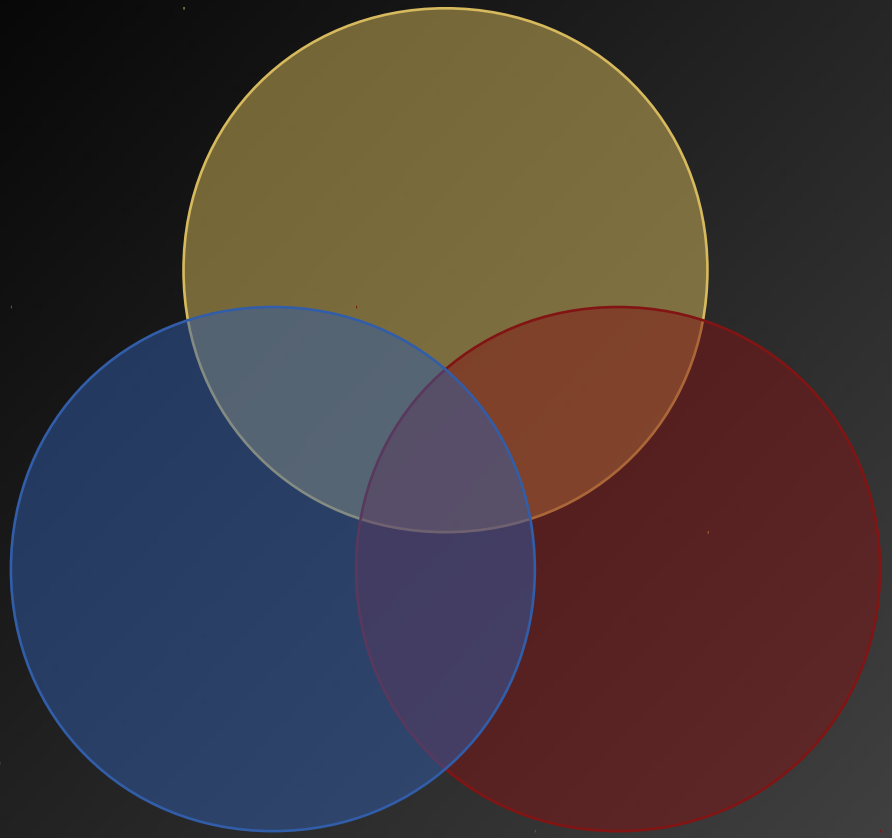
- 全球化三大時期
  - **1.0**：由國家的國力推動
  - **2.0**：由企業來推動
  - **3.0**: 推動力是來自個人
    - 「在網際網路上，沒人知道你是一隻狗」
    -
    - Hacker/Geek 撼動世界的途徑
    - 自由軟體給予新的平台與機會



世界是平的

新的開發典範

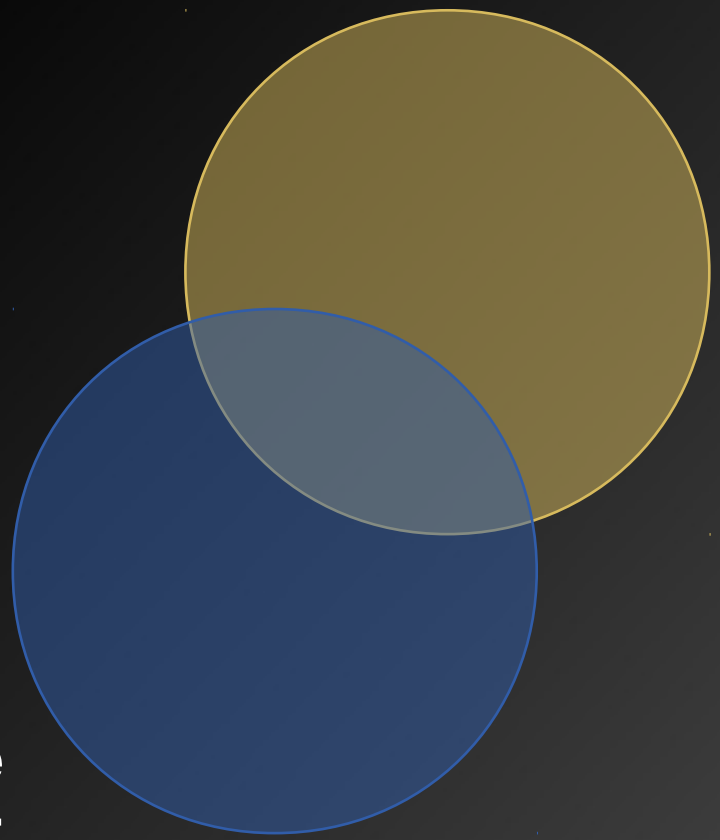
Open Source



Collaborative Development

Open Standards

新的開發典範



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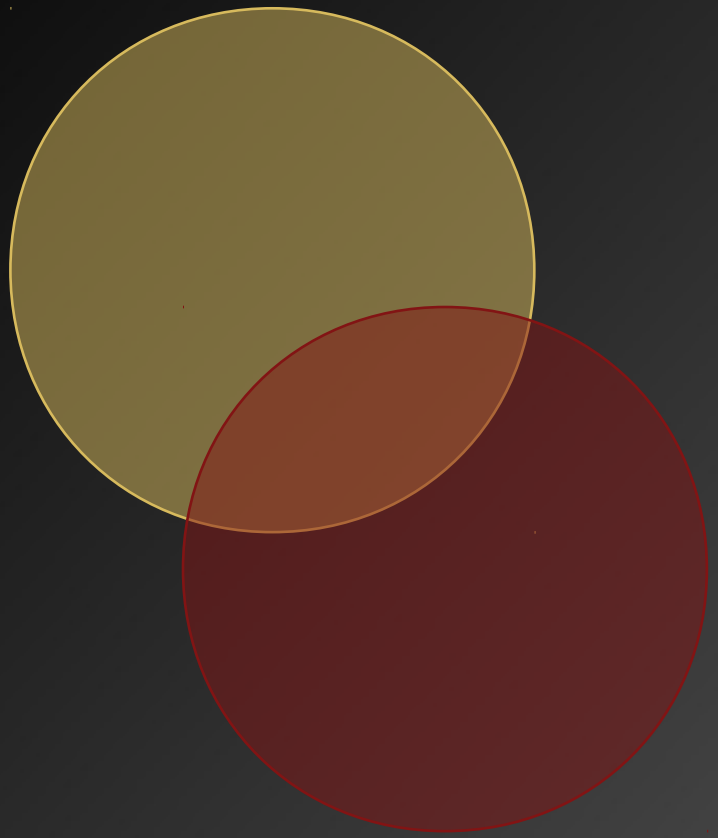
Open Source



Collaborative Development

Open Standards

新的開發典範

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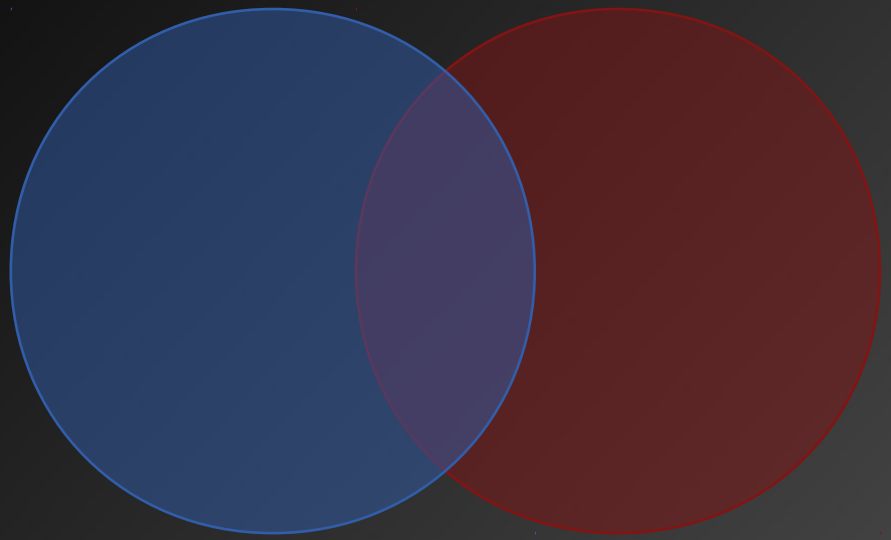

Collaborative Development

Open Standards

Open source

- Open membership
- Large developer community
- Individuals may decide priorities & projects
- Local development can lead to different versions
- Source code is open for review and change
- Corporate contributions welcome

(商業公司定義的)Community source

- Membership in a community
- Smaller development community
- Priorities established by community
- Locally developed components are compatible
- Source code may be included in commercial products
- Institutional and corporate contributions welcome

Community Development Process

- 主要由 Internet 驅使的開放開發模式
- 頻繁的原始碼釋出 / 套件維護
- 允許任何人檢驗、測試，與正向回饋
- 良性 fork ，並採類似 Web 2.0 的開發模式

Web 1.0 → Web 2.0

DoubleClick	→	Google AdSense
Ofoto	→	Flickr
Akamai	→	Bit Torrent
mp3.com	→	Napster
Britannica Online	→	Wikipedia
Personal Websites	→	Blogging
Publishing	→	Participation
Stickiness	→	Syndication

Code 1.0 → Code 2.0

SourceSafe, CVS, SVN, ...	→	Git, Darcs, hg, ...
library	→	service
framework	→	prototyping
Pay moneyto buy	→	In the form of “Free"
Team work	→	Web-based collaboration
Dead after Release	→	Living in Release
Publishing	→	Participation
Stickiness	→	Syndication

Community Development 成立的前提，軟體要是 . . .

- 廣泛地採用與被需要
- 無差異性
- 程式開發者與使用者的比例，以及核心開發者的質量
- 該項目在技術上有許多可著墨處，並有一定的複雜度

「我們需要的是既可適應世局變化，又可普及爲數百萬人參與，並讓此種變革有益、持久和永續的架構」

《不可思議的年代》

軟體：擠

自由軟體精髓

所謂的自由軟體社群...

其實就周旋於

工業與工藝間

自由軟體在哪裡？

道在便溺

《莊子》

道便是隨心所欲，與萬物之道融爲一體

《老子》：「道可道，非常道；名可名，非常名」

「道」沒有本質，脱離形體的想像和語言的描述

自由軟體
無所不在

先看看裝置 . . .

思考「看不見的電腦」


Cricket Indoor Location
Bluetooth G
Bluetooth
Nokia Symbian 60 Phones
N800 Tablet

The average middle-class American household includes about **40 to 50 microprocessor-based devices**, plus another **10 to 30 for each car** in the garage.

- Jim Turley

no matter how complicated the functions they may perform, the technology used to perform an action is not apparent to the user of the tool. Such tools are **human-centered** not technology centered. **The technology is invisible.**

- The Invisible Computer -

Donald Norman

美國西北大學計算機和心理學教授，Nielsen Norman Group諮詢公司的創辦人之一，曾任蘋果電腦公司先進技術部副總裁

著作包括《The Design of Everyday Things》、《Things That Make Us Smart》和《The Invisible Computer》

- 著作《Emotional Design》强調情感在產品設計中所扮演的重要角色
  - 不僅是幫助企業製造出滿足人們的理性需求
  - 更要滿足情感需求的產品

軟硬體設計複雜度
急遽提昇的今日

終日陷入 Technology-centered 的迷失

科技的提出，最初是
Human-centered

自由軟體的契機：站在巨人的肩膀上

Repeat the former steps
And may the source be with you always

WIND RIVER

我們的機會！

結語

- 軟體：又熱又平又擠
  - 熱：軟體在多樣的應用
  - 平：軟體作為破壞性技術
  - 擠：軟體在爆炸性的規模
- 法國小說家雨果：「我們怎麼知道世間萬象的創成，不是由落沙來決定？」
- 生態學家霍林：「在眞正的複雜系統裡，衡量財富的基準不是金錢或權利，而是變革和調適的能力」

送大家兩句話

(1)

「資訊人的本色就是作什麼像什麼」

洪良茂，成大資訊系第一屆畢業生

「老師，我想休學」

黃敬群，成大資訊系第？屆畢業生

(2)

「甘願做牛就不怕沒田可以犁」

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