

Il software libero: genesì, stato e prospettive

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Seminario per Sistemi Operativi – Corso di laurea in Informatica
Università di Padova

I - genesi

tre storie:

1- GNU & FSF

2- Linux

3- Open Source



1963 – Mainframe DEC PDP-6



Sui primi computer il software era distribuito in sorgente, e condiviso in una *comunità* di utenti/sviluppatori.

Con la diffusione dei minicomputer e dei PC (1981): software venduto a parte (UNIX, DOS, CP/M,...), solo in forma eseguitibile per evitare concorrenza, a degli *utenti isolati*.





Richard Stallman, MIT AI lab, USA,

“ci fu impedito di fare cose utili” = aggressione alla libertà

«When the AI Lab bought a new PDP-10 in 1982, its administrators decided to use Digital's nonfree timesharing system instead of ITS»

«The modern computers of the era, such as the VAX or the 68020, had their own operating systems, but none of them were free software: you had to sign a nondisclosure agreement even to get an executable copy»



“Make the world a better place”

1983 *GNU project*: come Unix, ma completamente libero:

Tools: editor (Emacs), compilatore (gcc),

1985 Free Software Foundation (FSF)

GNU General Public License (GPL)

GNU Manifesto

1990 *Kernel*, il nucleo: GNU Hurd: è molto avanzato e più difficile del previsto: blocca il progetto



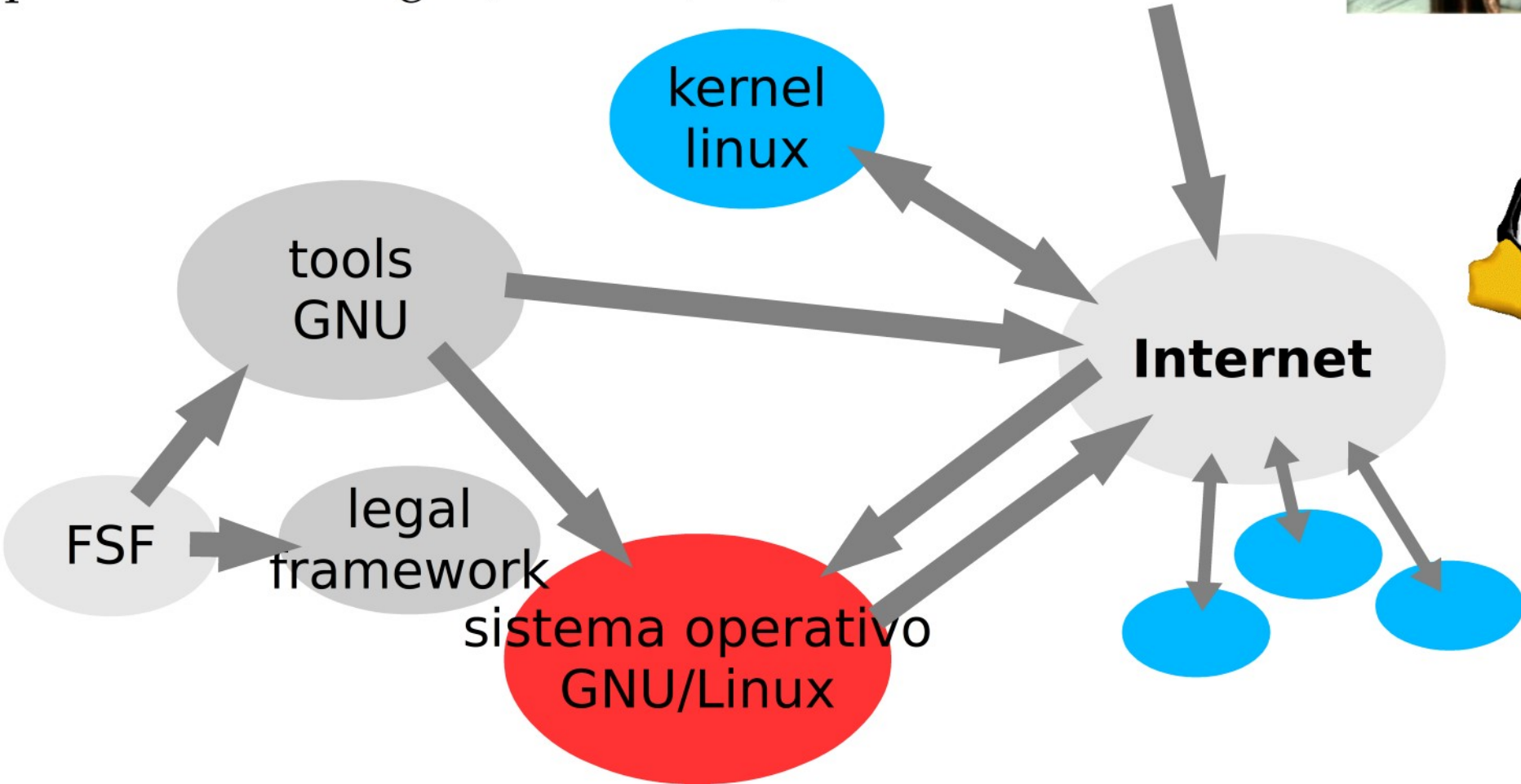
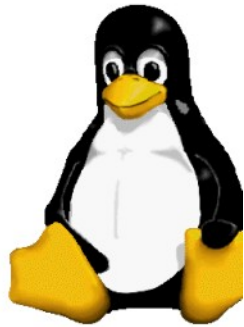
GNU e Le 4 libertà

- 0 Libertà di eseguire il programma, per qualsiasi scopo.
- 1 Libertà di studiare come funziona il programma, e adattarlo alle proprie necessità.
- 2 Libertà di ridistribuire le copie *in modo da aiutare il prossimo*.
- 3 Libertà di migliorare il programma, e distribuirne pubblicamente i miglioramenti, *in modo tale che tutta la comunità ne tragga beneficio*.

Richard M. Stallman, Cambridge MA, 1985

Linus Torvalds, Helsinki University, Finlandia, 25 Ago 1991

"Hello everybody out there using minix - I'm doing a (free) operating system (just a hobby, won't be big and professional like gnu) for 386(486) AT clones..."



functionalities layers

user space interfaces
system calls and system files

virtual

bridges
cross-functional modules

logical
functions implementations

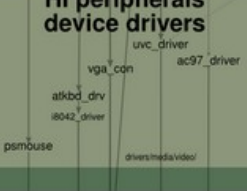
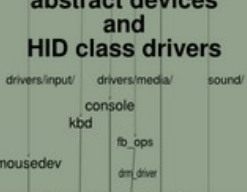
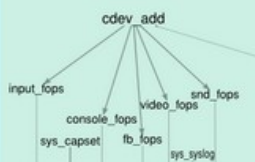
device control

hardware interfaces
drivers, registers and interrupts

electronics

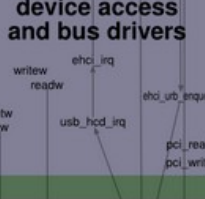
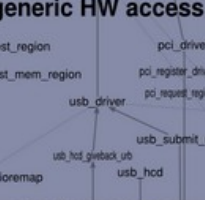
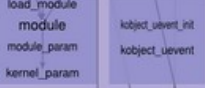
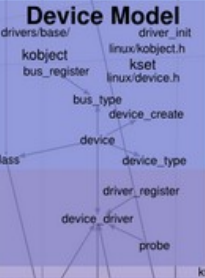
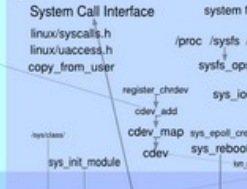
human interface

HI char devices



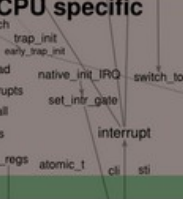
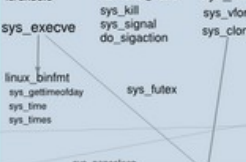
system

interfaces core



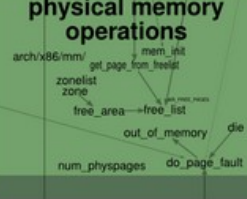
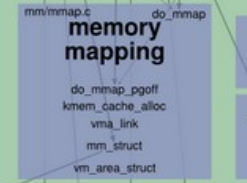
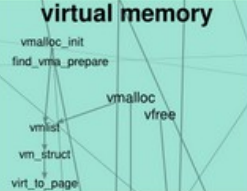
processing

processes



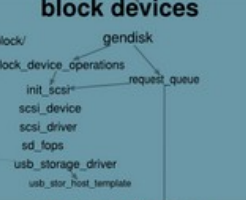
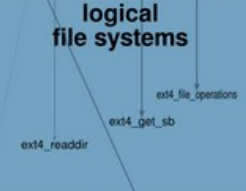
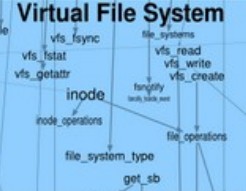
memory

memory access



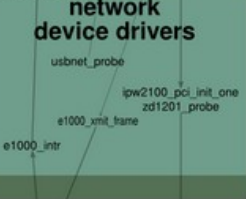
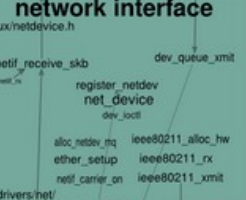
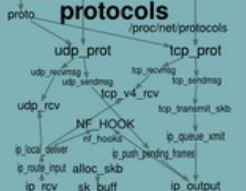
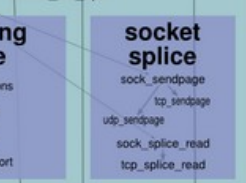
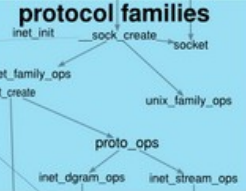
storage

files & directories access



networking

sockets access



1989 Cygnus Software, Michael Tyman: prima impresa di assistenza su free software



Il successo di Linux e degli altri programmi liberi attira le imprese.

1993 RedHat

1994 SUSE Linux 1.0

Free suona *gratis* : tabù per il business

→ “*Open Source*” è il *marketing term* per “*free software*”.

1998 Netscape, sotto la pressione della concorrenza Microsoft, decide di rilasciare il sorgente del browser Mozilla. → Open Source Initiative (Raymond, Perens).

2000 Sun rilascia OpenOffice.org, 2006 Sun rilascia Java, 2007 Google rilascia Android, 2010 Sun comprata da Oracle, 2011 fork LibreOffice



<http://geekz.co.uk/lovesraymond>

Richard Stallman

Linus Torvalds

Eric Raymond

Il successo di GNU/Linux

Programmi chiave:
- webserver apache
- openoffice.org

...

Comunita' di programmatori e utenti

Kernel Linux

Programmi GNU

Interesse dei produttori di software proprietario e hardware

Interesse delle PA e dei governi

Aziende produzione: rilascio di sorgenti

new economy .com

Idea *Open Source*

Aziende che prestano assistenza,

Idea *Free Software*

Linux Kernel

Issues: kernel testing

“19 million lines of code, and over 3 million lines haven't been touched in 10 years”

2038: 32bits-time register runs out of bits

2MB system: K Tinyfication effort (for IOT)

Live kernel patching

Binary : 10000000 00000000 00000000 00000100

Decimal : -2147483644

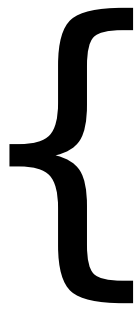
Date : 1901-12-13 20:45:56 (UTC)

Date : 2038-01-19 03:14:12 (UTC)

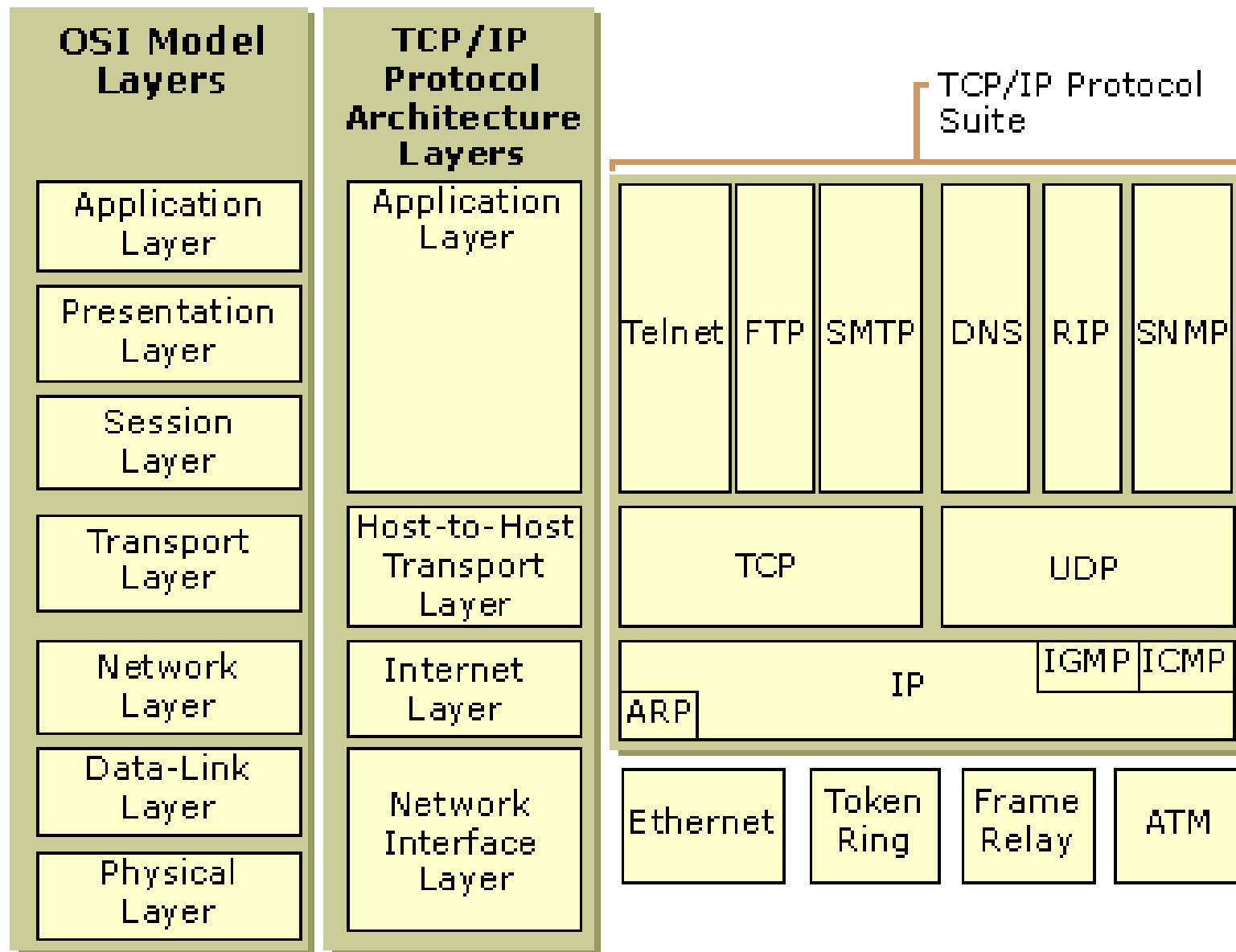
II - stato

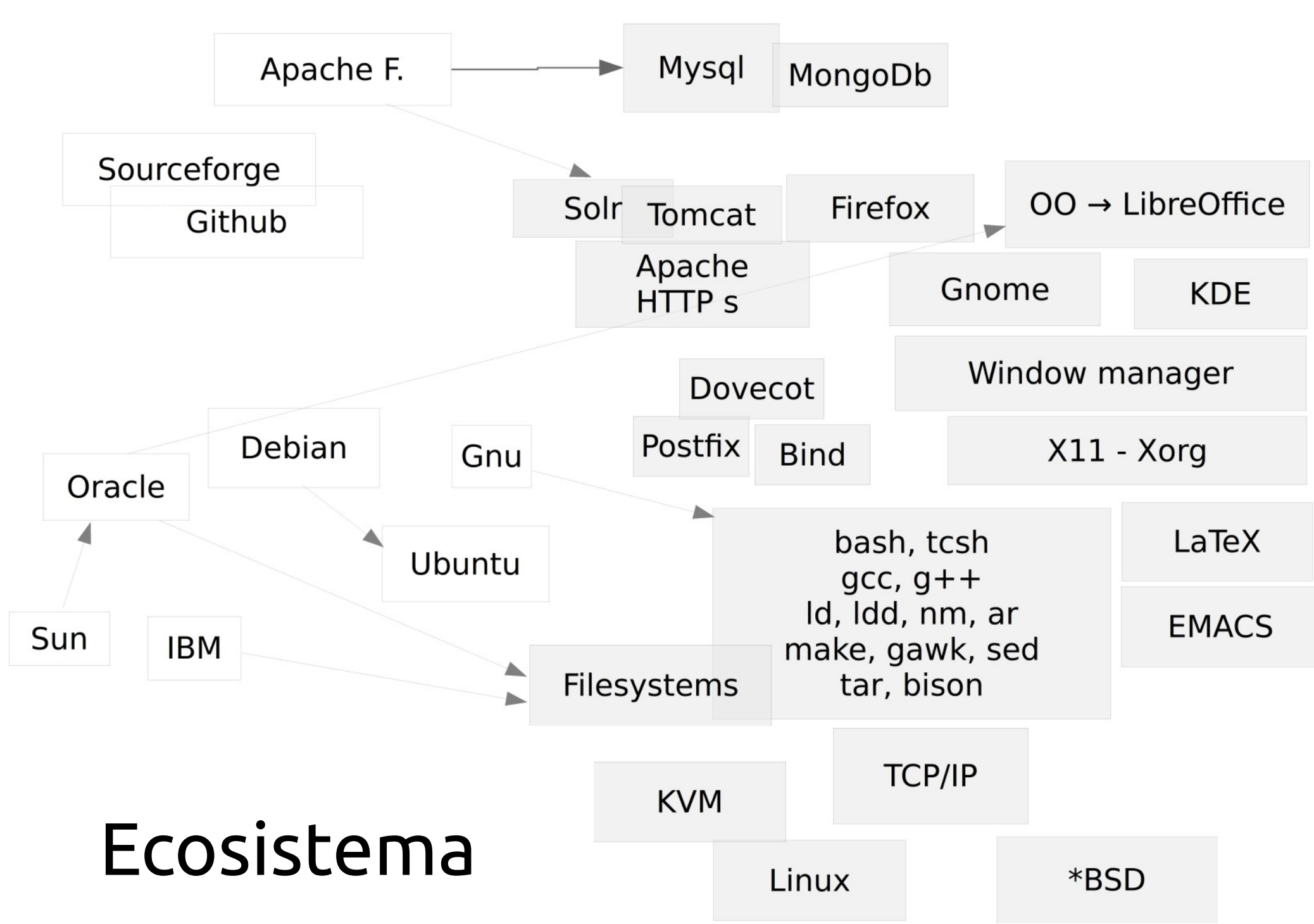
1 - ecosistema f/oss

2 - il mercato del software, regolazione

3 - foss come modello di  licenza
sviluppo
distribuzione
(prezzo)

Architettura aperta





Ecosistema

**You are
here**



Web individuals

communities

firms

f/oss

Internet

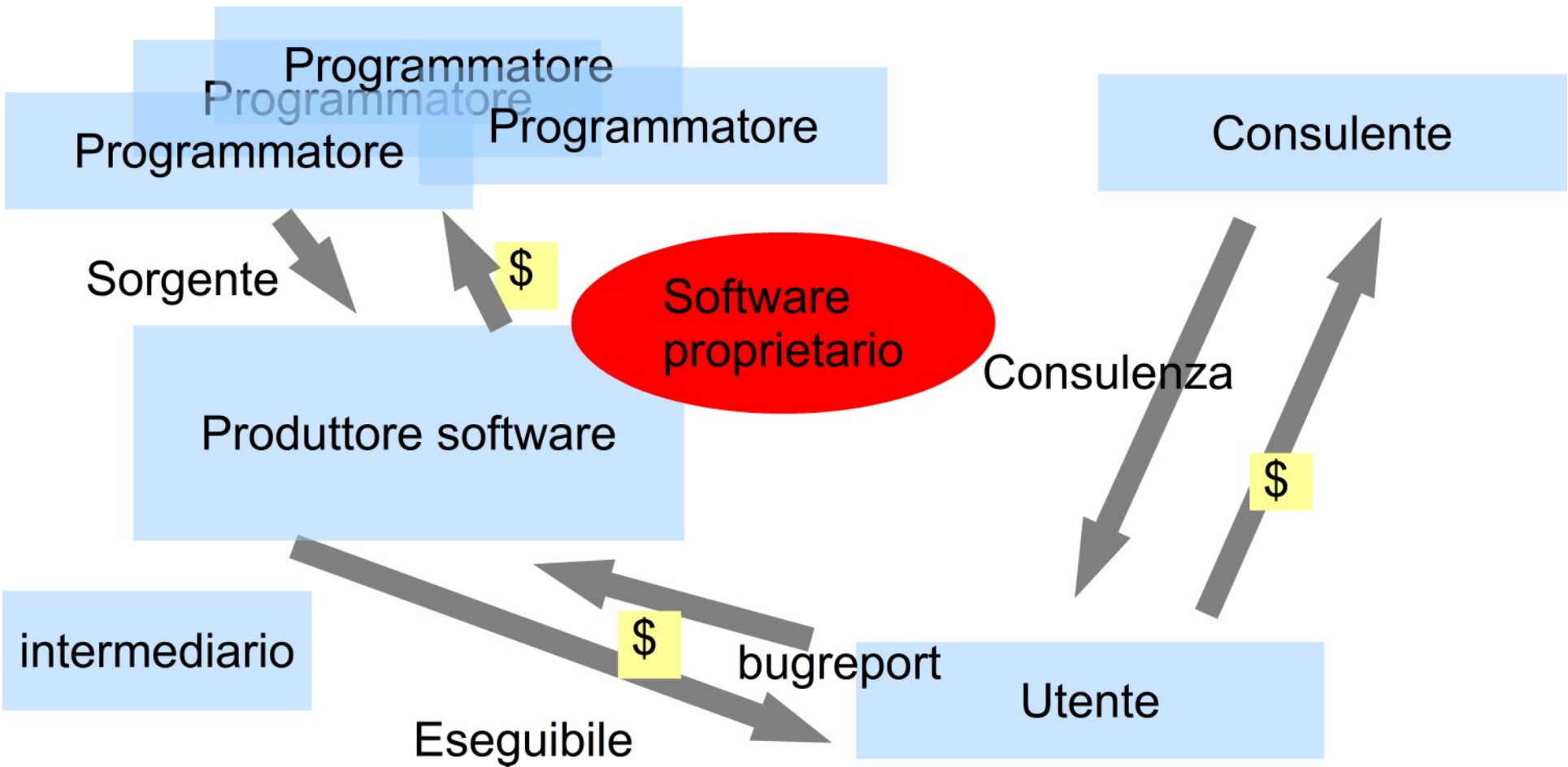
lan

WiFi

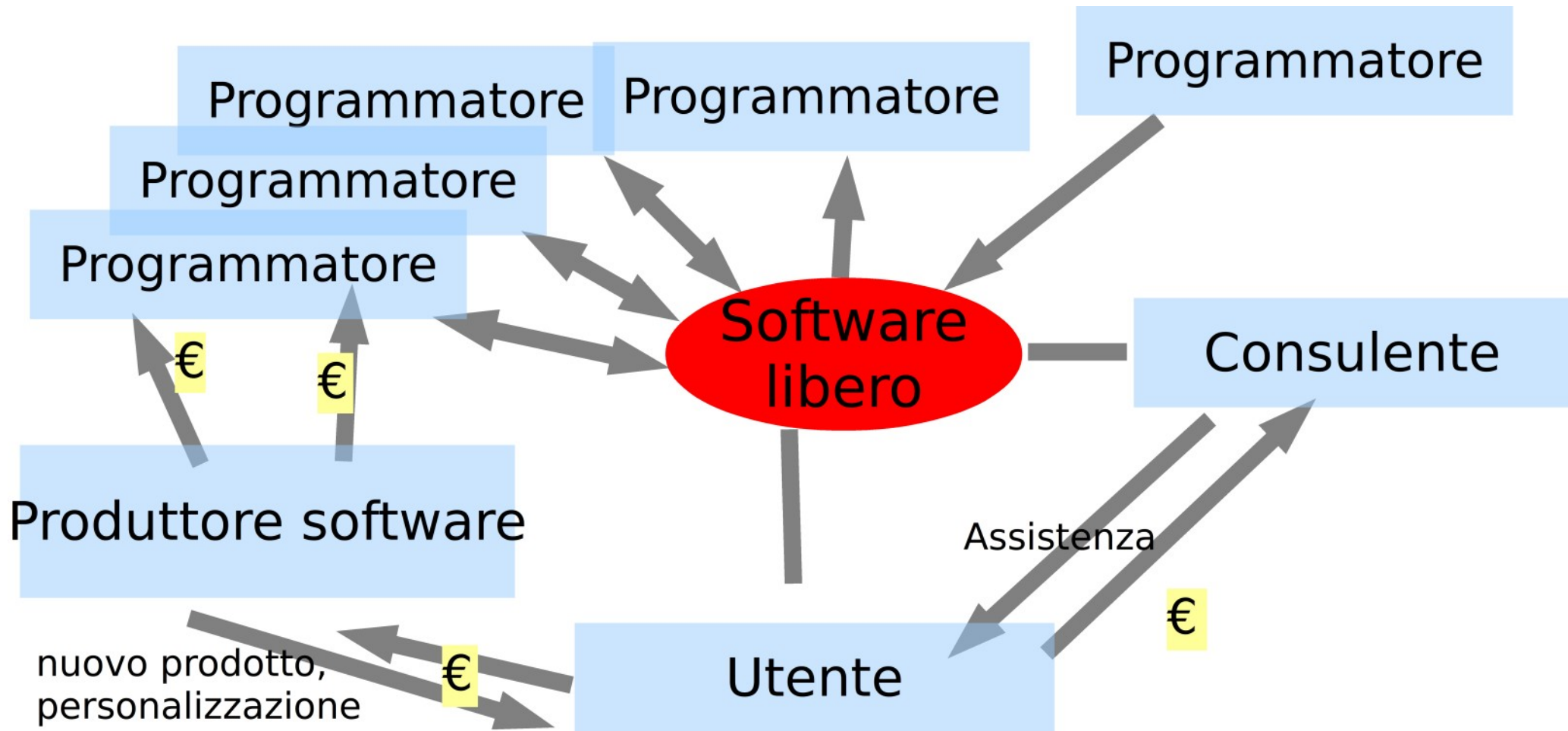
ISP

FOSS
ecosystem

software proprietario



software libero



Strategie delle imprese

- acquisire la **conoscenza** necessaria per competere
- **influenzare** lo sviluppo di prodotti strategici: il *backport* é più costoso
- ridurre **rischi e costi**: “in proprietary software, it can be too late to back up when you make a mistake”
- Attingere alla **creatività**: tapping the community exploration/exploitation
- Non vendere il sw, vendere i servizi!

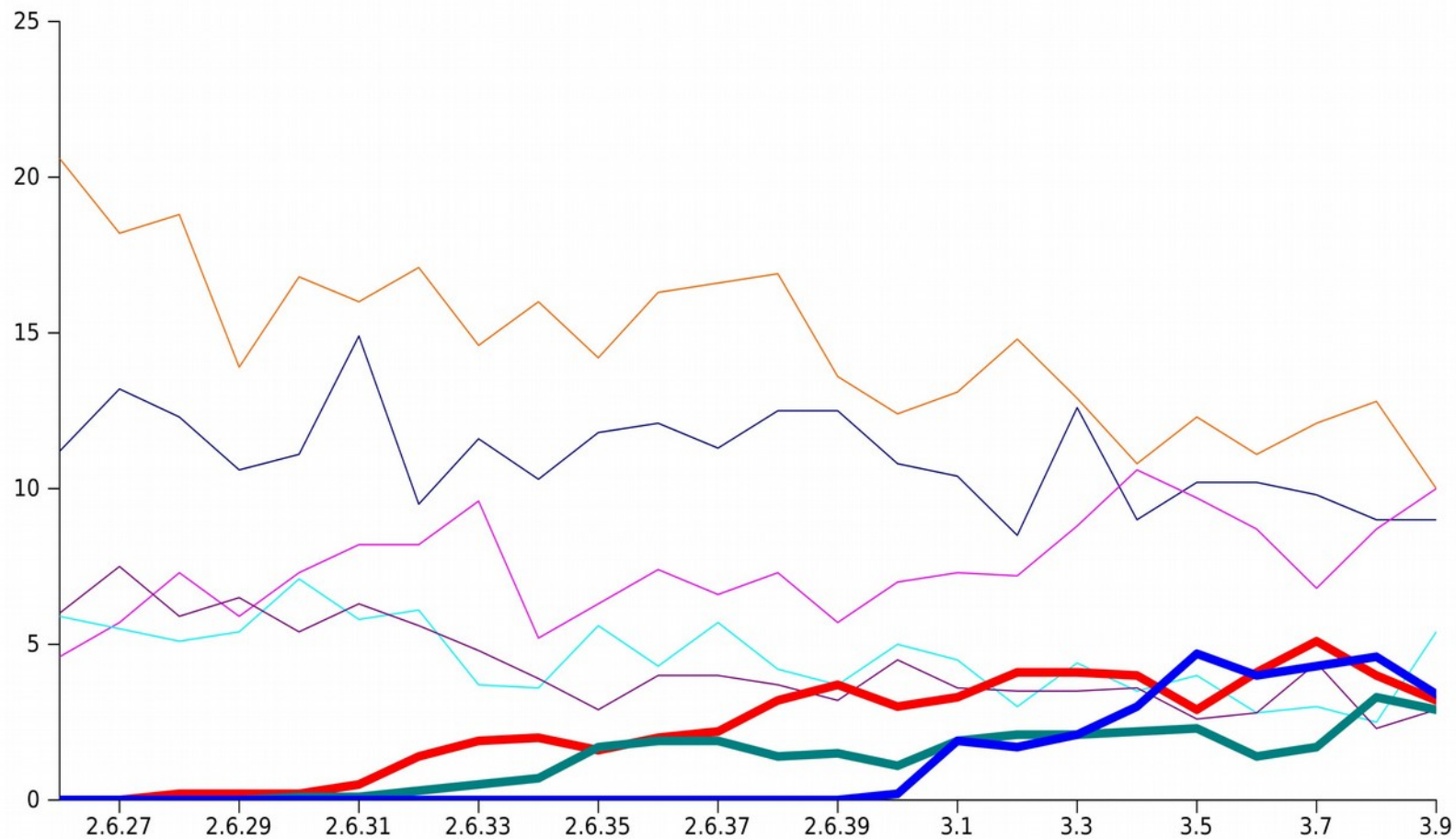
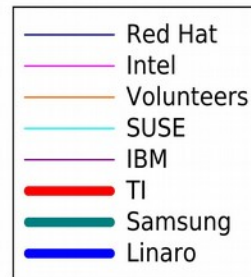
Kernel changeset contributions by employer

The kernel report

(Collaboration Summit 2013 edition)

Jonathan Corbet

LWN.net



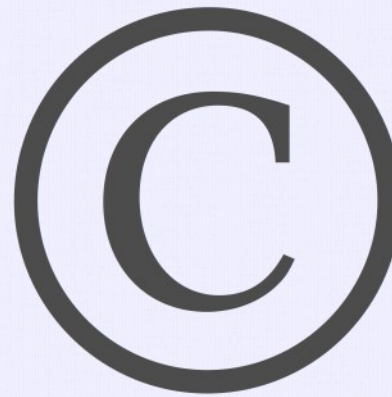
modelli di licenza

impresa

diritti di sfruttamento
economico

autore

diritti morali
+ economici



licenza
utente

Licenze sw proprietario

concedono:

- esecuzione del codice binario
(a certe condizioni)

vietano:

- copia, modifica, diffusione
- *reverse engineering*

Licenze sw libero

concedono:

- esecuzione del codice binario, senza condizioni
- modifica, diffusione, del codice sorgente

vietano:

...dipende...

Famiglie di licenze libere

- | | Reversibile? |
|---|--------------|
| 1 Public Domain viene ceduto tutto, anche il © | SI |
| 2 <i>tipo</i> BSD (Berkeley Standard Distribution):
deve sempre rimanere il © dell'autore
→ reversibile (può essere reso proprietario) | SI |
| 3 GNU GPL (General Public License):
“copyleft” o permesso d'autore:
→ opere derivate devono usare GPL | NO |



gnu general public license

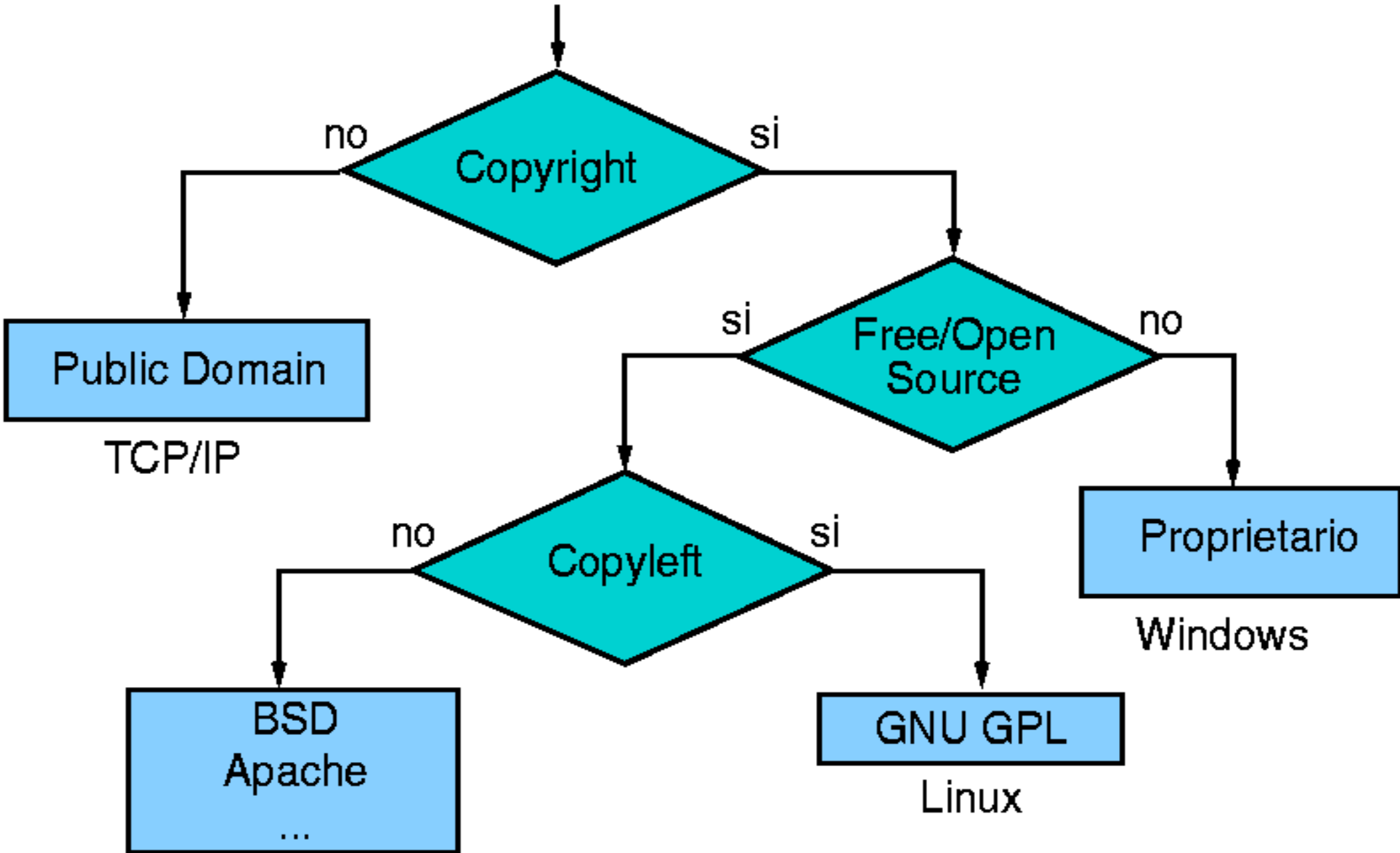


Copyright :

Chi **distribuisce** copie di un programma coperto da GPL, sia gratis sia in cambio di un compenso, deve concedere ai destinatari tutti i diritti che ha ricevuto.

Deve anche assicurarsi che i destinatari ricevano o possano ottenere il codice sorgente.

E deve mostrar loro le condizioni di licenza, in modo che essi conoscano i propri diritti.



da: Lawrence Lessig: Open Source Baselines, 2002

Modelli di sviluppo

Cattedrale/Bazaar (Raymond, 1999)

Single Guru

Master - Disciple → *Benevolent dictator*

Project team

self-identification (Benkler, 2006)

Modelli di distribuzione del software

~~Tradizionale~~

~~supporto fisico + distributore/rivenditore~~

Internet based

download, “try & buy”, demo/premium

f/oss: distribuzione integrata con sviluppo
e supporto

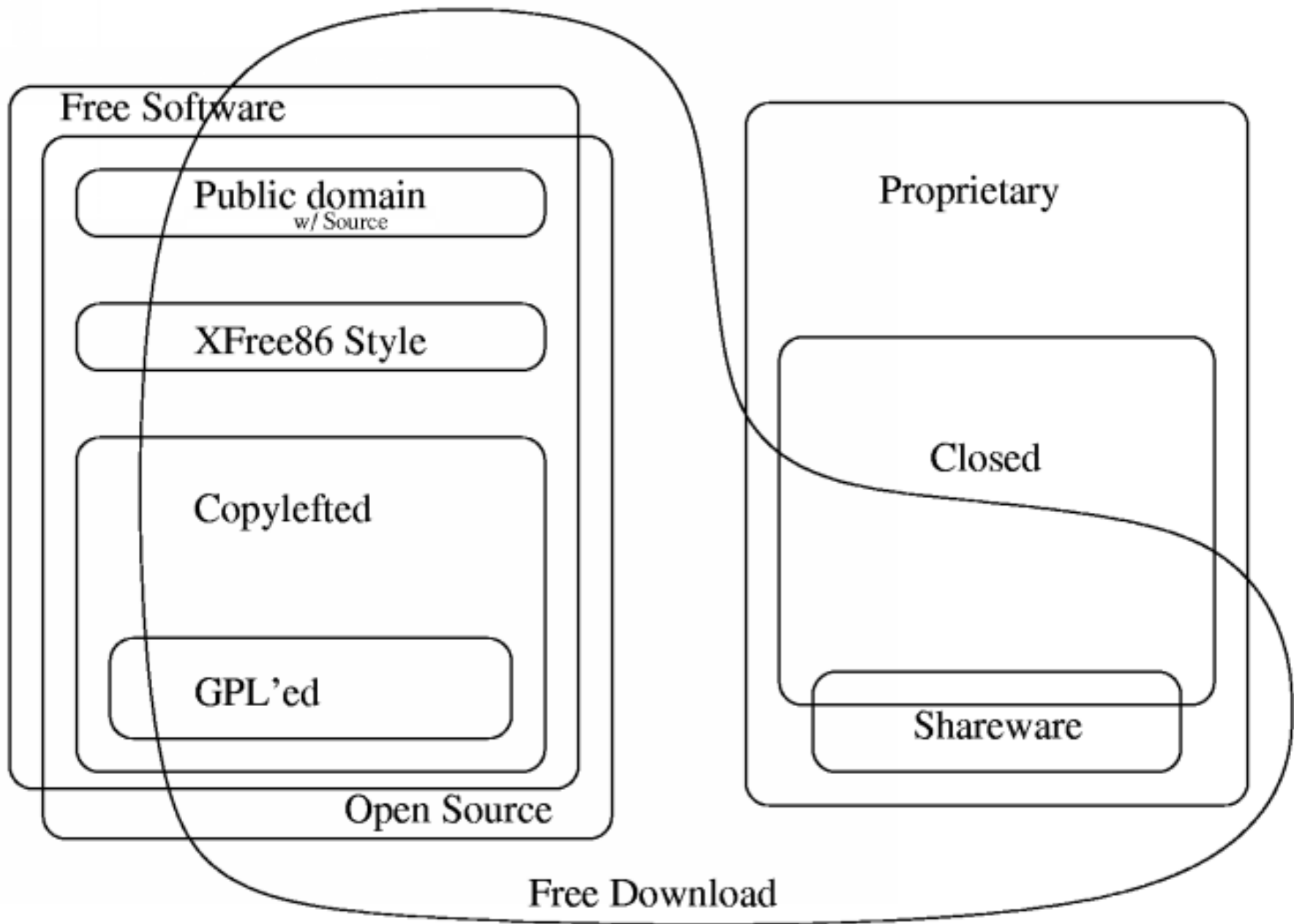
prezzo

Per essere *free software*
deve essere libero,

inoltre

può essere gratis
(e spesso lo è)

freeware (sw proprietario gratuito) \neq free
software



codice **sorgente**

+ licenze libere = *free software*

+ Internet = *peer-production* e distribuzione

+ imprese = *Open Source*

free software prodotto, usato e
distribuito grazie ad Internet da
privati e imprese

III - prospettive

- * “open source” e “peer production” (wiki-*) sono “mainstream”
- * Trending: cloud & platforms, mobile
- * sfide {
 - Big data: freedom/security/openness
 - Internet Architecture, AI [?].



Cloud

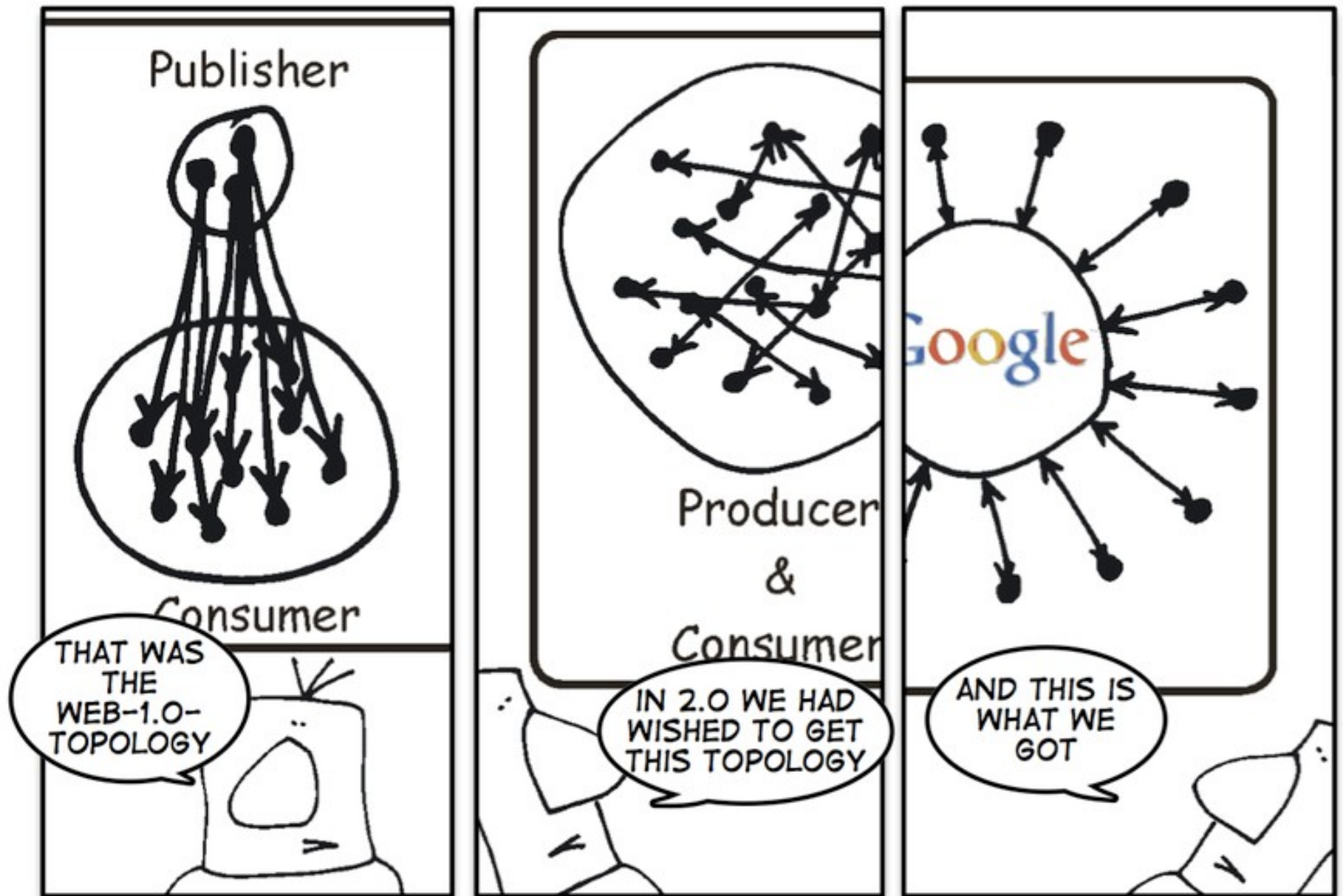


Cloud

IBM 2009 - NERCS @ Berkeley Magellan Lawrence Nat'l Lab - Roy Kaltschmidt, photographer

Cloud \neq Mainframe 2.0



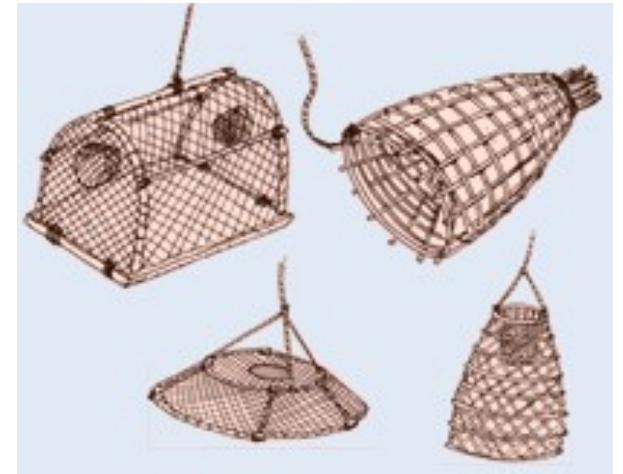


LOOK BACK ON WEB 2.0

GEEK AND POKE

Data *lock-in*

- accesso ai dati:
 - nel *tempo*
 - da *programmi* diversi
 - da *architetture* di tipo diverso



- **formati** aperti e interoperabili
Open Document – Open XML
- codice per la pubblica amministrazione digitale

“Data is the new Oil”

“Data is just like crude. It’s valuable, but if unrefined it cannot really be used. It has to be changed into gas, plastic, chemicals, etc to create a valuable entity that drives profitable activity; so must data be broken down, analyzed for it to have value.

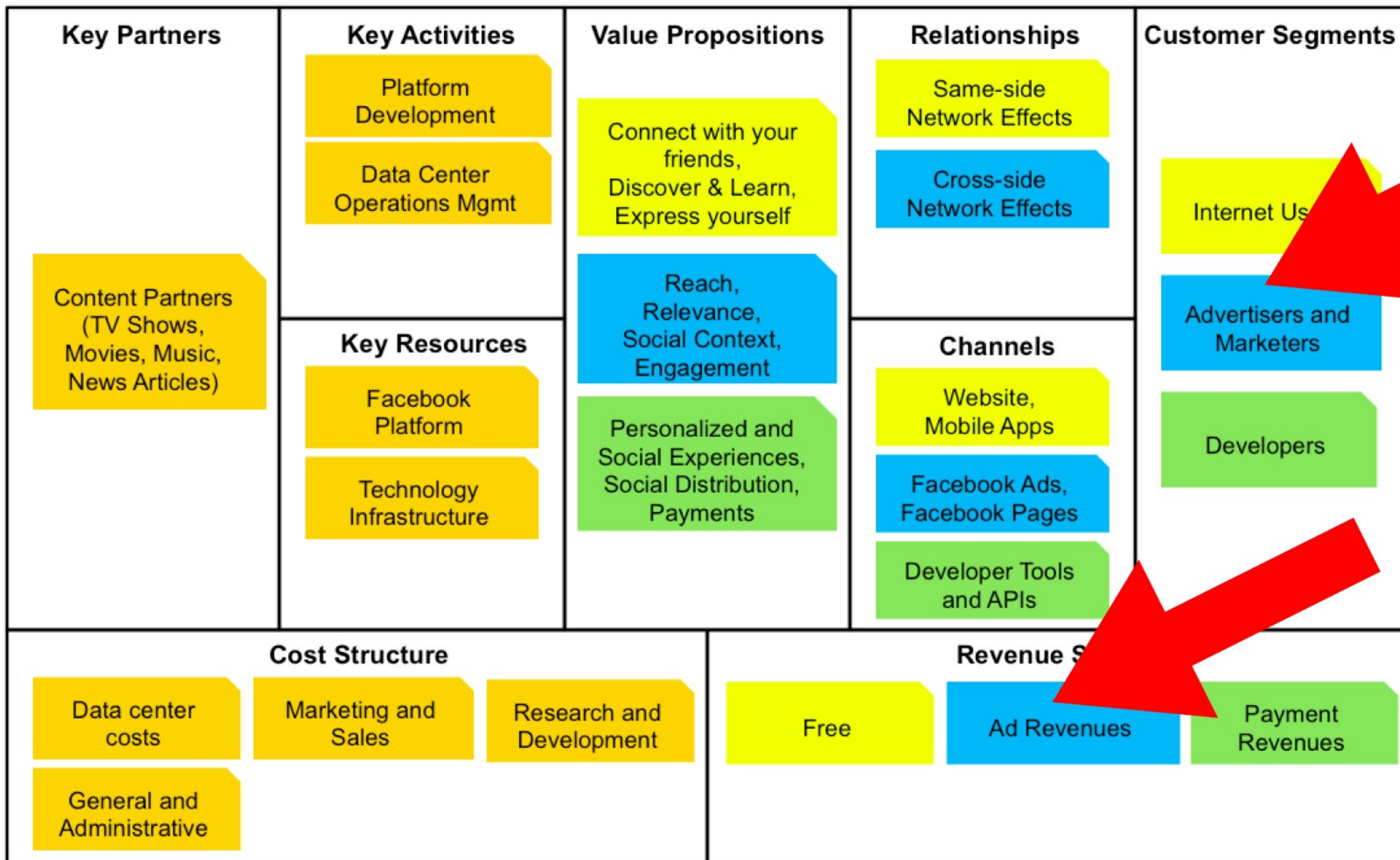
The issue is how do *we marketers* deal with the massive amounts of data that are available to us? How can we change this crude into a valuable commodity ?”

D: Da dove vengono i dati?

Michael
Palmer
2006

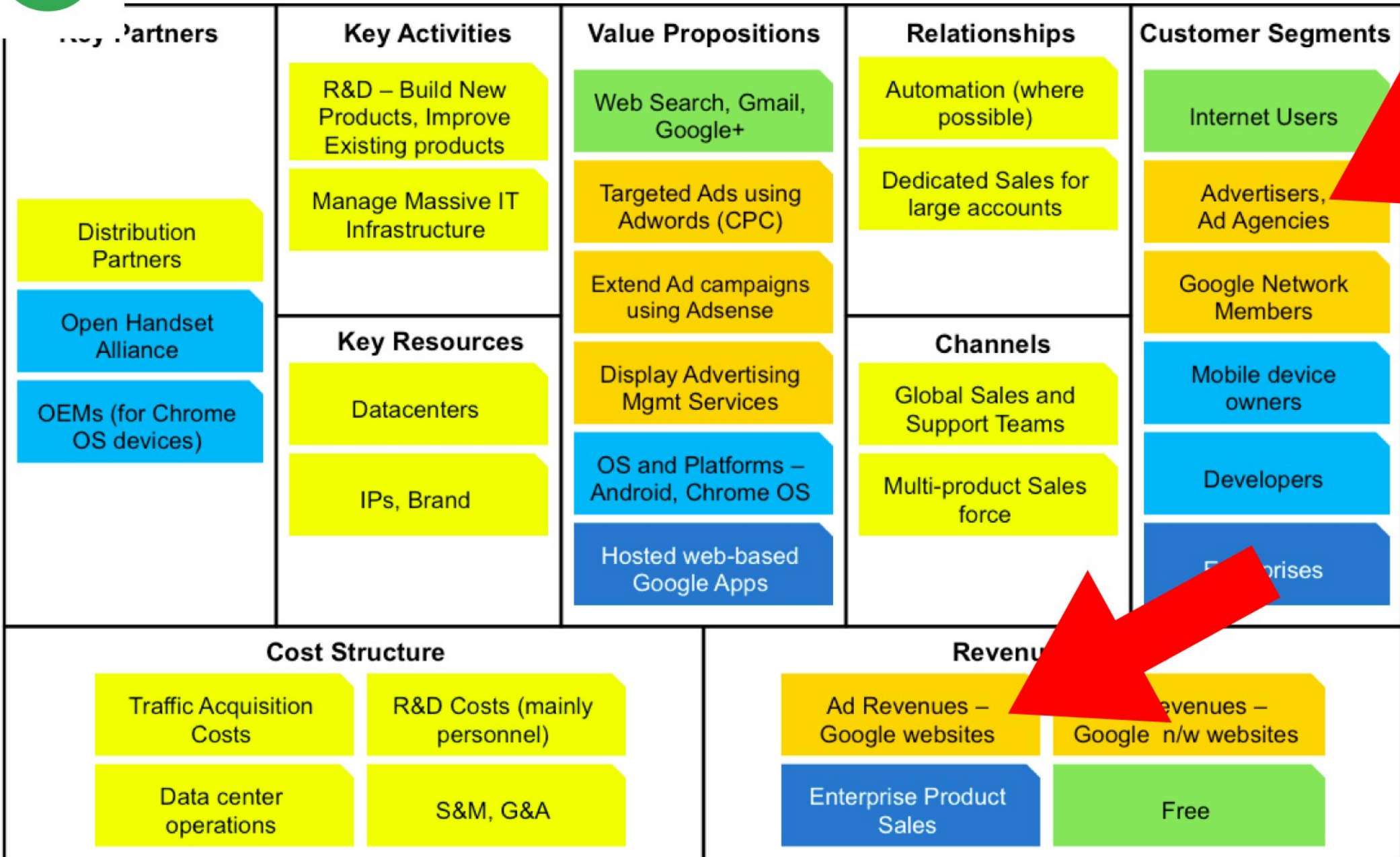


Facebook – World’s leading Social Networking Site (SNS)





Google Business Model



Open Data

- * Science : maps, genomes, chemical compounds, formulae, medical data and practice, bioscience and biodiversity [...]
 - * **Government and NGO: demographics, maps, public spending, justice, health, education, ...**
 - * Users: habits, voluntary crowdsourcing, ...
-
- * Provides: access, redistribution, reuse, ...
 - * Needs: security & privacy, interoperability, open data standards, licenses, statistics, visualization techniques

Cloud key concepts

- centrally hosted hardware + storage
 - functional separation between resources
 - modulation and pricing of resource use
-
- + services (backup, fault tolerance, balancing)
 - + some software (O.S. > application)

Cloud services

- * IaaS Infrastructure (+ virtualized os):
Amazon EC is mostly Gnu/Linux-based
you do: os installation > application
- * PaaS Platform (+programming env. + **APIs**):
Google App Engine: Java/Python
you do: application development & maintenance
- * SaaS Software (+ fixed end user application)
Google Apps for email and docs; Salesforce.com
you do: customization, configuration, integration

FOSS Clouds

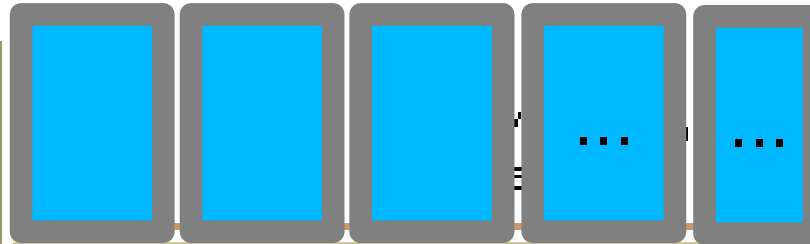
- * OpenNebula, Nimbus, ownCloud, OpenStack.org
- * Eucalyptus... Amazon EC2 and S3 API compliant.
User test drive: <http://open.eucalyptus.com/CommunityCloud>

- * Chiedersi:
 - * Posso migrare i dati?
 - * Application as a *service only* oppure sono consentite installazioni locali?
 - * Supported hosts?
 - * Supported clients?

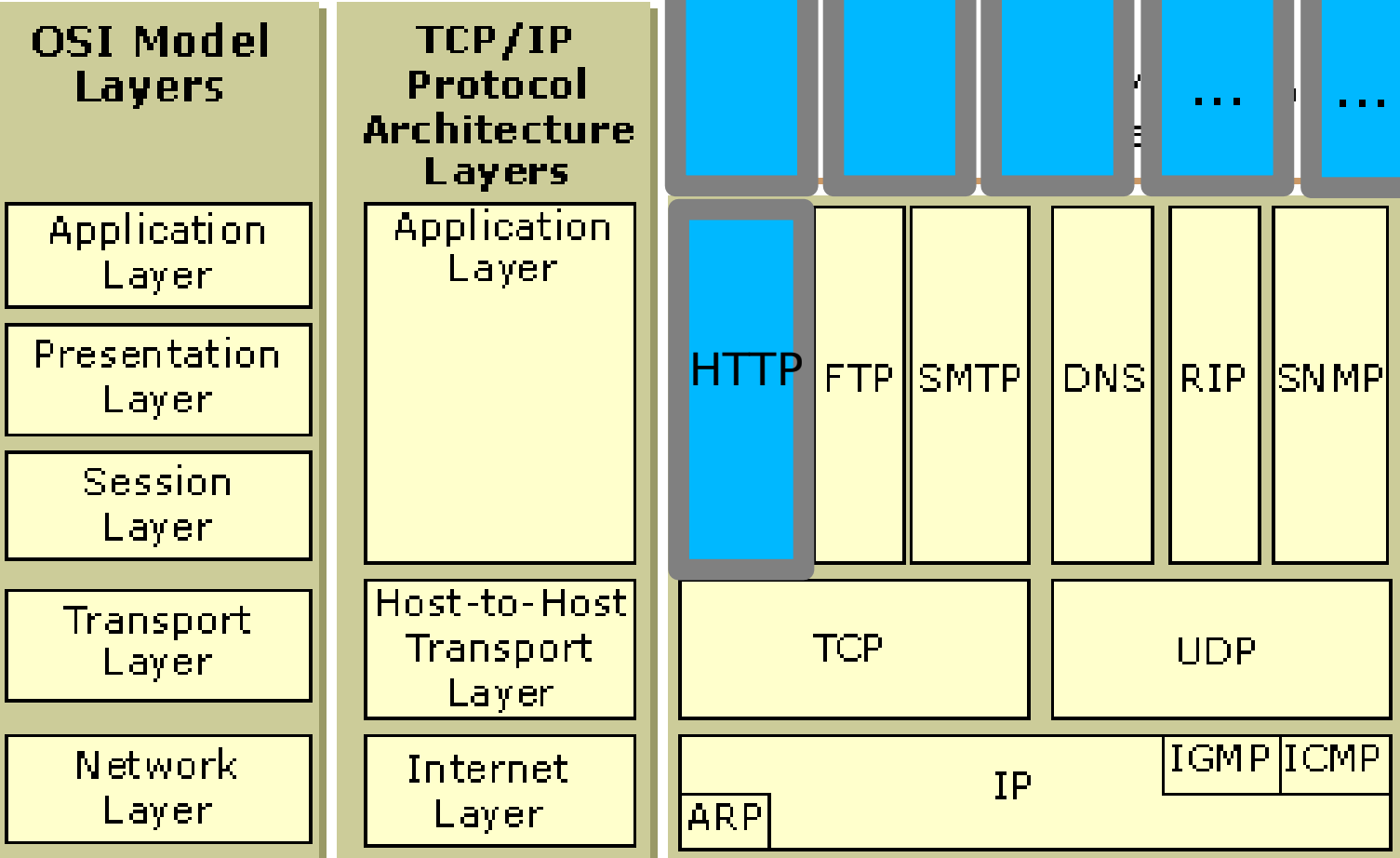
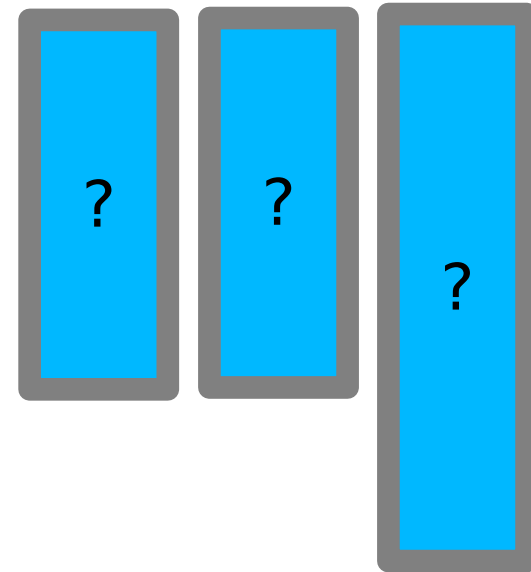
Architettura aperta?

verticale vs
interoperabile

Proprietary Apps



SN? IM? VoIP?



free-open future

Architettura aperta

- prodotto

free software & open design hardware

free spectrum

formati aperti, standard aperti, dati aperti

- processo

partecipazione libera, peer-production

- policy e governance

processi decisionali aperti e partecipati, valori condivisi

Thanks and happy hacking!

Riferimenti

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- Raymond, E., *The Cathedral & the Bazaar*, (2 ed.) O'Reilly, Sebastopol, CA; 2001.
- Bezroukov, N.,, *A Second Look at the Cathedral and Bazaar*, First Monday, volume 4, number 12 (December 1999); <http://firstmonday.org>, <http://www.softpanorama.org>
- Di Bona, Ockman, Stone, editors; *Open Sources: Voices from the Open Source Revolution*. O'Reilly and Associates, Cambridge, Massachusetts, 1999
- Torvalds, Linus, Diamond, David. *Just for Fun*, Texere, London, 2001. (*Rivoluzionario per caso*, Garzanti)
- Hahn, Robert W., editor; Bessen, Evans, Lessig, Smith.; *Government Policy toward Open Source Software*; AEI-Brookings, 2002
- Messerschmitt, Szyperski. *Software ecosystem*; MIT press, 2003
- Moore, J.T.S., *Revolution OS*, Wonderview Productions, LLC, 2002 (film)
- Yochay Benkler, Coase's Penguin, or Linux and the Nature of the Firm, Yale Law Journal, 2002, <http://www.benkler.org/CoasesPenguin.PDF>

Chi se ne occupa

- FSF Free Software Foundation : www.fsf.org
- Open Source Initiative: www.opensource.org
- GNU : www.gnu.org
- Electronic Frontier Foundation: www.eff.org
- Foundation for a Free Information Infrastructure: www.ffii.org

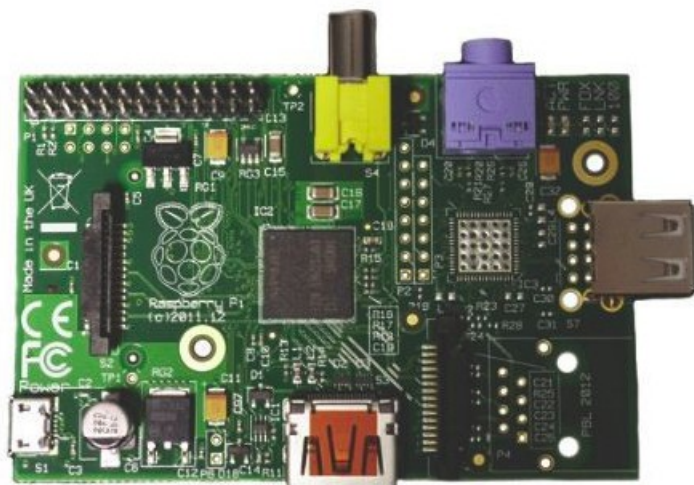
Open HW & IOT

Raspberry Pi Tipo A

Codice RS **756-8317**

Costruttore **Raspberry Pi**

Codice costruttore **Raspberry Pi Type A**



Dettagli prodotto

Modelli A e B SBC Raspberry Pi

✓ Disponibile per la consegna entro 3 giorni lavorativi, per ordini effettuati entro le 19:00 (magazzini in Europa)

€ 20,68

Prezzo per: Unità

unità	Listino
1 +	€ 20,68

Quantità unità

[Aggiungi](#)

[Clicca qui per verificare la disponibilità](#)

[Aggiungi alla tua lista](#)

Documentazione Tecnica

- [RoHS](#)
- [Regulatory Compliance and Safety Information](#)
- [Raspberry Pi Schematics](#)
- [BCM2835 Data Sheet](#)
- [Raspberry Pi Getting Started Guide](#)
- [Raspberry Pi Model A datasheet](#)
- [Raspberry Pi Quick Start Guide](#)

Open HW & IOT



[Visualizza Ingrandimento](#)

ARDUINO 9 axes motion shield

(ARDUINO)

29.00 € (incluso 22 % I.V.A.)

Quantità	Prezzo
1 - 9	29.00 €
10 - 100	28.00 €

ARDUINO 9 axes motion shield

Arduino 9 axes motion shield: Co-developed with Bosch, this shield integrates an accelerometer, a gyroscope and a magnetometer.

Firefox 38 arrives with contentious closed-source DRM integrated by default

DRM



 COMMENTS

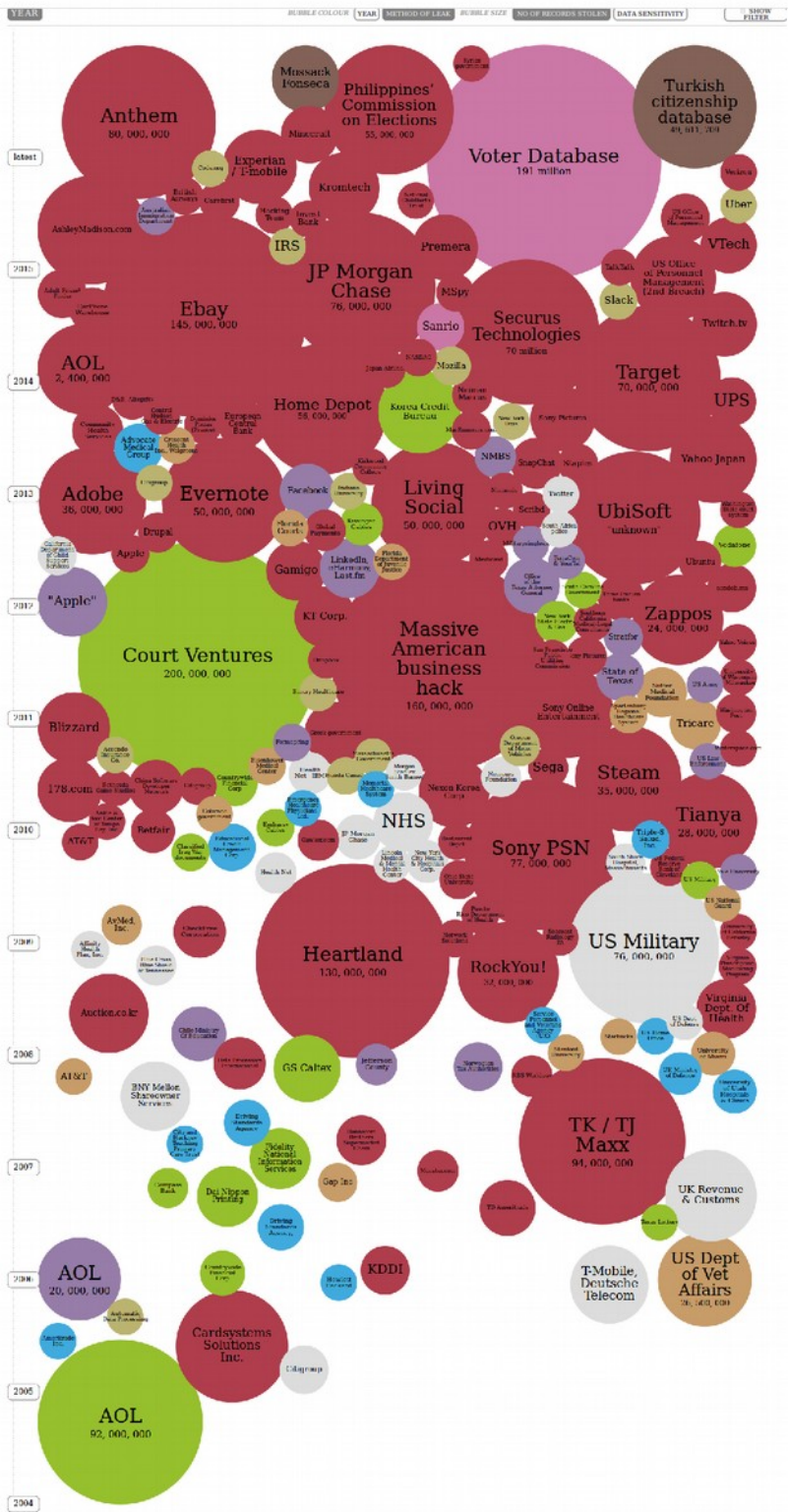


Ian Paul | @ianpaul

Contributor, PCWorld May 13, 2015 8:13 AM

One year ago Mozilla crushed the hearts of open source fans everywhere by announcing future versions of Firefox would come with the ability to [play copy-protected content via HTML5](#), which requires the use of integrated digital rights management (DRM) technology. On Tuesday, Mozilla finally pulled the trigger.

For users who just want to use Firefox, this means that soon you won't need Microsoft's Silverlight plugin to watch Netflix. Instead, Firefox 38 will use Adobe's Content Decryption Module (CDM). Firefox 38 automatically downloads the CDM in the background shortly after you upgrade or do a fresh install of the browser.



Data Breach

Incidente di sicurezza informatica con perdita o rilascio di dati riservati o segreti fuori dal contesto protetto

750.889.065
Numero totale di record persi o rubati

Per 91 eventi sopra ai 30.000 record

Prevalentemente USA e UK

Dati:

https://docs.google.com/spreadsheets/d/1Je-YUdnhjQJO_13r8iTeRxpU2pBKuV6RVRHoYcGimfg/edit?pref=2&pli=1#gid=

<http://www.informationisbeautiful.net/visualizations/worlds-biggest-data-breaches-hacks/>