



# Software libero: economia e impatto

Teoria e pratica

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Professore ordinario di Informatica, Parigi

(SNS 1986, Erdos #: 3)



- 30 anni di ricerca e insegnamento
- 20 anni di contribuzione al Software Libero
- 10 anni di direzione di strutture di interesse pubblico

1998 *Hold up planétaire* – best seller sui monopoli informatici

1999 *DemoLinux* – prima distribuzione live GNU/Linux

2007 *GTLL Systematic* 150 membri 40 progetti 200Me

2010 *IRILL* [www.irill.org](http://www.irill.org)

2015 *Software Heritage* [www.softwareheritage.org](http://www.softwareheritage.org)



## Software Heritage

THE GREAT LIBRARY OF SOURCE CODE



## Business

### THE WALL STREET JOURNAL.

Home World U.S. Politics Economy Business Tech Markets Opinion Arts

ESSAY

## Why Software Is Eating The World

By Marc Andreessen

August 20, 2011

This week, Hewlett-Packard (where I am on the board) announced that it is exploring jettisoning its struggling PC business in favor of investing more heavily in software, where it sees better potential for growth. Meanwhile, Google plans to buy up the cellphone handset maker Motorola Mobility. Both moves surprised the tech world. But both moves are also in line with a trend I've observed, one that makes me optimistic about the future

Software companies

outperform or buy out

hardware companies

*Marc Andreessen, 2011*

## Technology

### Software Defined Everything

Hardware gets commoditised

Software becomes the new value!





## Free Software

Software that offers to *its users* the freedom to:

- 0 use the software
- 1 study and adapt the software
- 2 distribute software copies
- 3 distribute modified copies

Free Software has changed the way software is:

- developed
- tested
- deployed
- maintained
- marketed
- sold
- designed
- taught
- ...

# Free Software: 30 years in a nutshell

## Three Main Phases:

### First 15 years, 1984-1998

early movement

focus: freedom for users and developers

keyword: free software

### Second 15 years, 1999-2014

progressive industry adoption

focus: software quality and cost

keyword: open source

### Today, 2015-...

mainstream use

focus: community and governance

keyword: governance

# Free Software: “la rançon de la gloire”

## Going mainstream

Today, everybody loves Free Software, even ancient opponents

*“Microsoft loves Linux”*

*Satya Nadella, October 2014*



## Just in May 2018

- Facebook releases OpenGo (AI)
- Google releases Asylo (Containers) and Seurat (3D)

Today, knowing and using Open Source is ... just table stakes!

Myths, misunderstandings, hype, ... are all around us.

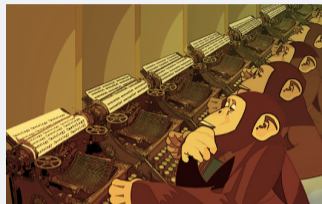
**Let's dispel some of this.**



## Anarchic development (“Bazaar”, “Wisdom of software crowds”)

Software is a technical object.

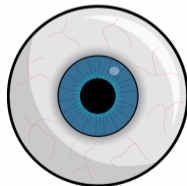
A mass of random coders **does not** create beautiful software.



## Software Quality and Free Software

*With enough eyeballs, all bugs are shallow*  
— Eric Raymond

That's a *logical implication!*  
**You need enough eyeballs first.**



# Myths surrounding free software

The community will take care of it

Making software available is *necessary*.

But **not sufficient** to create a community that curates it.



Free software and cost

Creating and maintaining beautiful software has **a cost that must be paid for**.

The fact that you do not pay for a software licence **is a detail**.

**THERE AINT  
NO SUCH  
THING  
AS A  
FREE  
LUNCH**

## Back to the basics

**economics**: the study of how society chooses to allocate *scarce* resources to produce, exchange, and consume goods and services.

*Ruffin, Gregory, "Principles of Economics", 1990*

*Without scarcity, there is no economy.*

Started in 1969, with the *IBM Unbundling of software and services*

Based on the **artificial** “scarcity” of *verbatim copies* of an *existing* piece of software!

Adopts a *push* approach

- identify a market
- develop a “one size fits all” software solution
- sell licences to a lot of users, . . . if you can
- make sure the users will need new versions, *often*. . .

free software ...

*removes* the “scarcity” of copies

it may surprise actors used to the old world, but...

... creates value!

## France

### Marché de l'Open Source Total (Logiciels & Services IT)

En million EUR	Croissance									
	2017	2018	2019	2020	2021	CAGR 17/21	17/18	18/19	19/20	20/21
Logiciels Open Source	278	316	355	399	447	12,6%	13,7%	12,3%	12,4%	12,0%
Services IT liés à l'Open Source	4 184	4 517	4 878	5 252	5 645	7,8%	8,0%	8,0%	7,7%	7,5%
<b>Total Marché Open Source FR (Logiciels + Services IT liés)</b>	<b>4462</b>	<b>4833</b>	<b>5233</b>	<b>5651</b>	<b>6092</b>	<b>8,1%</b>	<b>8,3%</b>	<b>8,3%</b>	<b>8,0%</b>	<b>7,8%</b>

© Source : PAC-CXP Novembre 2017

## A lot of interest

- GNU Manifesto, early vision of Richard Stallman, circa 1985
- Chris Hecker: Setting up shop, 2000
- John Koenig: Seven open source business strategies for competitive advantage, 2004
- Gasperoni, Comar: Open Source in Dependable Systems
- Livre blanc Aful, 2007
- Livre blanc April, 2007
- Livre bleu du GTLL, 2015...

## A common starting point

selling “licences” is gone; one needs *other scarce resources*

## Free software exposes the *truly scarce* resources...

- know-how
- commit rights
- community connection
- infrastructure
- process, industrialization
- customization, qualification

## ... and changes the cost structure

- advertising
- adoption
- evolutive maintenance
- human resources
- partnerships
- mutualization

Looking for a (free) software business model?

Start by looking for a resource that is *scarce*

and valuable to *a group of users*

# Building a *successful* FOSS project

Martin Michlmayr (former Debian project leader) studied successful FOSS projects (see <http://opensource.mit.edu>).

They all show a similar pattern of evolution.

Cathedral phase	Transition phase	Bazaar phase
Original "idea" Project Author Core developers Unix philosophy	⇒ "Interest" ⇒ Prototype <i>Modular design</i>	⇒ Distributed development environment Community Parallel perfective and corrective maintenance Peer reviews

The transition does not come for free!



## In other words

- identify a need
- develop a software prototype
- build a community
- set up an *ecosystem*, with:
  - *users*
  - developers
  - architects
  - service providers...

*all working together*, and playing by the rules

The first two phases are the less difficult to get right.

The challenge is in the second two.

## Economia della conoscenza

- competenze, talenti
- connessione, adesione
- mindshare

## Osservazione essenziale

*L'infrastruttura di collaborazione è il nuovo differenziatore*

## Missione

Favorire l'emergenza di un ecosistema attraverso progetti di R/D collaborativa

- emergenza di progetti: polo di competitività
- selezione di progetti: esperti al ministero dell'Industria
- finanziamento pubblico: 1/3 stato, 1/3 regione, 1/3 dipartimenti
- almeno 2 imprese e un partner accademico
- 100% costi accademici, parziale per i privati

## Qualche data chiave

- 2005, creazione (fondi della privatizzazione delle autorstrade)
- 2007, creazione del Gruppo Tematico Software Libero

## Qualche data chiave

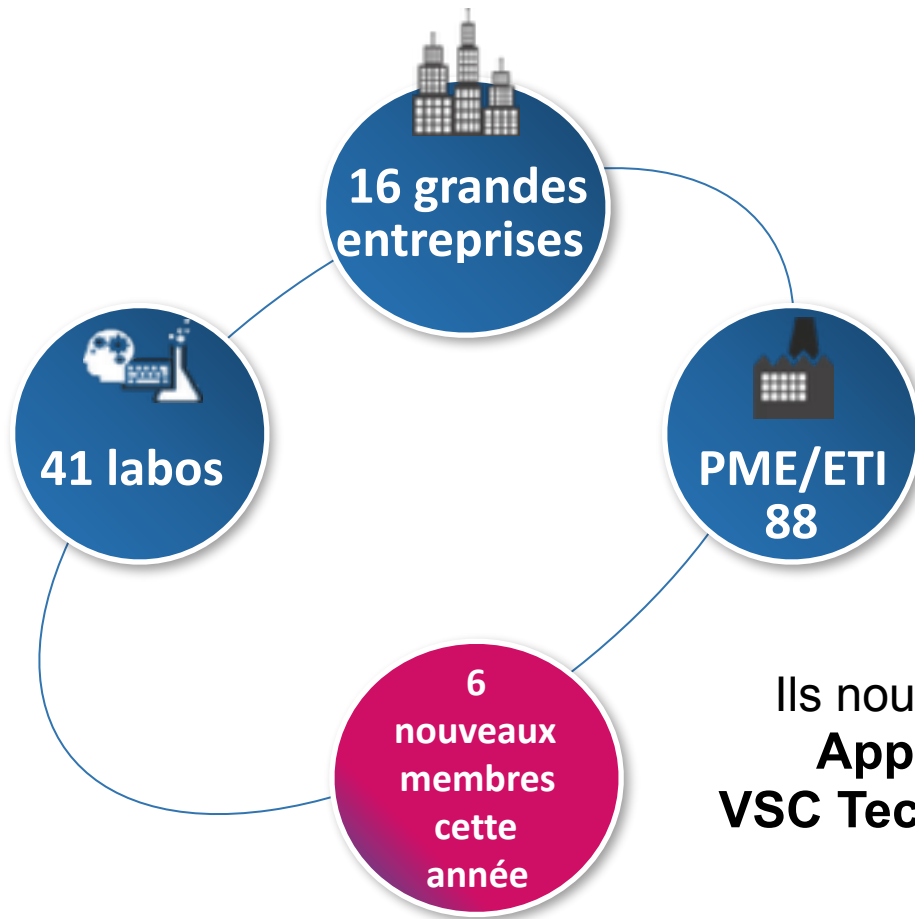
un video è disponibile: <https://youtu.be/syblEEgMZJI>



Happy  
Birthday

**Le GTLL a 10 ans!**

# 145 partenaires en réseau



Ils nous ont rejoints depuis début 2016 :  
**Appcraft, Estimancy, Containous,  
VSC Technology, Sensio, Hypra, Minij**

# Les projets du GT (depuis 2007)



**60**

**projets  
de R&D**

16 ANR  
38 FUI-Feder-FSN  
6 H2020/Eureka



**197**

**millions d'€  
d'effort  
R&D**



**82**

**millions d'€  
d'aide  
publique**



**57**

**des 163  
produits  
du book  
2016**

# L'ÉQUIPE DU COMITÉ DE PILOTAGE

**12 industriels & 7 académiques**

**Président : Stéphane FERMIGIER, ABILIAN**

**Vice-président : Roberto DI COSMO, IRILL, Inria, Université Paris-Diderot**

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Jérémy PAPPALARDO, Ecole Polytechnique

Laure PETRUCCI, UNIVERSITE PARIS 13

François PELLEGRINI, Labri / Aquinetic  
(membre invité)

Yannick MOY, ADACORE

Philippe CARRE, NOKIA, Bell Labs

Gilles LEHMANN, C-S

Frédéric LEPIED, eNOVANCE/RED HAT

Véronique DELEBARRE, SAFE RIVER

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Pierre FICHEUX, OPEN WIDE

Grégory BECUE, SMILE

Florent ZARA, HENIX

Cédric THOMAS, OW2

**Responsable du Groupe thématique : Muriel SHAN SEI FAN**

## Focus on publicly funded R&D projects

Quite different from the usual FOSS success stories:

- research dimension (long to medium term)
- high technology focus
- transfer from Academia
- public funding through grants
- users are *too often* an afterthought



Project info: <http://www.open-do.org/projects/hi-lite/>

Goals: Formal methods tooling for *high-integrity* software.

Funding: 1.4Me French funding, over 4.1Me project cost

Duration: 3 years (may 2010/may 2013)

Cluster: Free Software thematic group (GTLL) in Paris

## Project partners

Leader: AdaCore (SME)

Academia: CEA-LIST, Inria

Industry:

- Altran
- Astrium Space Transportation
- Thales Communications

## Scientific and technical Results

SPARK 2014 : new version of high integrity Ada

Why 3 : new version of the proof platform

E-ACSL : new annotation language for C

## Adoption, Community, Business

[embedded.com](#) : *Next-generation of SPARK static verification toolset released*,  
Bernard Cole, May 2014

[lists/forge](#) : 69 members, thousands of mails exchanged

[collaborations](#) : joint AdaCore/Inria lab, CNAM and Kansas State University,  
Mitsubishi Electric...

SPARK Pro 15 : professional edition, with new clients and upgrades of old clients

# The Hilite success story

## Key success factors : consortium

**leadership** : active *editor* of a Free Software solution, *SME*

**academia** : strong partners with *development* background

**users** : big companies onboard *are real potential users*

The focus was on *the product*, from the start.

## Key success factors : community

**insiders** : core community *inside* the project from the start

**academia** : partnerships established through conferences and collaboration

**outsiders** : precise focus on the industry sector that *uses* the technology

The *community* does not need to be *large*...

...it must be *pertinent* and *active*

# The Squash success story

Project info: <http://www.squashtest.org/>

Goals: Unified approach to Functional Testing

Funding: 1.3Me French funding, over 3Me project cost

Duration: 2 years (march 2011/june 2013)

Cluster: Free Software thematic group (GTLL) in Paris

## Project partners

Leader: Henix (SME)

Academia:

- University Paris 8
- Loria

Industry:

- GDF Suez
- Kalis

## Scientific and technical Results

Two new OSS products

Squash TM : test management

Squash TA : test automation

## Adoption, Community, Business

**downloads** : more than 1.000 downloads per month, including many big companies

**user base** : large international market (RTBF, for example...)

**contributions** : no contribution good enough to deserve inclusion, but...

**service** : enabler for a healthy service activity that ensured a real, full Free Software editor strategy (no freemium/open-core, etc.)

# The Squash success story

## Key success factors : consortium

**leadership** : active *editor* of an Free Software solution, *SME*

**users** : big companies onboard *are real potential users*

The focus was on *the product*, from the start.

## Key success factors : community

**insiders** : core community *inside* the project from the start

**outsiders** : a healthy community of *users* of the technology, despite no real community of contributors to the code maintained through traditional marketing

Again: **access to the code is not enough!**

There is not necessarily an *external community* of developers

## Lessons learned

**users** a key success factor

- must be *in the project from the start*
- in large companies *business units* may help more than R&D departments

**community** necessary to ensure sustainability

- must be *in the project from the start*
- may be a *developer* or a *user* community, or both

**leadership** coordination by a free software *editor* is a real plus

**ecosystem** is essential

- a clear effort is needed to build it



## Software Heritage

THE GREAT LIBRARY OF SOURCE CODE

*Collect, preserve and share the source code of all the software*

Preserving our heritage, enabling better software and better science for all

### Reference catalog



reference **all** source code

### Universal archive



preserve **all** source code

### Research Infrastructure



analyse **all** source code

4+ billion files, 1+ billion commits, 80+ million projects!



## Open Source, Software Libero

**complesso** richiede oggi grande professionalismo

**opportunità** se ben usato, crea valore e riapre mercati

**indispensabile** necessario in ogni campo

- adottato dai grandi attori internazionali
- crea ecosistema e mindshare
- grosso rischio per chi ne resta escluso

# Domande ?