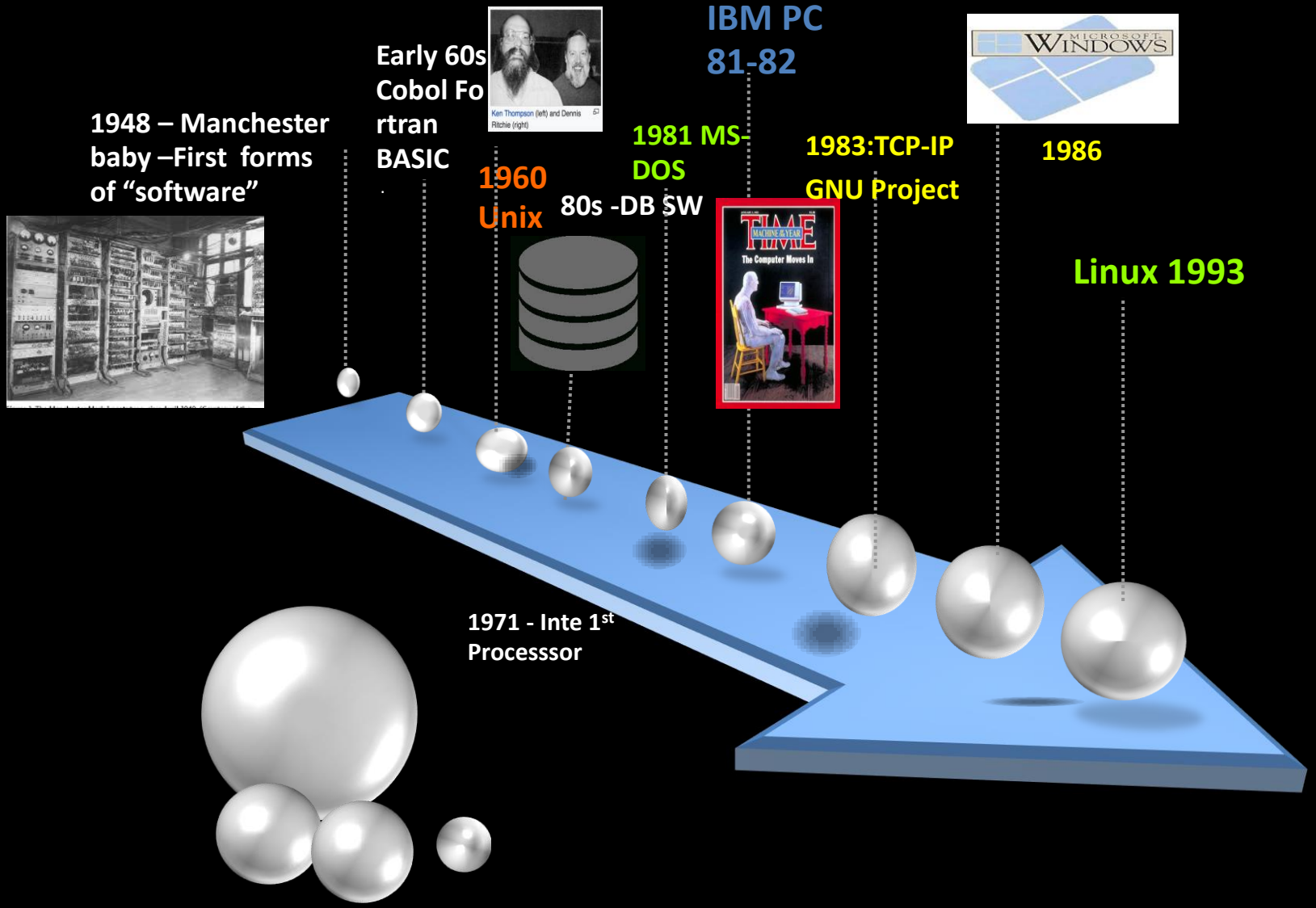
# Free and Open Source Software Paradigm

EFSA Conference 2018

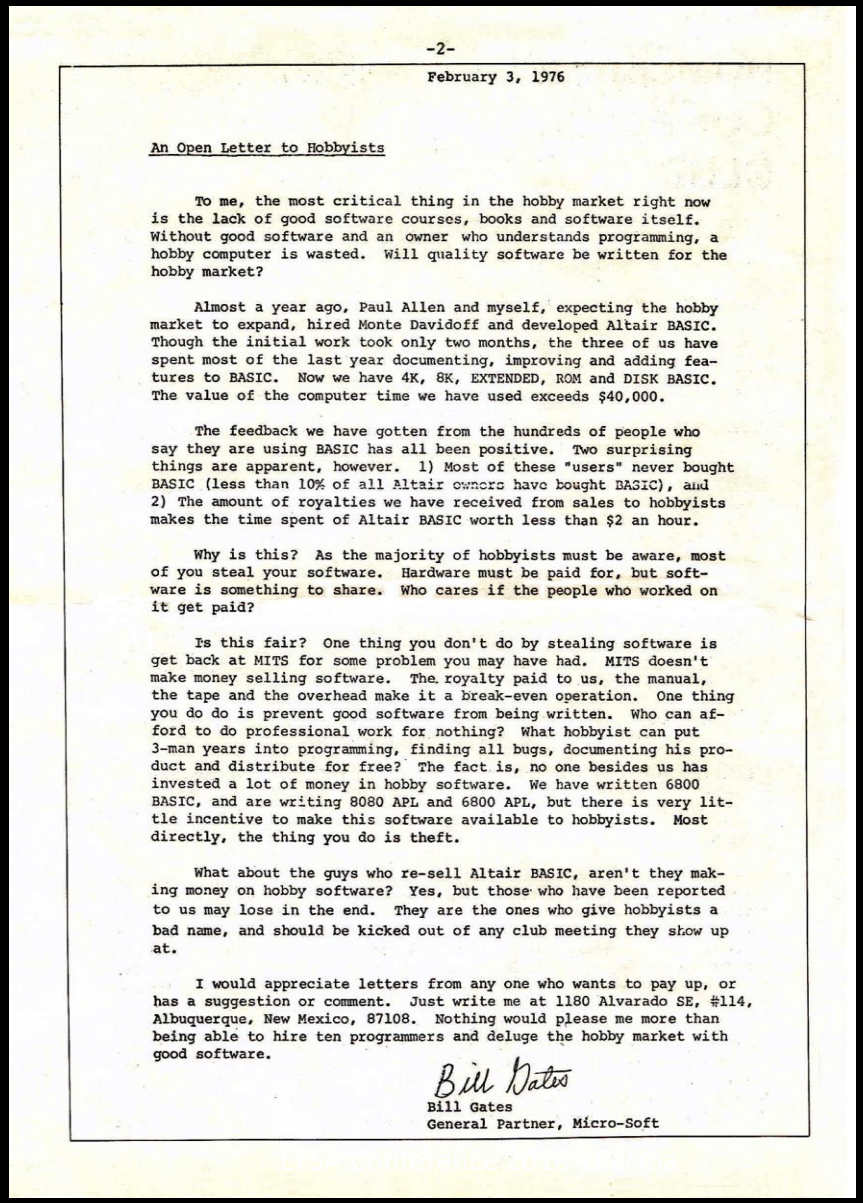
Science-Food-Society

Lazaros Tossounidis, Cedefop

# The Software revolution



# Bill Gate's letter to the Hobbyists 1976



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February 3, 1976

An Open Letter to Hobbyists

To me, the most critical thing in the hobby market right now is the lack of good software courses, books and software itself. Without good software and an owner who understands programming, a hobby computer is wasted. Will quality software be written for the hobby market?

Almost a year ago, Paul Allen and myself, expecting the hobby market to expand, hired Monte Davidoff and developed Altair BASIC. Though the initial work took only two months, the three of us have spent most of the last year documenting, improving and adding features to BASIC. Now we have 4K, 8K, EXTENDED, ROM and DISK BASIC. The value of the computer time we have used exceeds $40,000.

The feedback we have gotten from the hundreds of people who say they are using BASIC has all been positive. Two surprising things are apparent, however. 1) Most of these "users" never bought BASIC (less than 10% of all Altair owners have bought BASIC), and 2) The amount of royalties we have received from sales to hobbyists makes the time spent of Altair BASIC worth less than $2 an hour.

Why is this? As the majority of hobbyists must be aware, most of you steal your software. Hardware must be paid for, but software is something to share. Who cares if the people who worked on it get paid?

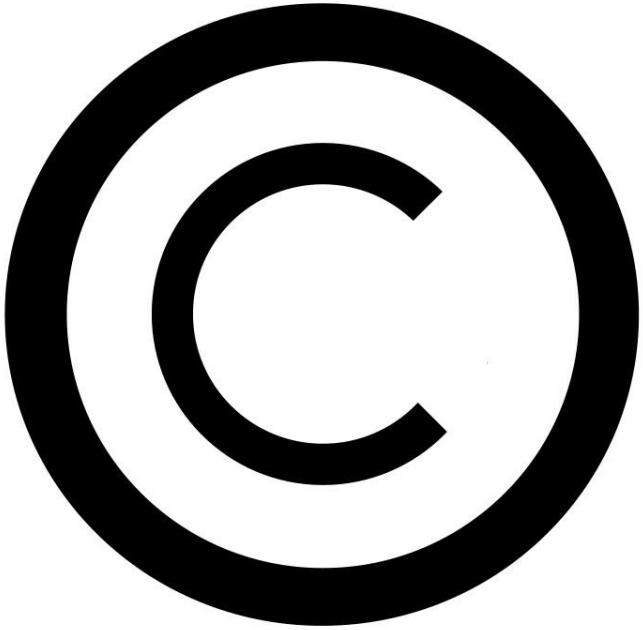
Is this fair? One thing you don't do by stealing software is get back at MITS for some problem you may have had. MITS doesn't make money selling software. The royalty paid to us, the manual, the tape and the overhead make it a break-even operation. One thing you do do is prevent good software from being written. Who can afford to do professional work for nothing? What hobbyist can put 3-man years into programming, finding all bugs, documenting his product and distribute for free? The fact is, no one besides us has invested a lot of money in hobby software. We have written 6800 BASIC, and are writing 8080 APL and 6800 APL, but there is very little incentive to make this software available to hobbyists. Most directly, the thing you do is theft.

What about the guys who re-sell Altair BASIC, aren't they making money on hobby software? Yes, but those who have been reported to us may lose in the end. They are the ones who give hobbyists a bad name, and should be kicked out of any club meeting they show up at.

I would appreciate letters from any one who wants to pay up, or has a suggestion or comment. Just write me at 1180 Alvarado SE, #114, Albuquerque, New Mexico, 87108. Nothing would please me more than being able to hire ten programmers and deluge the hobby market with good software.

Bill Gates

Bill Gates
General Partner, Micro-Soft



Software Copyright enters into play

# Copyrighted works enjoy the following exclusive rights:

- To copy, modify and distribute the work,
- To produce derivatives,
- To run, display, perform the work
- No other party has these rights except if explicitly granted

# **Free** Software inverts and bypasses the copyright principles

***Freedom to:***

- Run SW programs for any purpose by anyone
- Study & modify the source code
- Redistribute copies with no or trivial fee
- Distribute improved copies ensuring the same freedoms downstream

(aka “The four freedoms”)

Ownership Vs Commons

# Milestones of a movement

Free Software Foundations

1985

Linux kernel

1991

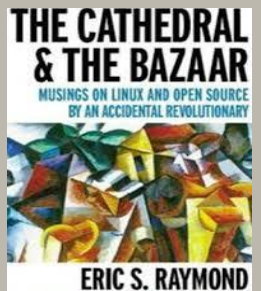
Emergence of the Internet

1993

Netscape declared Free Software

1996-97

1997- Eric Raymond publishes



Open Source Initiative

1998

Ubuntu 2004

2004

US courts put FOSS licensing on equal footing with proprietary

# Open Source Software

**pirnciples embeded in licensing schems**

- the freedom to redistribute OSS programs
- that source code always accompanies the program
- Must  explicitly allow for derivative programs
- the integrity of the author(s)' source code
- no discrimination against persons or groups
- no discrimination against fields of endeavor
- upon distribution of the program, all rights attached to it will be inherited  by all downstream recipients
- not to be linked to a specific product
- not to restrict other software in any way
- technology-neutrality

# Free SW Vs Open Source SW ?

OS is a development methodology; FS is a social movement." Richard Stallman

- **Same founding principles and spirit**
- **Complementary views not opposed**
- **Free SW embodies the concept of COPYLEFT to bypass the Copyright law obligations**

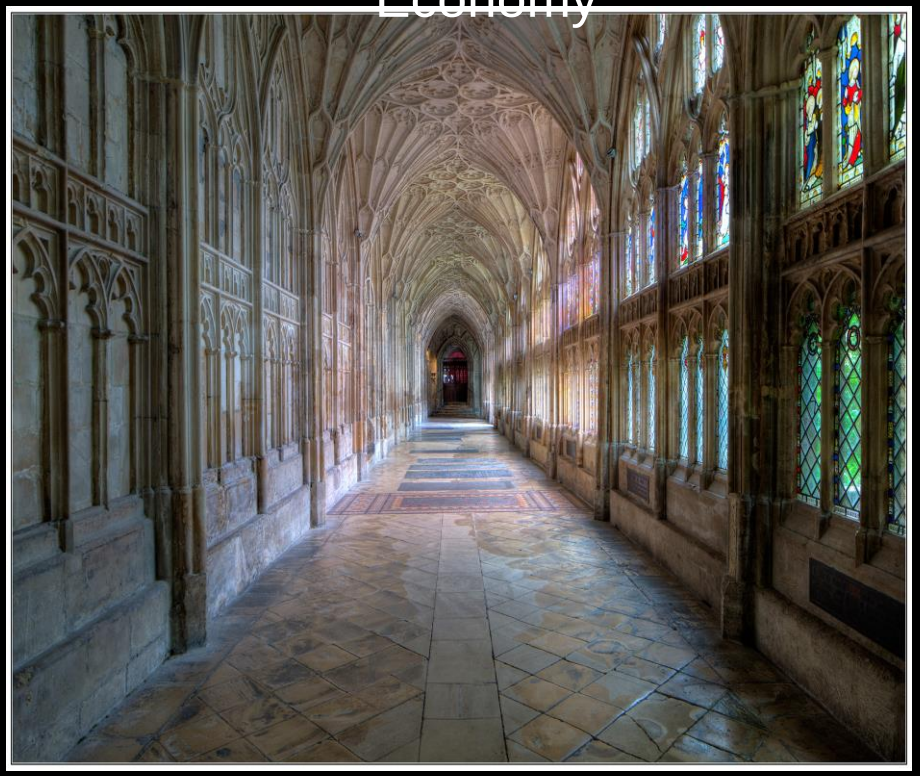
- **Open Source focuses on licencing schemes, and intergration with proprietary software**
- **Opens the door to Corporate world of proprietary software**
- **Opens to commercialization**
- **Key: FOSS is copyrighted - Openess and freedom apply to the SOURCE CODE – Free does not mean 'no cost'**
- **https://www.gnu.org/philosophy/open-source-misses-the-point.html**

# Two economies emerge in the IT spher

## FOSS 1.0 :Free vs Fee

A Commons economy

Closed-Proprietary Economy



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Version 2, June 1991

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## Preamble

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When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

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We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

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Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

# FOSS Licensing

1. CREATIVE COMMONS 2001.
2. FREE SOFTWARE LICENSE
3. GNU General Public License (GPL) v3.0 .
4. MIT license.
5. Mozilla Public License 2.0..
6. BSD 3-Clause “New”

# FOSS Licensing

7 Apache License 2.0.

8 AGPLv3

9 GNU General Public License (GPL) v3.0

10 Eclipse Public License.

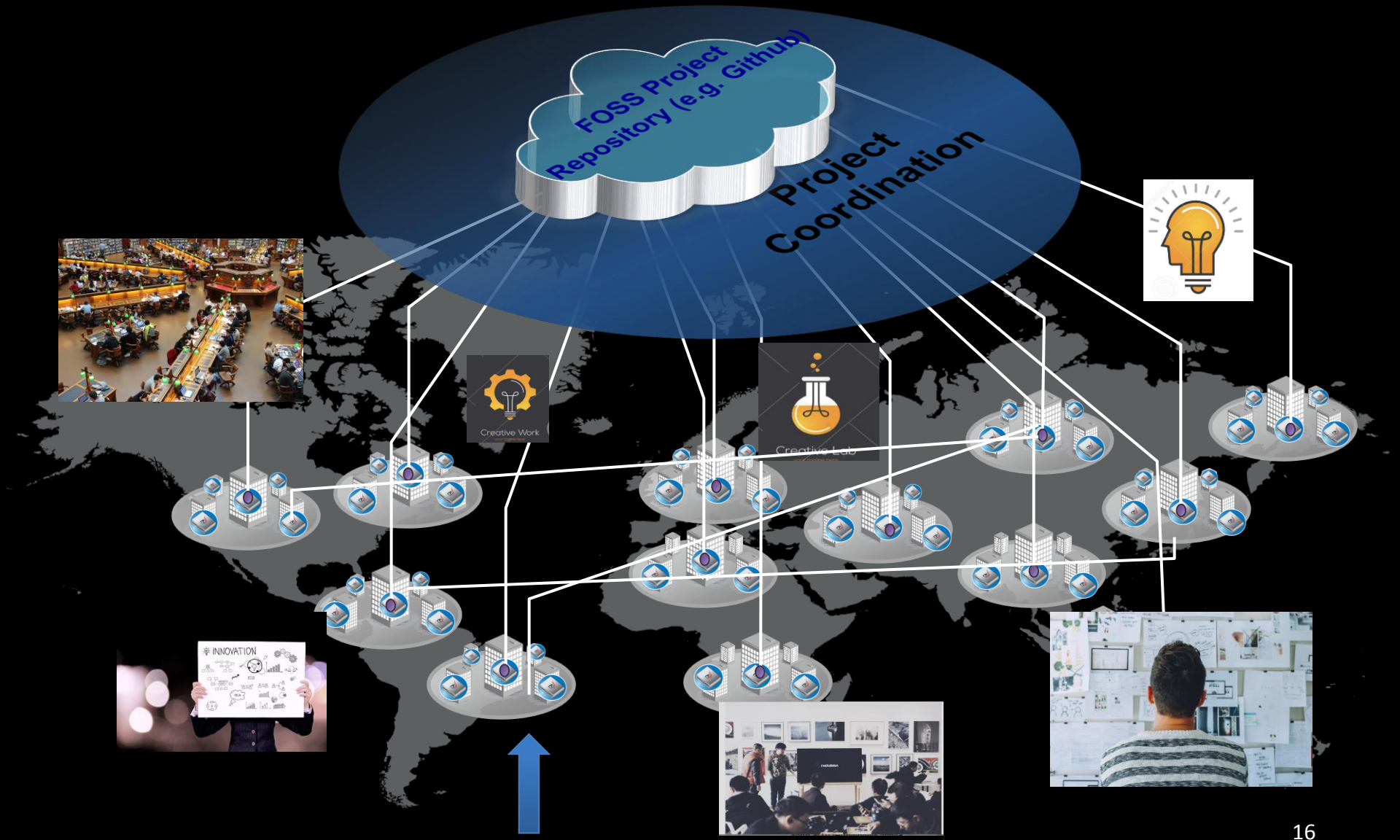
11 Common Development and Distribution License

12 GNU Library or "Lesser" General Public License

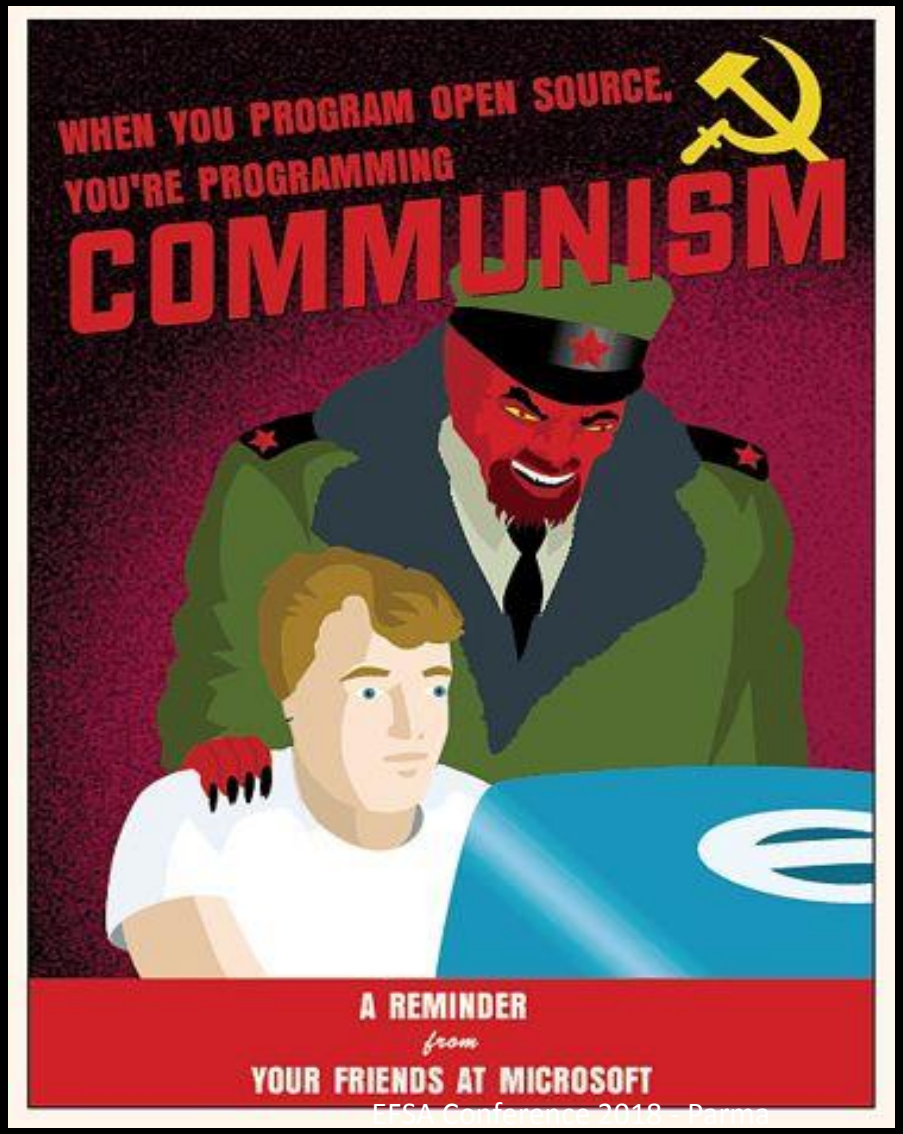
# Software Use types

| Freedoms / Term | Access code | Private Use | Modify | Distribute | Time limited | Cost | Copyrighted | License | Examples |
|---|---|---|---|---|---|---|---|---|---|
| Proprietary Software | ✗ | ✔ | ✗ | ✗ | ✔ | ✔ | ✔ | ✔ | Microsoft Word…. |
| Shareware | ✗ | ✔ | ✗ | ✔ | ✔ | ✗ | ✔ | | Games… |
| Freeware | ✗ | ✔ | ✗ | ✔ | ✗ | ✗ | ✔ | ? | AdobeReader<br>TeamViewer<br>Skype |
| Free software | ✔ | ✔ | ✔ | ✔ | ✗ | ✗ | ✔ | ✔ | LibreOffice<br>GIMP<br>BitDefender<br>GoogleChrome |
| Open Source Software | ✔ | ✔ | ✔ | ✔ | ✗ | ✗ | ✔ | ✔ | Linux<br>Apache<br>Firefox<br>SugarCRM<br>Piwik/Matomo |
| Fremium | ✔ | ✔ | ✔ | ✔ | ✗ | Y&N | ✔ | ✔ | LinkedIn<br>Badoo |

# FOSS Project : Global knowledge sharing across a FOSS community



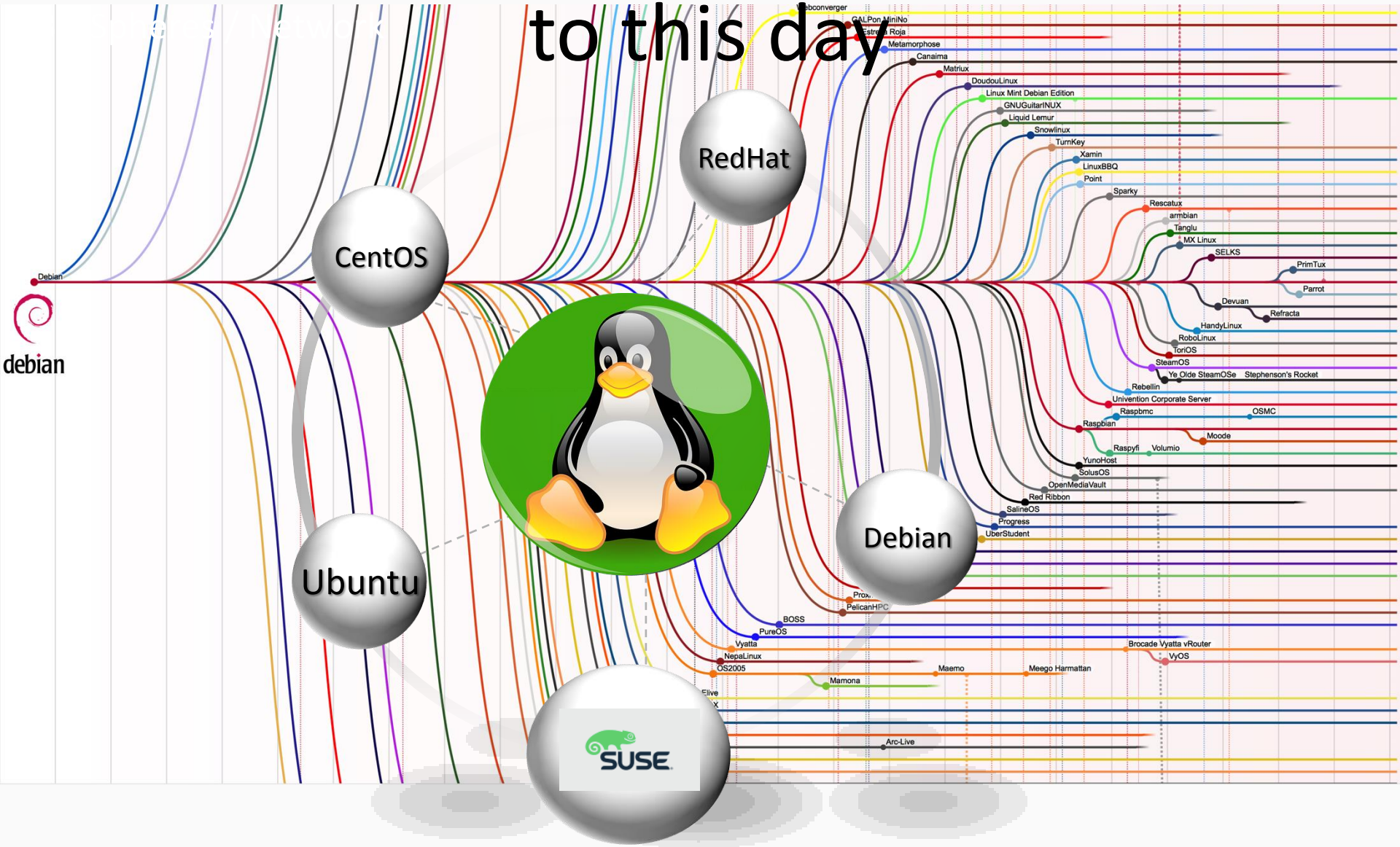
# From a suspicious activity to a thriving innovation model ….



# FOSS 1.0

Linux

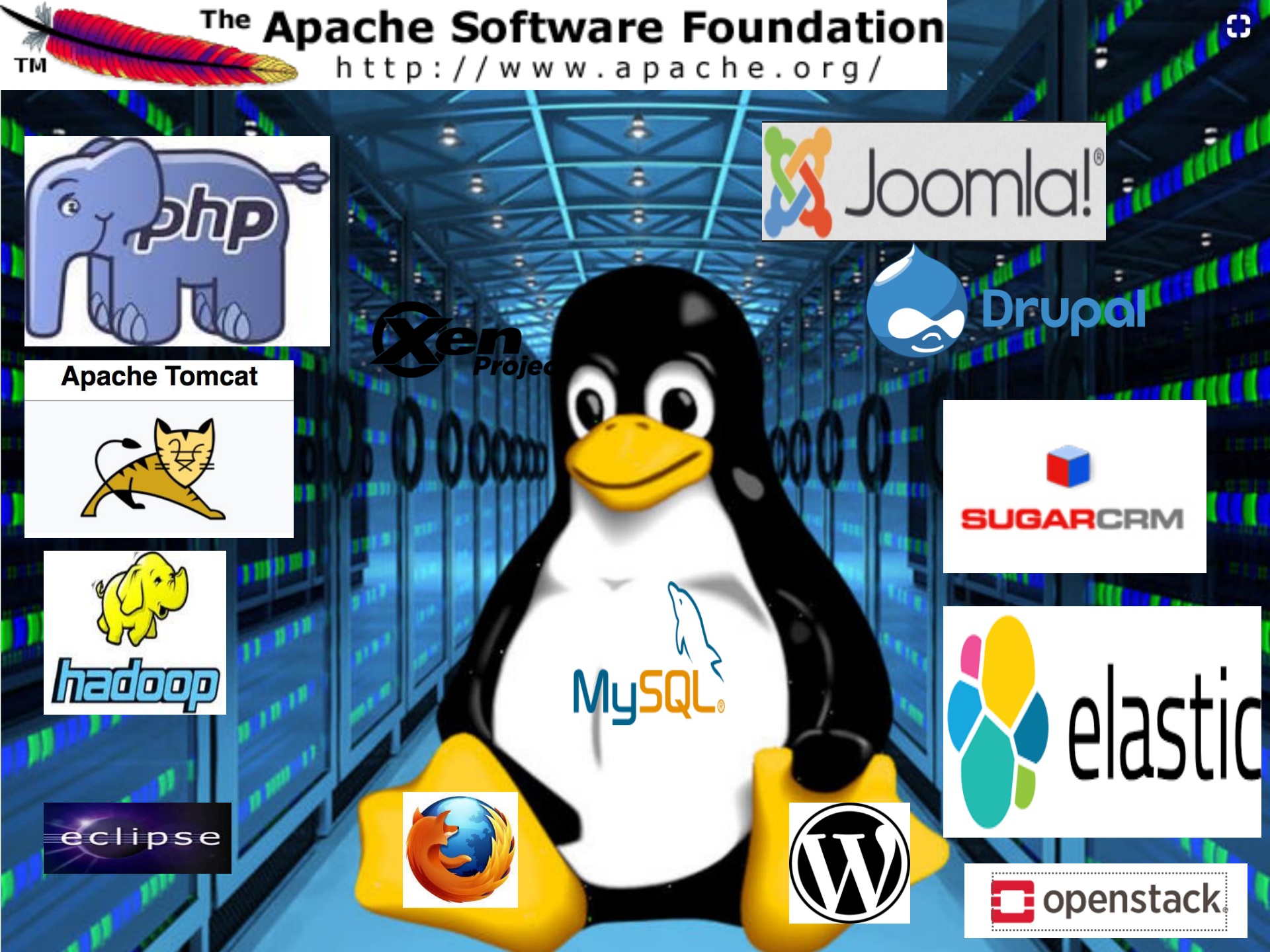
# Linux OS Family Tree: 800 distributions to this day



# A thriving software ecosystem in the making

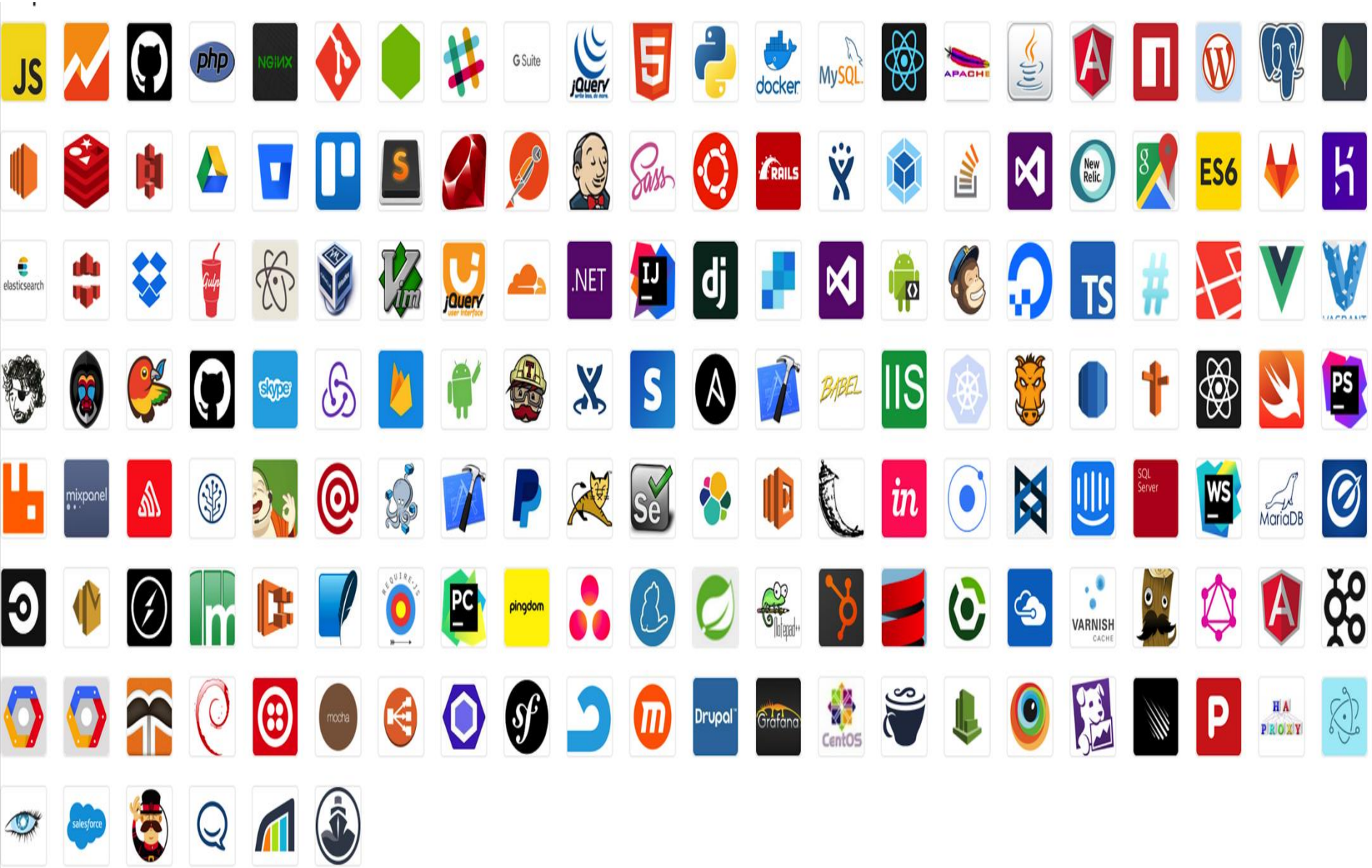
# mySQL and other FOSS db tools

There are in total nearly a 100 FOSS db systems


The Apache Software Foundation
http://www.apache.org/
TM
php
Joomla!
Drupal
Xen
Apache Tomcat
SUGARCRM
hadoop
MySQL
elastic
eclipse
openstack

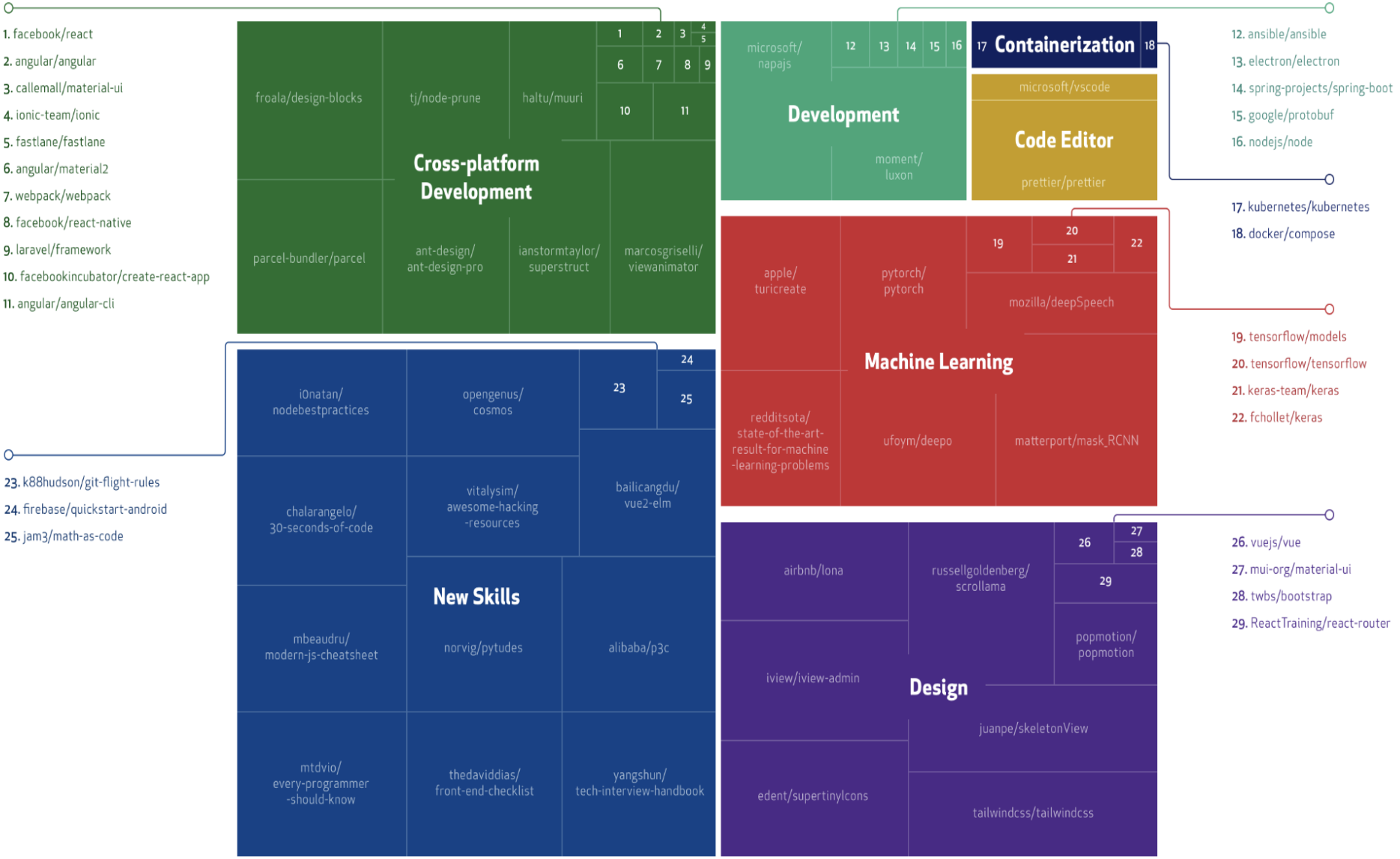
# Forces shaping the future of IT

# FOSS 2018


JS
php
NGINX
G Suite
jQuery
docker
MySQL
APACHE
RAILS
Sass
New Relic
ES6
elasticsearch
.NET
TS
skype
BABEL
IIS
mixpanel
SQL Server
MariaDB
VARNISH
CACHE
pingdom
Drupal
Grafana
CentOS
mocha
salesforce

# Fastest growing open source software communities in 2017

(Grouped by project type)



# FOSS 2.0: 20 years success

- Continuously increasing influence abd adoption rate
- Academia deploy a rich array of FOSS technology stacks
- Tech giants (Amazon, Google, Twitter, Facebook, IBM, Apple, Oracle) power their data centers' with Linux
- Web operations world wide rely on FOSS systems (**Apache suite)** Prestigious organizations power critical infrastructures with FOSS: e,g,: NASA, CERN, ESA…
- Business (Banks, Transportation,..)
- International organizations officially recognize the potential in FOSS
- 90% of (OECD) Governments include FOSS in their digital strategies (starting 2000-2003)
- FOSS projects and communities thriving
- Investors interest in constant rise

# FOSS practical benefits ?

## Businesses

- Very law CAPEX (upfront exp.)
- Innovation driver
- Flexible acquisition
- Rapid running-in - Free testing during market prospection
- **Security** (esp. data sec.)
- Freedom to customize
- No forced upgrades; no or minimal cost for upgrades
- Reasonably good support from FOSS Communities
- Reduces entry barriers
- Gives competitive edge

# FOSS in GOVS

# Why Governments support FOSS ?

- Increase the overall value expected from the use of technology – in most cases FOSS is cheaper
- Increase data control and security
- Foster freedom of choice and independence from big vendors Strengthen market competition (avoid monopolies/oligopolies
- Accelerate development of interoperability
- Propagate the FOSS model in public agencies
- Stimulate and nurture innovation
- Facilitate the creation of a sustainable, equitable technology marketplace

# OPEN POLICIES AT EU

- IN the EU political agenda since 2000 special role of EP pushing for FOSS adoption
- EC/EP leadership in all fields: H2020 Open Access (e.g.FOSTER with dozens of projects). Prominent position in the Single Digital Market
- Numerous programmes, constant strategy updates and follow-up, countless funded projects at EUI and across member states
- IDA, IDABC, ISA2 a coherent consecution of policies in support of FOSS
- Policies on copyright and cross boarder licensing, EUPL.
- EC under constant pressure to escape MS vendor lock-in. Not hopeless.
- **Strategic aims**: Create a local (EU) dynamic software industry that would boost economic growth and create favourbale conditions  for European software vendors, startups and SMEs to compete globally.
- Became a key global player in the IT industry; Strengthen independence from major US vendors
- EU Agencies: numerous FOSS systems in operational environments.
- Examples include:  Web and CMS, PM, DMS,, Analytics,..( Drupal, Linux, Alfresco, Apache, Zimbra)

# FOSS POLICIES AT EU

joinup

www.joinup.eu

# When should public agencies move to FOSS?

**Governments**

- Yesterday (or today) !
- Favourable government policy
- Budget is cut
- Current  model not functional
- Improved **security** is required
- Persistent legacy components need change
- Innovation is needed
- Increase level of control on your data
- When PPP opportunity appears

# How should public agencies switch to FOSS?

## Governments

- Ensure **executive support**
- Identify skilled human capital (internal&external esp, Linux admins)
- **Prepare change** (train, coach) well in advance -
- Replace first infrastructure workloads
- Seek to visit a success story site
- Identify **popular and time proven F**OSS products
- Procure **a solution** not products
- Ensure **sustainable support** (internal and external) - aim lasting benefits
- Involve legal service to manage licensing

# FOSS advantages and benefits in public agencies ?

**Governments**

- Cost effectiveness
- Independence and transparency
- Security (data)
- Open standards setting
- Lead by example

# From evolution to revolution

- A highly effective and **prolific** business model
- A comprehensive legal and licensing infrastructure
- An effective production standard
- A reliable foundational technology dominant in the market
- The largest repository of code and projects available on earth [GitHub - 4.7 million projects!]
- FOSS experts in highest demand ever in the past 30 years
- A vibrant services market; FOSS to reach 32bi by 2022
- Soaring adoption by businesses (78% worldwide using FOSS )
- The WEB powered by FOSS technology (Apache occupies 53% of all web servers market
- Google, Amazon, Oracle, IBM supporting financilally FOSS
- Governments enter FOSS 2.0 era i.e making FOSS a default choice
- Microsoft acquires the FOSS world in 2018 !

# FOSS 3.0 : an ‘opening’ universe

https://en.wikipedia.org/wiki/Open-source_model

# FOSS' Wordwide Organizations

ifrOSS

Institut für Rechtsfragen der Freien und Open Source Software

frdm Software Freedom Law Center

特定非営利活動法人
オープンソースソフトウェア協会
OSSAJ
Open Source Software Association of Japan

fsfe

Open Softwar Initiative

OER COMMONS
OPEN EDUCATIONAL RESOURCES

openstack

The Apache Software Foundation

The Framasoft association

The network Framasoft relies on its large community of volunteers but could not exist if it wasn't supported by an association founded in 2004.

The Framasoft association is a 1901 non-profit association whose character of general interest authorizes a tax deduction. Which shows its willingness to stay an association on a human scale (less than forty members, less than ten permanent staff)

You will find below some information including our statutes, the rules of procedure and the annual moral reports.

- Statutes of the association
- Internal Regulations

Framasoft

AFUL
Association Francophone des Utilisateurs de Logiciels Libres
*French speaking Libre Software Users' Association*
Promouvoir les logiciels libres ainsi que l'utilisation de standards ouverts.

ΕΛ/ΛΑΚ

WIKIMEDIA FOUNDATION

http://wiki.p2pfoundation.net/FOSS_Organizations_Directory

# FOSS vibrant world events

THE LINUX FOUNDATION

OSMC

GET YOUR

SPEAK

NOVEMBER 5-8 | 2018 | NUREMBER

## WHAT' S THE OSMC ABOUT?

The Open Source Monitoring Conference is the annual meeting of international monitoring experts, where future trends and objectives are set.

The four-day event comprises 3 tracks of expert presentations on Nov 06 & 07. On Nov 05 a variety of technical workshops imparting in-depth professional knowledge are offered. And on top the OSMC hackathon is scheduled directly following the lecture program on Nov 08.

DETAILS

Intro Network path Bootloader Device model Xen Conclusion

Securing your cloud with Xen's advanced security features

George Dunlap

Brussels – February 2-3, 2013

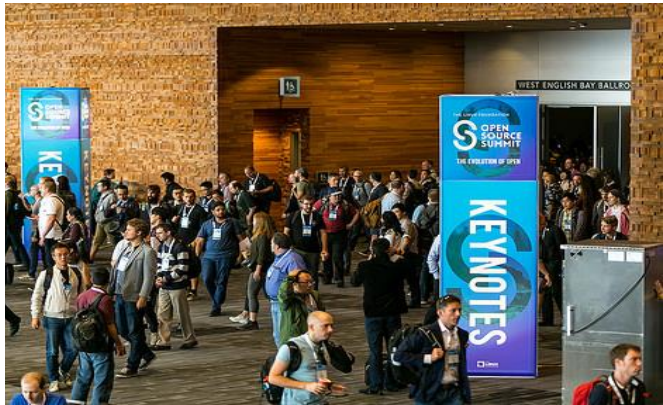
Xen.org

## Join us at SugarCon 2018

Our annual CRM event showcases thoughtful keynotes and break out sessions on business and technical topics focused on making your CRM sharper, smarter and more productive.

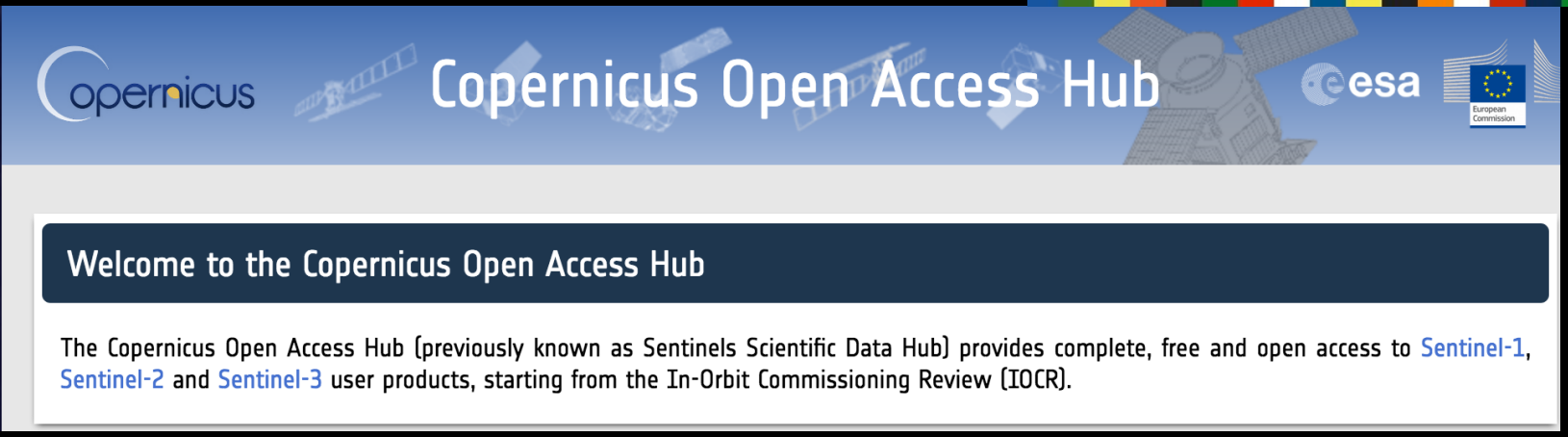
MIDWEST DRUPAL 2018 SUMMIT

devs openstack summit users

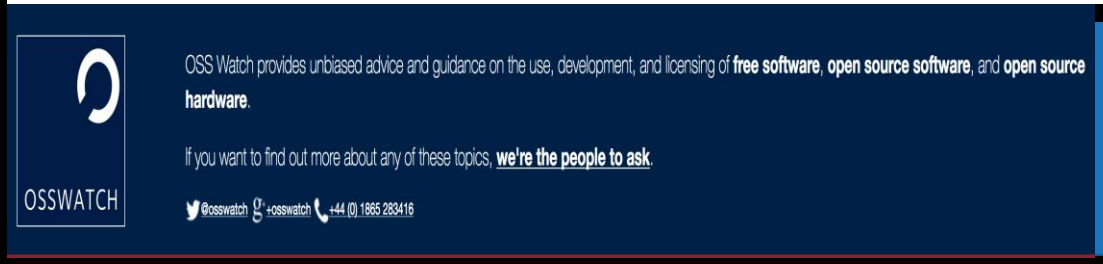


# FOSS Foundations and NPO

Open Government Partnership



# Opening Knowledge and Education.....



# Open Science & research

funded research should be made freely accessible to the public without charge.

- Open Science
  - Open Access
    - Open Access Definition
    - Open Access Initiatives
    - Open Access Routes
      - Gold Route
      - Green Route
    - Open Access Use and Reuse
  - Open Data
    - Open Big Data
    - Open Data Definition
    - Open Data Journals
    - Open Data Standards
    - Open Data Use and Reuse
    - Open Government Data
  - Open Reproducible Research
    - Definition of Open Reproducible Research
    - Irreproducibility Studies
    - Open Lab/Notebooks
    - Open Science Workflows
    - Open Source in Open Science
    - Reproducibility Guidelines
    - Reproducibility Testing
  - Open Science Definition
  - Open Science Evaluation
    - Open Metrics and Impact
      - Altmetrics
      - Bibliometrics
      - Semantometrics
      - Webometrics
    - Open Peer Review
  - Open Science Guidelines
    - Organisational mandates
      - Funders policies
      - Governmental policies
      - Institutional policies
      - Open Access policies
      - Open Data Policies
    - Subject policies
    - nce Projects
    - Open Repositories
    - Open Services
    - Open Workflow To

EOSC

The European Open Science Cloud

Open Access Journal Of Oncology And Medicine

# Open Ecology

OPEN FOOD NETWORK | FRANCE

DE

OPEN SOURCE ECOLOGY GERMANY

WELCOME

Enabling a sustainable way of life and creating an Open Source Economy through free access to self made means of production.

OSGeo

SARAPIS

OPEN SOLUTIONS TO LOCAL CHALLENGES

ABOUT | OUR WORK | BLOG | DONATE | CONTACT

To make that vision into a reality, we make strategic interventions in sectors that have the most to offer the global information commons.

* Projects: We produce and manage projects that show people how free and open source solutions can solve real and local problems.

* Advocacy: We help build support for the adoption of free/libre/open-source tools and techniques within nonprofit and ethical business communities.

EMERGENCY MANAGEMENT

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SUSTAINABLE AGRICULTURE

LEARN MORE

COLLABORATIVE ECONOMY

LEARN MORE

OPEN GOVERNMENT

LEARN MORE

Attribution: Top image by Wikipedia. Helicopter designed by Manuela Ribas, Farm by Brand Mania, Network designed by Gabriele Lorusso and Government Building by Adrian Coquet from the Noun Project.

TravelSpirit Foundation

We are a not-for-profit community and organisation that helps people working in the field of voluntary, public and private transportation to work together for a better tomorrow. We connect coders, planners, activists, and policy-makers through a global network. We provide research, advocacy, event organisation and business support services.

Through open source technology, collaborative commercial partnerships, and trusted data systems, our mission is to realise both the pro-social and economic potential of new transport paradigms, such as "Mobility as a Service" (MaaS) and a future world of "Connected & Autonomous Vehicles" (CAV). In doing so we believe we can create a more resilient, sustainable, and connected world.

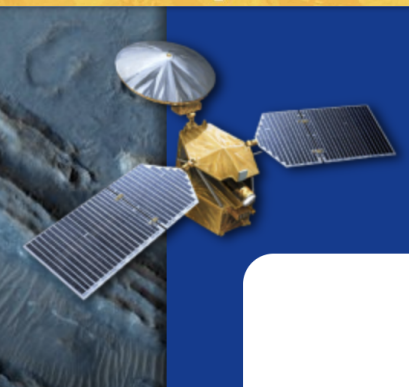
diverse and inclusive community membership

bPay by barclaycard | D. | ITS United Kingdom | ICONIC BLOCKCHAIN

clickworker

Solut

Data Powered By Crowd
fast, accurate, global



ClickW

SETI@home

SETI HOME Project Science Computing Community Site

What is SETI@home?

SETI@home is a scientific experiment, based at UC Berkeley, that uses Internet-connected computers in the Search for Extraterrestrial Intelligence (SETI). You can participate by running a free program that downloads and analyzes radio telescope data.

Join SETI@home

## Original Pilot Study (2000-2001)

# Open-design movement

From Wikipedia, the free encyclopedia

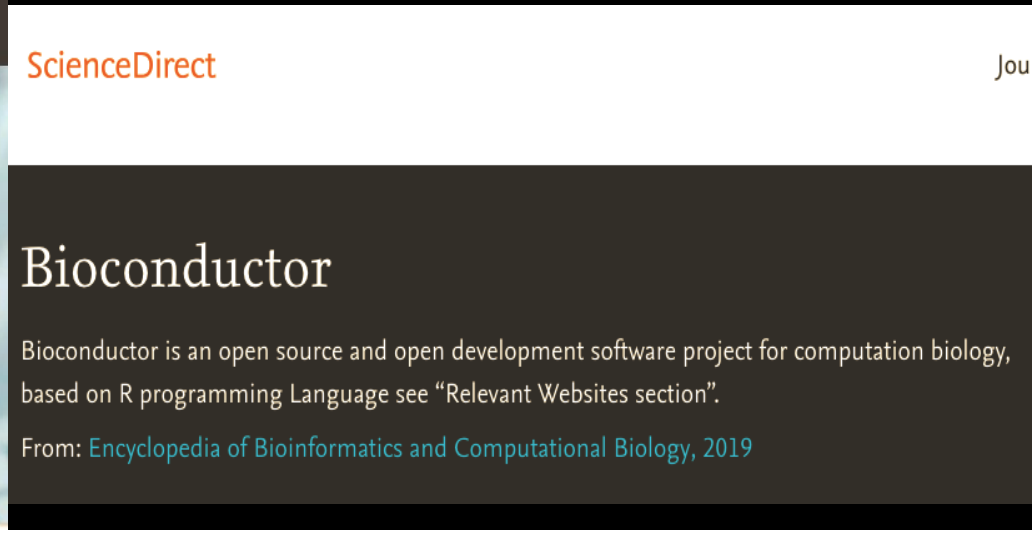
The **open-design movement** involves the development of physical products, machines and systems th
making of both free and open-source software (FOSS) as well as open-source hardware. The process i
monetary compensation. The goals and philosophy of the movement are identical to that of the open-so
physical products rather than software.[5] Open design is a form of co-creation, where the final product
a private company.

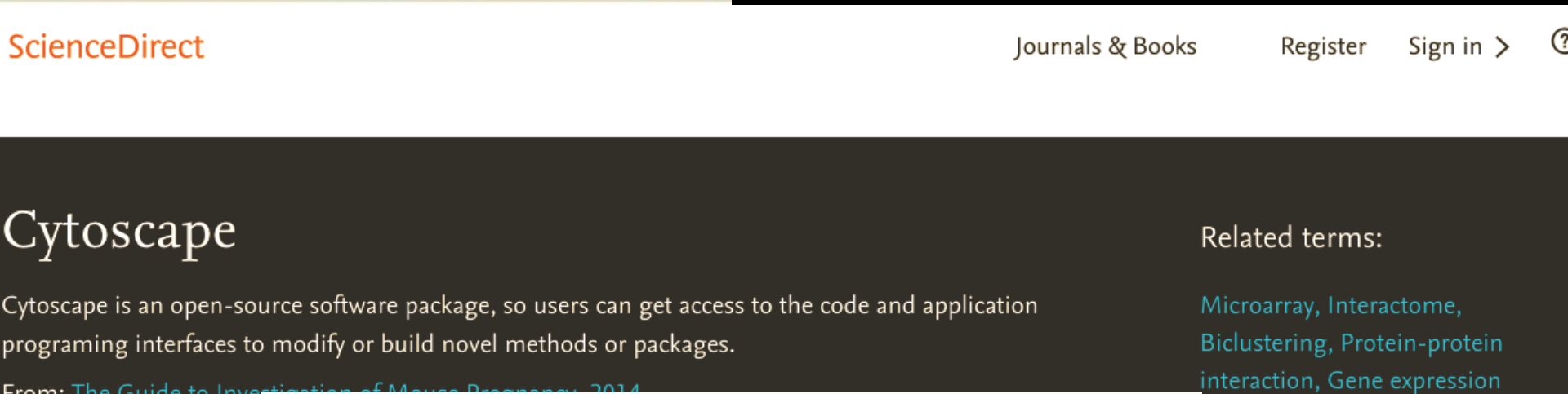
ent that showed that public volunteers (clickworkers), many working for
onger, can do some routine science analysis that would normally be
end. From November 17, 2000 to January 3, 2002, we had as many
**2,832 sessions**, and **2,378,820 entries**!

ur clicks is a map of the geologic ages of different regions of Mars.
ger it has been since a region has had water washing over it (or lava, or
re craters it has had time to accumulate. (By the way: Earth and its
th has very few craters. Think about why that is.)

**directly from clickworker inputs.**

# FOSS projects in Life Sciences



# The fabric of the FOSS model

- Open self-organizing communities decentralized and global powered by SW and the Internet
- Open peer-production and peer to peer interaction
- Open knowledge sharing
- open and free access to the goods produced i.e.
- shared work - shared results
- Common values and ethic

# FOSS values ecosystem

# Software

- A crucial human discovery
- Immaterial object
- Soft - Malleable
- Easy to copy
- Transformative
- Evolutionary

# New ethic

- A new shared "fiction"
- The hacker / Geeky culture
- A movement
- A promethean attitude to the discovery?

# The Internet

- Instant access
- Ubiquitous
- 7/24 available

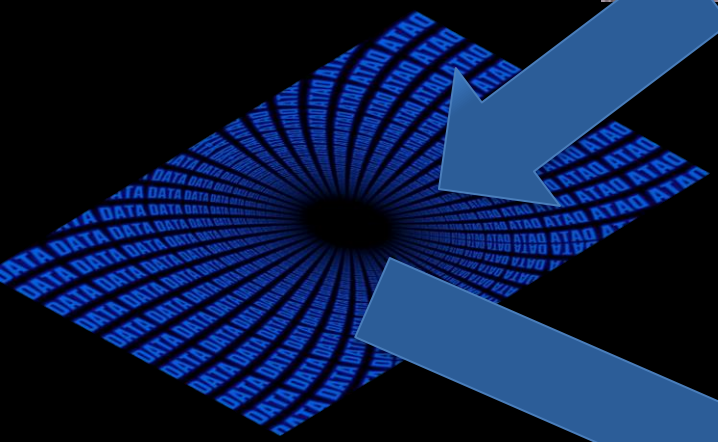
# FOSS impact

- Fast cost-effective production and vast value creation potential
- Fast open access to knowledge
- Accelerates technology adoption
- Creates a highly dynamic Innovation ecosystem
- Funding friendly
- Business opportunity creating - Money making
- Protecting data - reducing risks
- Creating a common (public ) good
- Propagates a new ethic
- Instates a universal paradigm !!!

# The power of FOSS in Scientific Research

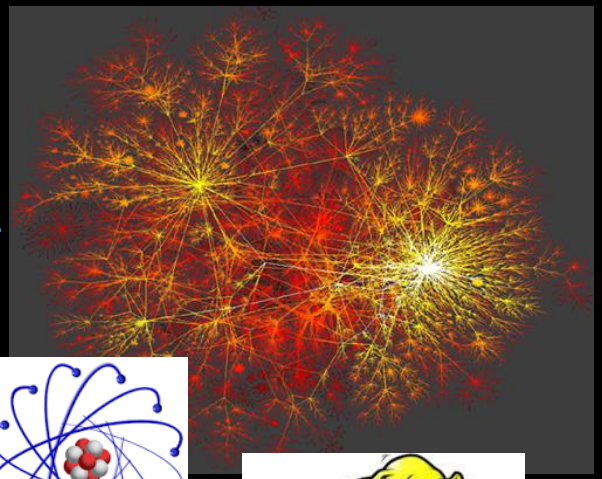
Higgs boson predicted 1964

**Large Hadron Collider (LHC) CERN 2008**



**850 TB data per day**

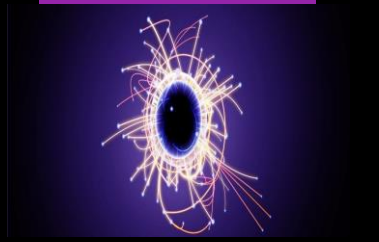
Worldwide community of physicists setup using FOSS principles and tools



Scientific Linux

hadoop

Higgs boson Discovered 2012



# Let FOSS inspire Life Sciences

- General perception: food world and systems highly proprietary
- Idem for Pharmacetical, Medical, Biotech…
- A lot of potential to change this  and reap the benefits of a FOSS approach in many LS fields
- It is not about using  FOSS tools it is about adopting the **whole spirit and method**
- Building research-data handling tools
- Collect and connect big data from the field
- Crowd-source plant genomics with open tools
- Food and ecological alert systems
- Growing plants in urban areas

# Time to enjoy an Open Source Cola

Tøyen-Cola!, an also GPL'd Cube Cola offspring from Norway (2015).

**Thank you !**

The texts of OpenCola and Cube-Cola recipes are published under the GNU General Public License (GPL)

Made in Norway (2015)

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