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# **Open Source for changing mobility across Europe**

**White Paper 2019**



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## Change

Mobility is now about a large ecosystem, made up of a multitude of heterogeneous actors, potentially competing but also dependent on each other. In addition, new global players are coming into the ecosystem and finally, the value share of digital is growing. All this happens in a short time in view of the adaptability of industrial factories. This set of constraints weighs on the actors individually and collectively.

To restore degrees of freedom, it is essential to bring useful, open and manageable resources to entrepreneurs. **In order to change the mobility behavior of millions of citizen in a short time, we need to act at European level with a network of open source pioneers by :**

- **supporting the development of Open Source at european level,**
- **integrate the Open Source production in European Commission financed projects.**

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# Open Resources

These open resources facilitate the action of intrapreneurs and the entry of small actors who use them to prototype and test their ideas, they also reduce the burden for an actor to maintain a resource. They also play a vital collective role in bringing actors together to work together and see each other progress through the resource. It is no longer necessary to have a third party, a client since the resource is useful, open and documented, it is self-sufficient.

Faced with all the problems to be solved, the number of actors involved, the implementation of open resources (data, software, hardware) is no longer an option. Nor is it the answer to everything, just a new way of acting in uncertainty and complexity. This must be combined with new individual and collective skills to be developed in order to use the commons, produce new ones and build new "anti-fragile" industrial strategies through the commons. The question now facing organizations: **"How can I leverage open source in my business ?"**

## A Network of Open Source pioneers

Several stakeholders are already working to develop open source for mobility. In UK, [Travel Spirit Foundation](#) was launched in Manchester to empower the MaaS with open source. More recently, VW foundation starts a new [Open Source Lab](#) in the EUREF Campus of Berlin for working on Shared Mobility. In Italy, [Fondazione per lo sviluppo sostenibile](#) aims to use open source to develop sustainable mobility. In France, Québec and in Africa, [FabMob](#) index and produce open resources by involving more than 200 partners (startup, school, industry, city, lab, cluster).

Europe must invent a new approach to ecosystem innovation through open source. Part of the public funds to support innovation could be allocated to produce open resources, useful to all entrepreneurs especially in the relevant areas of sustainable mobility.

Our energy must be focused on supporting volunteer actors to explore, those who have already done work on themselves. This commitment affects all areas (technical, legal, HR, organization & management), so we talk about "corporate culture". In this way, being interested in commons and open source is a good way to help change the culture of your company while improving relations with the ecosystem.

Approaches using Open Source are not opposed to a traditional approach but rather different in the objectives and the means to act in complexity, to bring products / services, to discover new markets. We also observe that the teams in charge of these subjects are gradually developing another culture in terms of external relations, exchanges and the collective. This makes it possible to reinstate in this new culture of openness, trust, and change the culture of risk among manufacturers.



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Open source is more in line with the evolution of organizations seeking to innovate by opening up to the outside world. This [document](#) presents the interest of ecosystems generally open. Recently, the European Commission has just published its digital strategy by supporting openness and open source ([.pdf](#) of the EC strategy).

## Super powers of Open Source

We have seen benefits on several levels:

- Curation, as communities are also working with competitors
- Generate new ideas
- Choose and generate new partnerships
- Identify key communities, and the most important spheres of influence.
- Attract the best talents seduced by this way of working
- Identify new markets and uses
- Improve brand image
- Create open standards faster
- Improves Confidence in the ecosystem by creating spaces for non-competitive dialogue
- Accelerator: deliver solutions faster
- Differentiation: pool resources and focus on its specificities.
- Facilitate / accelerate the digital transformation of the company

## Open Source in general

Open source is already installed in many markets. For example, concerning Linux:

- Linux is the catalyst for growth of the web and many platforms (mobile, IoT, cloud, big data)
- The 500 most powerful supercomputers use Linux
- 90% of the public cloud uses Linux
- Linux holds 62% of the embedded systems market
- Linux-based Android has surpassed Windows as the most used operating system in early 2017

In mobility, digital is changing several components:

- the value of the products of historical players such as the automobile which contains more and more digital. The digital culture of which open source is also developing.
- the distribution of value between actors whose position towards the end customer changes thanks (or because) to digital.



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- the ability to achieve a goal for a community. For example to know the traffic it is possible to buy data from Telecom operators, to have a quasi-free partnership with Waze or to install sensors.
- links and positioning between all actors to produce services.

## Open source in the Automotive field

Several foundations, associations, generally of world rank, produce resources open source with and / or for the constructors:

- ECLIPSE: Connected car projects <https://wiki.eclipse.org/OpenPASS-WG>,
- Open Source Solution for Model-Based Systems Engineering used in particular by Thales and [Continental](#)
- GENIVI : [GENIVI Alliance](#) is a non-profit consortium founded on March 2, 2009 by BMW Group, Delphi, GM, Intel, Magneti-Marelli, PSA Peugeot Citroen, Visteon, and Wind River Systems. The goal of this alliance, which brings together 160 companies, is to create a Linux-based operating system standard for the multimedia systems and automotive navigation systems industry (referred to as IVI systems for In-Vehicle Infotainment). . With a budget of around \$ 1 million a year to run the open source project (github / GENIVI), over 10 years, this gives an order of magnitude of 10 million USD without taking into account some budgets invested directly by the contributors.
- AGL, [Automotive Grade Linux](#) : with a budget of about \$ 50M per year since 2012:
  - 5 out of 10 of the biggest manufacturers including Toyota, Honda, Mazda, Nissan, Mercedes and more recently Hyundai,
  - 7 out of 10 of the largest semiconductor manufacturers, accounting for 95% of the automotive market,
  - the latest version has 72 million lines of code
- [Autosar](#) is a development partnership of the automotive industry, created in 2003. It develops and establishes a standardized and open software architecture for the electronic control units (ECU) of vehicles, excluding infotainment. Among the objectives are adaptability to different versions of vehicles and platforms, transferability of software, consideration of requirements of availability and dependability, collaboration between different partners, sustainable use of resources and maintainability throughout the "product life cycle",
- The [W3C](#) driven by the web players also has a dedicated GT: Automotive Working Group to develop the Open Web Platform specifications,
- [Open Alliance](#) is working on the topic of embedded networks to create standards and adopt an Ethernet network,
- [Open Automotive Alliance](#) or (OAA) is a group of major automotive and technology groups created to integrate the Android system into vehicles.
- BAIDU and its partners, always more numerous for embedded software, robotics simulation software (and hardware) with <http://Apollo.auto> as well as cloud



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- developments. In addition, Baidu announces a \$ 1 billion budget to help interested project owners use Apollo.
- <https://www.autoware.org/> Foundation to support open source projects in the fields of autonomous driving and to create synergies between industrial and academic fields,
  - TIZEN developed by Samsung :
    - <https://wiki.tizen.org/IVI>
    - 2015-09: TIZEN IVI HAS BEEN INTEGRATED INTO AUTOMOTIVE GRADE LINUX: <https://wiki.automotivelinux.org/>
  - OCF Automotive:
    - <https://wiki.iotivity.org/automotive>

But also many manufacturers start using open source :

- Toyota promotes [Global Vehicle Electrification by Providing Nearly 24,000 Licenses Royalty-Free](#)
- VW Foundation starts [Open Source Lab](#) in the field of Shared Mobility
- Tesla : <https://github.com/teslamotors>
- Fiat Mio : <http://fiatmio.cc>
- Ford : <http://openxcplatform.com>

Some startups working on autonomous vehicle :

- [Voyage about](#) security,
- [OPEN MOTORS](#) previously Open Source Vehicle

Some actors use open source scale models to lower financial barriers and equip communities of developers on the subject of vehicle robotisation :

- AMAZON launch a small vehicle [AWS DeepRacer](#)
- [DIY Robocar](#) launched by the father of Maker movement in USA

Finally, universities and schools produce open resources for educational and training purposes:

- The OSV Camp project initiated in Rennes is widely documented on the [wiki](#). The vehicle is not homologated for open road use, but it offers a modern and powerful pedagogical support to learn in action while advancing the resource. The FabMob supports the networking of several schools and laboratories to share and contribute on the same technical basis of Robotic Vehicle to train, prototyping, conducting research projects.
- MIT with Phil Tinn uses [open source vehicles](#) for training and studying robot / human interactions in the street.
- [Udacity](#) (mainly in US and China) propose online MOOC on self driving car and develop several [open source software](#) for education and useful for professional



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New kind of FabLab focused on Open Source are coming like [Shenzhen Open Innovation Lab](#), an Open Innovation Platform for Global Maker. The lab dedicates in exploring the issues and developing solutions to connect the massive production ecosystem to small hardware startups so as to promote the international standing of Shenzhen in the development of digital intelligent hardware and manufacturing and build a future intelligent hardware Silicon Valley by combining new open source method and current manufacturing system in Shenzhen.

## Open source in the broader field of mobility

Private actors are investing open source to facilitate the reuse by others of their development, attracting developers:

- UBER that produce many open resources. A final [article](#) mentions "ber now hosts more than 320 open source projects and repositories, with over 1,500 contributors delivering over 70,000 commits". Uber also opens some of its data via [Movements](#).
- GOOGLE or Sidewalk labs also produces open resources ([example in cartography](#), or [urban planning](#)) and uses open source software like [SUMO](#). Google is also behind standard public transport data with GTFS,
- Kisio Digital - Keolis, SNCF group develops Navitia, open source route calculator and open databases <https://github.com/CanalTP/navitia>

Global associations like:

- Open Street Map play a central role on key resources such as the map without having the budgets of the private competitors (link to [OSM budgets](#) of around € 200k),
- [Calypso](#) in the field of ticketing are built on open source solutions and offers open source offers like [Keyple](#).
- Foundations like Bloomberg are launching projects such as [SharedStreets](#): a project of the Open Transport Partnership, a non-profit organization, and public-private collaboration-builds tools for transport-related data. Blending technology and policy.

Public actors also like:

- The World Bank has also launched [OpenTraffic](#): OpenTraffic is a global data platform to process anonymous positions of vehicles and smartphones into real-time and historical traffic statistics. We're building this in the open, using fully [open-source software](#),
- AFD and FabMob an open resource center for Africa with [DigitalTransport4Africa](#)
- The French State with:
  - <https://transport.data.gouv.fr/> which structures and promotes open data in the field of public transport.



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- the development of open source software bricks such as [Chouette](#) for public transport. The AFIMB is responsible for the management of the two software packages CHOUETTE and IRYS implementing respectively the NEPTUNE and SIRI standards.

## Open Resource Library

- Many open resources on the subject: <https://www.reddit.com/r/libreauto/>
- The FabMob has identified more than [300 open resources](#) in areas related to mobility.

## Join the movement

You want to integrate open source in your project, strategy and culture. Join us and sign our [letter of interest](#).

Any question : [contact us](#) !