

Why the renewed buzz in open geospatial?

Over the last few years I've noticed that many job advertisements now request open geospatial skills - including skills in software like QGIS, PostGIS/PostgreSQL and GeoServer. Multiple companies offer training in these technologies, and these companies are being hired to further refine open geospatial technologies. And it is now the norm to see government agencies publish geospatial data via open standards, under open licenses.



Figure: Open Source applications available in the OSGeoLive desktop.

<[Source image](#)>

What is driving government, business and academia toward open geospatial? I believe there is a growing realisation amongst enlightened decision makers that openness facilitates collaboration, which fast tracks innovation, and mitigates many of the challenges introduced by the digital economy. Issues such as rapid obsolescence, monopolies, wealth disparity and lowering of public trust.

But if we are to realise these benefits, we need to be able to understand and then explain the subtle and yet key success characteristics of openness. Here is the dilemma faced when considering open business:

Looked at through the lens of traditional management, openness and collaboration is time consuming, imprecise, unreliable, hard to manage, rarely addresses short term objectives, and hard to quantify in a business case. And yet, in a digital economy, collaborative communities regularly out-innovate and out-compete closed or centrally controlled initiatives.

So how do we justify following a more effective, sustainable, open and equitable strategy? The answer involves understanding the digital economy, complexity, trust, innovation and obsolescence.

Digital economy

The digital economy has fundamentally changed the rules of business. Ignore this at your own peril. Zero duplication costs and the connectivity of the internet has led to wicked complexity, interdependence, rapid innovation, and on the flip side, rapid obsolescence.

These challenges are heightened in the geospatial domain. Our data types are especially complex as we try to describe a not-very-round earth on flat maps, with slowly moving continents, and we need to achieve all this at multiple scales. Our datasets are huge, and we've been forced to solve big data challenges well before most other domains. We have been forced to collaborate, as our maps need to integrate with our neighbours and our map layers only make sense when presented on someone else's base map.

Luckily, we've had big players such as defence and government investing in these problems, and the geospatial domain has developed advanced solutions to these challenges. We have mature standards; collaborative communities; comprehensive and healthy open source software; and a wide range of open data sets. We will come back to these themes.

Trust

Due to the increased complexity of our systems, it is no longer feasible for one person to understand all of a system's intricacies. So decision makers need to assume, deduce and trust information provided by others. It means that sourcing trustworthy advice has become a key criteria for success in the digital economy.

So how do we assess trustworthiness?

$$\text{Trustworthiness} = \frac{\text{Credible * Reliable * Open * Intimate}}{\text{Self Interest}}$$

([Source image](#))

It turns out we all use a variant of this trustworthiness equation. We trust people who are credible and who have track records of providing reliable advice in the past. We trust people who are open and transparent. We trust that processes, such as the scientific method, create more reliable outcomes. We trust ourselves, our family, our friends, because they look

out for us, and we look out for them. We are suspicious of people who stand to gain from advice they give us.

But we also know that all processes can be gamed. And the more complex a system, the easier it is to bamboozle people and game the system. Part of the reason open communities have become so successful is that openness lead to trustworthiness. Let's break this down, starting with open source software.

Freedom and Altruism

Open products, such as open data and open source software, by definition, are provided free to use, copy, modify, and improve. The altruism associated with giving so much, and receiving little in return, increases the trustworthiness of the giver.

Transparency

Open communities typically communicate transparently and openly. Conversations are public. Everyone has the opportunity to join and contribute. Decisions are made openly. Issues and limitations are published and shared. Being transparent and open to public critique reduces the potential for hidden agendas and creates trustworthiness.

Do-ocracy and Meritocracy

Within a "do-ocracy" a person who is altruistically motivated to "scratch an itch" decides how they spend their time. Within complex systems, these people are usually the best qualified make good decisions, which in turn makes them trustworthy.

Likewise, in a meritocracy, the best ideas win, no matter where in the management hierarchy the idea comes from. Increasingly, the best ideas are coming from the people on the tools, and organisations which embrace meritocracy are more likely to be both trustworthy as well as being more successful.

Open Standards

A key strategy for managing complexity is to divide large systems into modular subsystems. Using modular architectures, connected by open standards, reduces system complexity and enables interoperability. This reduces technical risk, facilitates sustained innovation, and mitigates the risk of vendor lock-in. It means you can improve one module, without impacting the rest of your system. This helps with maintenance, innovation, and keeping up with latest technologies.

Obsolescence and monopolies

Because data and software are so time consuming to create and so easy to copy, they are excessively prone to monopolies. This holds true for both proprietary and open business models.

A product that becomes a little better than its competitors attracts users, developers and sponsors, which in turn allows that product to grow and improve quickly, allowing it to attract more users. This highly sensitive, positive feedback leads to successful projects becoming "category killers" with all the others becoming obsolete.

However, open and proprietary business models differ in how realised value is shared.

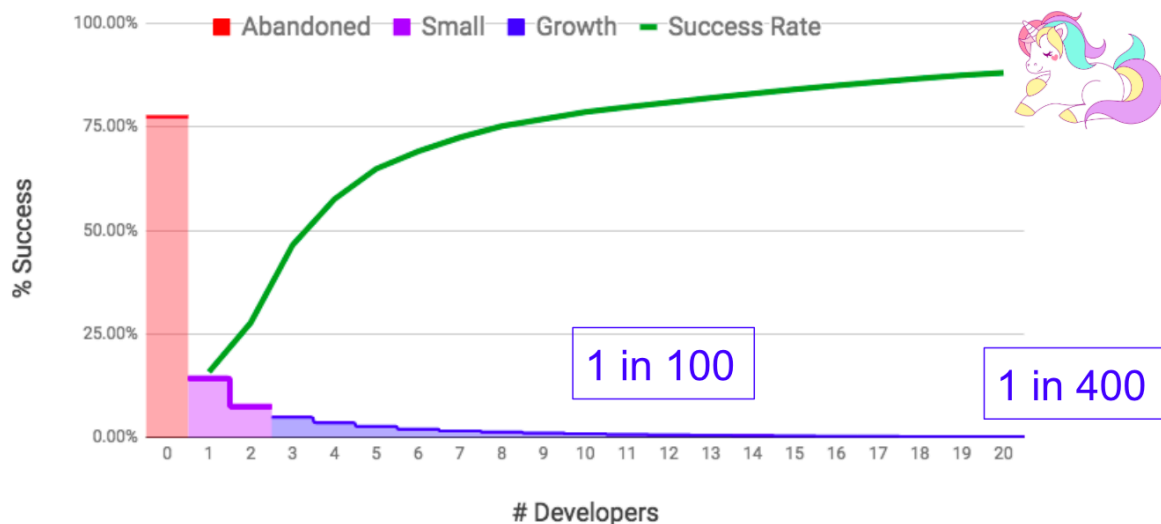
Open licenses are structured such that multiple companies can use and support the same product, so the market self-corrects any tendencies toward price-fixing. Effectively, open licenses democratise information and shares realised value.

By comparison, the ruthless competition between proprietary companies results in “winner takes all” scenarios, leading to growing wealth inequality.

Picking a winner

Most open projects fail. Actually, the success rate of innovative technology projects across the board is low, but let’s start by looking at research into open source software.

Open Source Success Rate



[\(Source data\)](#) [\(Source image\)](#)

Professor Charlie Schweik [studied thousands of open source software projects](#) and found that most projects are abandoned, one in seven remain with just one or two developers, and only projects of exceptional quality attract sustained growth and large communities.

The successful projects typically possessed a clearly defined vision, clear utility, and had leaders who lead by doing. Projects which manage to attract large teams tended to provide fine scaled task granularity, making it easier for people to contribute, and often attracted financial backing.

Another strong indicator of success is demonstrated conformance with the established processes of open communities, such as the Open Source Geospatial Foundation (OSGeo)’s incubation process. These cover quality, openness, community collaboration, maturity, and sustainability.

Bringing this all together

So if we bring this all together, what have we learned?

The digital economy leads to high complexity, rapid innovation and rapid obsolescence. Increased complexity requires us to trust more. So increase the value you place on trustworthiness, openness and transparency.

Collaboration and openness fast tracks innovation. Value, recognise, select and apply collaborative practices.

Don't be naive, most open projects fail. (Most proprietary projects fail too). Learn how to pick winners.

Openness and collaboration leads to the democratisation of wealth and power. Learn how to be part of the community - it makes good business sense.

Our geospatial domain has excellent open data, software and standards to draw upon. Learn all about them at the upcoming FOSS4G SotM Oceania conference in Melbourne 20-23 November 2018.

About the author



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By day, Cameron is a software, information, geospatial and open technologies consultant, and has recently joined the spatial team at Technology One. By night he helps build open source communities, mainly in the geospatial domain. Over the last couple of decades he has contributed to numerous open source projects, some of which he started. He's contributed to the OSGeo Foundation board, to committees and has co-authored many strategies and processes.

<http://cameronshorter.blogspot.com/>

Separate column: Open Geospatial Highlights

There is a comprehensive stack of mature, standards compliant, widely used, widely supported and rapidly innovating Open Source Geospatial applications, data and standards, all available for free. Here are some of the highlights:

<images - look for screen shots from project overviews in <http://live.osgeo.org> >

OSGeoLive - training material and Linux distribution

OSGeoLive is a self-contained bootable Linux distribution, that is pre-installed and pre-configured 50 of the best geospatial open source applications along with sample datasets, project overviews and quickstarts. It is ideal for quickly learning the open source stack of software. <http://live.osgeo.org>

PostGIS - spatial database

PostGIS spatially enables the PostgreSQL object-relational database. It is stable, fast, standards compliant, comes with hundreds of spatial functions, and is the most widely used open source spatial database. https://live.osgeo.org/en/overview/postgis_overview.html

GeoServer - web service

GeoServer publishes maps from databases, shapefiles and more via numerous standards based web services. Mapserver is also worth checking out.

https://live.osgeo.org/en/overview/geoserver_overview.html

QGIS - desktop GIS

QGIS, is a user-friendly GIS client which allows you to visualize, manage, edit, and analyse data, and compose printable maps. It supports numerous vector, raster and database formats, and boasts many toolboxes, including access to many of the advanced GRASS analysis modules. https://live.osgeo.org/en/overview/qgis_overview.html

OpenLayers - browser GIS

OpenLayers is a JavaScript browser based library, designed to work across a wide range of browsers and mobile platforms. Leaflet is also worth checking out.

https://live.osgeo.org/en/overview/openlayers_overview.html

Open GIS Data

There is plenty of open data to choose from as well. Both Australian and New Zealand governments are publishing many datasets under an open license, which is able to be sourced at <https://data.gov.au/> and <https://data.govt.nz/>. Australian geospatial datasets can be easily viewed at on the National Map at <http://www.nationalmap.gov.au/>.

OpenStreetMap also has good coverage. It is community built, similar to Wikipedia:

<https://www.openstreetmap.org/>

Open GIS Standards

For over a decade the Open Geospatial Consortium has coordinated the development of robust standards for sharing geospatial data between both open source and proprietary applications and between organisations. <http://www.opengeospatial.org/>

FOSS4G-Oceania Conference



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The Free Open Source Software for Geospatial (FOSS4G) and State of the Map (SotM) Oceania Conference will take place in Melbourne 20-23 November 2018.

The event co-locates FOSS4G, the conference for open source geospatial software, and State of the Map, which brings together the OpenStreetMap community.

2018 will be the first time in nine years that these communities have been brought together in a single Australian conference, and the event will feature a full day of workshops, two days of presentations, a community day and a program of social events.

<https://foss4g-oceania.org/>