From Code to Collaboration:
Making Open-Source a Strategic Choice for Organisations

Ana Belgun

Co-founder Terria

Board Member OS Geo Oceania

Outline

Objective: Enhance understanding of open source for business and government

- About us
- Open-Source evolution
- What is Open Source and how does it work
- Implementation - lessons learnt
- Bridging the gap
- Where does one start

Terria is a mission driven team focused on simplifying access to spatial data and technologies, including digital twins.

OSGeo Oceania is a volunteer organisation devoted to growing and enabling the OpenStreetMap and Open-Source Geospatial communities in Oceania.

The organisation welcomes participants of all skill levels, from hobbyists to professionals, engaged with mapping in the Oceania region.

FOSS4G SotM Oceania is the regional conference series of the 'Free Open Source For Geospatial' and 'State of the Map' conferences centred on the Oceania community. It's an inspiring and innovative event with a warm community feel. It includes conference sessions, workshop days, and a community day for mapathons.
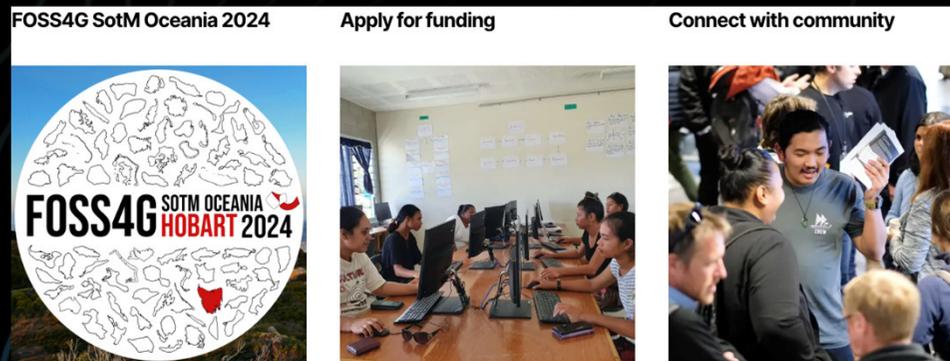
The Open-Source vs FOSS4G evolution

1980s — Birth of the Free Software Movement
Initiated by Richard Stallman, emphasizing software freedom and user rights.

1990s — Rise of Linux and Open Source
Emergence of Linux and formalization of the term "open source."

2000s — Mainstream Adoption
Widespread use of open source in consumer and enterprise software

2010s — Corporate Embrace
Major companies began investing in and contributing to open source (e.g. Microsoft, Google, IBM)

2020s — Modern Era
Open source is foundational in cloud, AI, and digital infrastructure; governance, sustainability, and security are in focus.

70-80s — Early foundations
Beginnings of geospatial open-source tools (GRASS GIS)

1990s — Emergence of key projects
Development of projects like PostGIS and GDAL

2000-2005 — Foundation era
Establishment of OSGeo, QGIS, GeoServer, OpenStreetMap

2006 - 2010 — Maturation period
Growth and wider adoption of FOSS4G

2011 - 2015 — Web mapping
Introduction of Leaflet, Mapbox, and Cesium

2016 - onwards — Cloud and modern era
Shift towards cloud-based and modern solution

How open-source software works

Almost all modern systems and software packages (both proprietary / open) rely on some open-source software; either as dependencies or tools used in development.

OSS is the result if one individual/group of developers' work; in many cases voluntary.

ALL MODERN DIGITAL INFRASTRUCTURE

A PROJECT SOME RANDOM PERSON IN NEBRASKA HAS BEEN THANKLESSLY MAINTAINING SINCE 2003

Credit: https://xkcd.com/2347/
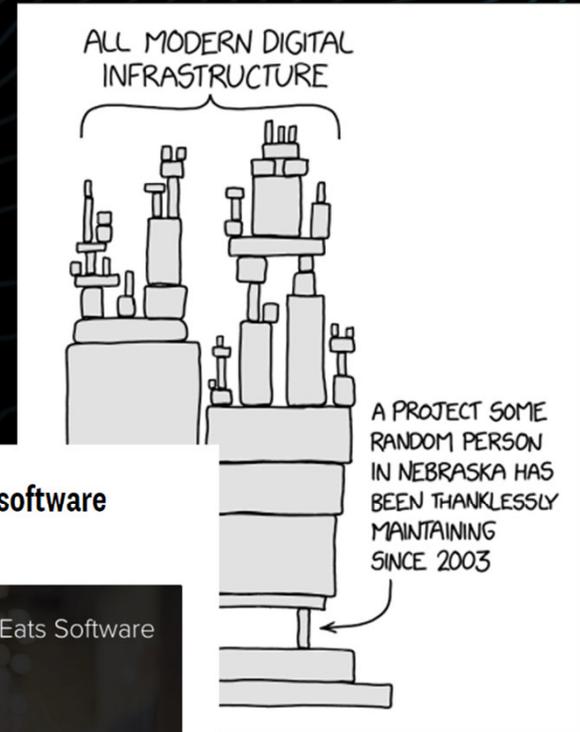
OSS 3.0 – Open Source is a part of every software company.

As Software Eats the World, Open Source Eats Software

BUSINESS INNOVATION

TECHNOLOGY INNOVATION

AI

Open Source Data

Blockchain

Ad-supported

Data-driven Revenue

Crypto Tokens

ANDREESSEN HOROWITZ
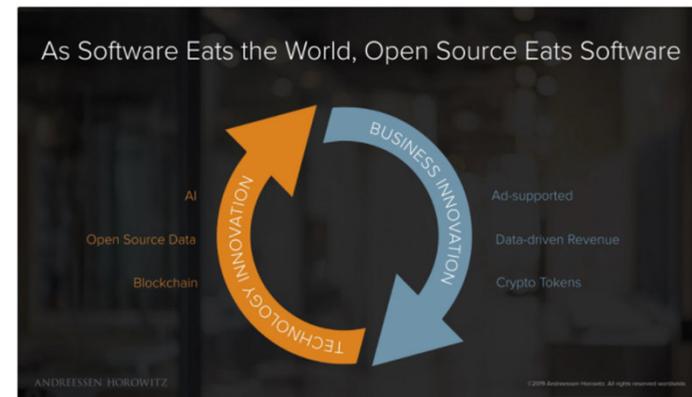
Credit: Andreesen Horowitz

How open-source software works

Open-Source Software needs reliable, responsible and sustainable core teams to manage libraries.

Open-source software. Is it 'free'?

❤️ Time, love & dedication
$$ Sponsorships
$$$ Commercial revenue
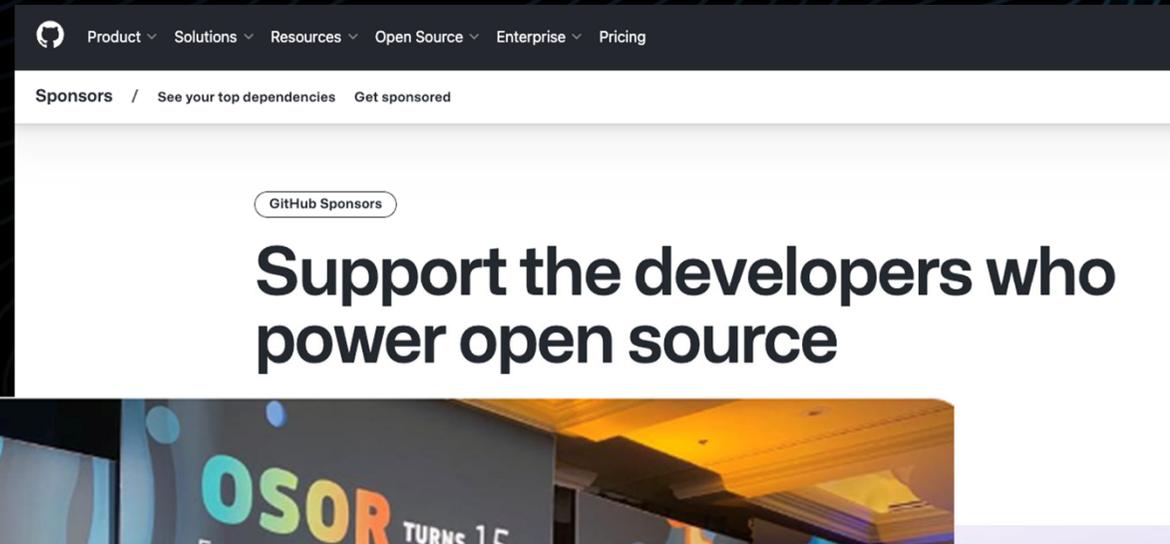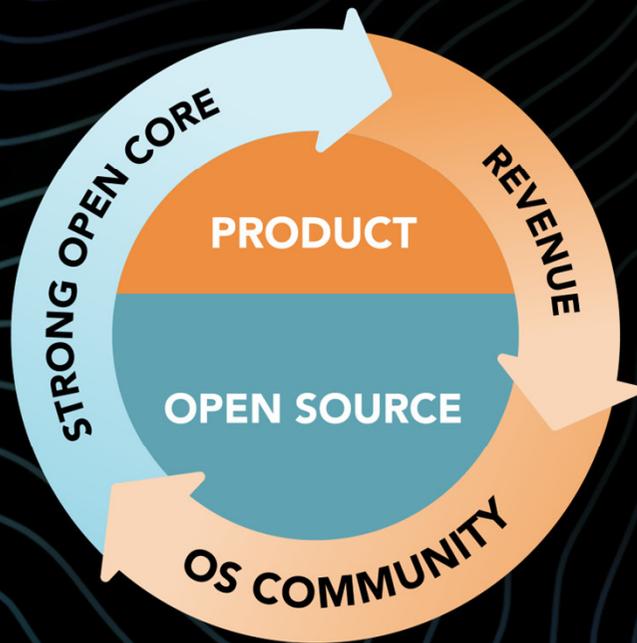
Adoption – Framework

DBDS Framework for Software Adoption (Alessio Fanelli)

- **DISCOVER** – engineering metrics
- **BUILD** – engineering metrics
- **DEPLOY** – engineering + business metrics
- **SCALE** - engineering + business metrics

Adoption – lessons learnt

- **Appetite -** most organisations are open to understand / trial
- **Deploy & Scale** – Performance, security, support MATTER A LOT
- Putting yourself in their shoes – understand requirements, narrative and help teams work within their organisation environment
- **Holistic implementation** – leave 'library tribe' aside

Adoption examples around the world

Desktop - QGIS in municipal and regional planning (https://hub.qgis.org/map-gallery/)

Many local governments in Europe and Latin America have adopted QGIS to manage urban planning, zoning, and environmental monitoring projects. For example, some Italian municipalities use QGIS to integrate land use, infrastructure, and environmental data to support planning decisions.

Data - OpenStreetMap and Humanitarian Mapping

The Humanitarian OpenStreetMap Team (HOT) has coordinated mapping activities in disaster-stricken regions (e.g., after earthquakes or floods). For instance, during the 2010 Haiti earthquake, volunteers used OSM data to help first responders navigate damaged infrastructure.

Data infra & Web - GeoNode for Open GeoPortals (https://geonode.org/gallery/)

The Humanitarian OpenStreetMap Team (HOT) has coordinated mapping activities in disaster-stricken regions (e.g., after earthquakes or floods). For instance, during the 2010 Haiti earthquake, volunteers used OSM data to help first responders navigate damaged infrastructure.

Data infra - MapServer and GeoSever (https://geoserver.org/)

Government agencies, such as state and local authorities in the United States, have adopted GeoServer to serve geospatial data via web services (WMS, WFS). These services are used in public safety, infrastructure management, and urban planning projects. Similarly, MapServer has been adopted by organizations in Europe for real-time mapping and data dissemination. Eg: The Office of Geographical and Environmental Information of the state of Massachusetts, the Great Lakes Commission etc.

Open-Source Adoption Benefits

Cost efficiency – Flexibility in tech stack to customise solutions (easier to implement); **Better negotiating power** (see capacity building); seat-free

**Innovation** – Rapid, community-driven development

Talent – Access to a broader talent pool and global best practices

Capacity building – Organisation's technical 'fitness'; independence
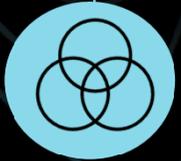
Interoperability – with open and proprietary standards to support whole systems and integrations

Open-Source Adoption Challenges

Security management – management of vulnerabilities

Support – Escalation paths

License, IP – Understanding license and IP, Terms of Use

Integration – legacy systems compatibility

Bridging the gap - Organisations

Objective - Balancing the cost efficiency, innovative and growth potential of OSS with organisational business requirements

What can be done
- **Framework** – Create an overall software adoption framework and criteria; followed by clear internal process and communication of benefits when OSS is an option

- Technological fitness – build internal expertise in different tech (regardless if using OSS); will result in better understanding and assertiveness of what organisations need and want from providers

- **Engage** – with OSS communities and understand pathways for adoption and escalation; ask questions, don't make assumptions.

- Support – OSS through sponsorships, trials, projects, scaled deployments. They all contribute to sustainability and ultimately, more robust options for organisations.

(other) Things to consider - Organisations

Holistic approach

Not one library, tool, technology can solve all use cases/requirements. There's always a combination of open and proprietary.

Follow the Data:

data production, hosting, maintenance, processing, visualisation/consumption, analysis, sharing, collaborating

Application/System and its use case

Database; cloud; desktop GIS vs web mapping; 2D, 3D, timeseries; spatial analysis; standards interoperability

Where does one start?

Bridging the gap – Open-Source Community

Objective - Protect the Open-Source core values while adapting to organisational needs and creating an ecosystem that benefits both

What can be done
- **Security** – Improve practices, documentation, transparency, vulnerability management

- Sustainability – clear governance models, grow contributions and maintainers, custodianship planning; strengthen and grow core team (custodians)

- **Support** – clarify pathways for support, network, providers, training, establish enterprise user groups

- Licensing – Clarify license and T&Cs; business focused documentation

It takes a ~~village~~, ~~community~~, ecosystem

- **Consider -** how OSS can benefit your organisation
- **Ask** – Do your research, ask questions

Get involved!

A warm welcome from OSGeo Oceania

OSGeo Oceania

2025.foss4g.org

FOSS4G Auckland 2025

Auckland
New Zealand
17-23 November

Acknowledgments

QGIS Development Team. (2023). QGIS: A Free and Open-Source Geographic Information System, https://www.qgis.org/

Humanitarian OpenStreetMap Team. (2023). HOT: Humanitarian Mapping, https://www.hotosm.org/

GeoNode Project. (2023). GeoNode: Open Source Spatial Data Infrastructure, http://geonode.org/

GRASS Development Team. (2023). GRASS GIS: Geographic Resources Analysis Support System, https://grass.osgeo.org/

MapServer Community. (2023). MapServer: Open Source Mapping Platform, https://mapserver.org/

GeoServer Community. (2023). GeoServer: Open Source Server for Sharing Geospatial Data, https://geoserver.org/

Lantmäteriet. (2023). Lantmäteriet – The Swedish Mapping, Cadastral and Land Registration Authority, https://www.lantmateriet.se/en/

Acknowledgments

Nadia Eghbal – 'Working in Public: The Making and Maintenance of Open-Source Software' (Stripe Press, 2020)

Daniel O'Donohue and Todd Barr –'Strategic Buy-In for FOSS4G' (Mapscaping Podcast, Oct 4, 2023)

Alessio Fanelli – 'How do open-source companies make money' presentation (All Things Open YouTube channel, 13 Apr 2021)

Peter Levine and Jennifer Li – "Open Source from community to commercialization" (Andreessen Horowitz Blog, Oct 2019)
https://a16z.com/open-source-from-community-to-commercialization/

Emily Omier – "Entrepreneurship for Engineers: Making Open-Source Pay" (The New Stack, Dec 2021)
https://thenewstack.io/entrepreneurship-for-engineers-from-open-source-to-monetization-profit/

Research assistance – Claude 3.5 Sonnet, by Anthropic

Photos - @spacemanpaul Paul Haesler – satellite imagery photos taken using TerriaJS, Open Data Cube on Digital Earth Australia, Geoscience Australia

European Commission's Open-Source Observatory - https://interoperable-europe.ec.europa.eu/collection/open-source-observatory-osor

https://dev.to/yawaramin/the-human-toll-of-log4j-maintenance-35ap

Thank you!