

QGIS – from a geodata viewer to a GIS platform

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QGIS

- › **Open source desktop GIS**
- › **License: GNU GPL, Version 3**
- › **Founded in 2002 by Gary Sherman**
- › **C++, based on Qt libraries**

Qt + GIS = QGIS

C++, platform independent
Graphical user interfaces
Interprocess communication

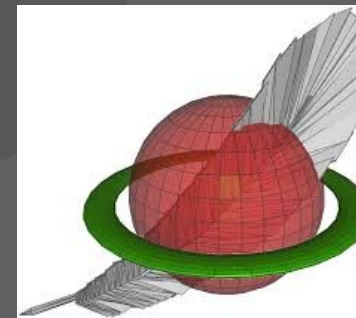
...



GIS functionality



GIS data sources



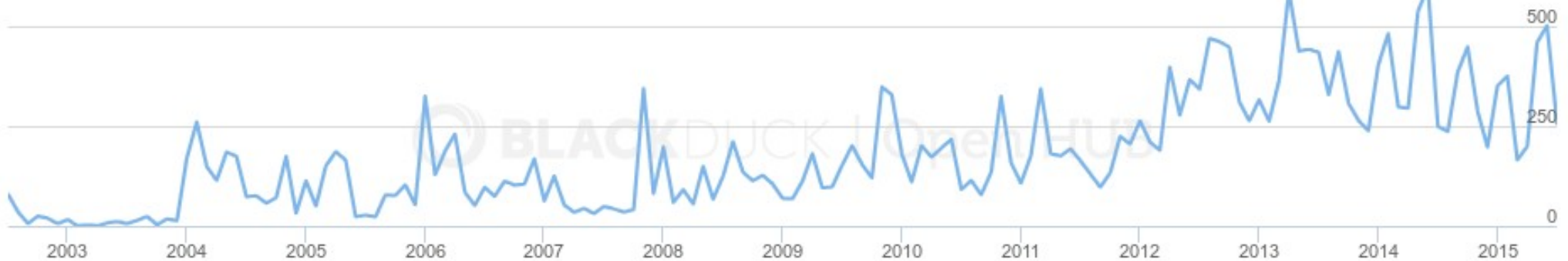
QGIS – from a geodata viewer to a GIS platform

Openhub.net says:

- Total 28124 commits by 252 contributors
- Has 689'473 lines of code
- Project took (estimated) 186 years of effort
- Maintained by a very large development team

Commits per Month

Zoom 1yr 3yr 5yr 10yr **All**



Why is QGIS a successful open source project?

QGIS is a bazaar!



What is a bazaar?

- **E. Raymond (1997): The Cathedral and the Bazaar**
- **The cathedral development model**
 - Code developed between releases is restricted to an exclusive group of software developers (or is not available at all)
 - Examples: proprietary software, GNU Emacs, GCC
- **Bazaar**
 - Code is developed over the internet in view of the public.
 - Example: Linux kernel
- **Raymonds lessons for creating good open source software**

QGIS and the bazaar

- Open development process since project start in 2002 (because started by individuals, not a single company)
- Public source code repository on github:
<https://github.com/qgis/QGIS>
- Bugtracker (hub.qgis.org)
- Mailing lists:
 - <http://lists.osgeo.org/mailman/listinfo/qgis-user>
 - <http://lists.osgeo.org/mailman/listinfo/qgis-developer>
- Chat: #qgis on irc.freenode.net

OGIS and the bazaar

- Developer meetings twice a year (formerly known as 'hackfest')



Developers need

- “Every good work of software starts by scratching a developer's personal itch”
- 2002: Gary Sherman needed a map viewer for PostGIS tables on Linux
- Bazaar style development nearly from the begin of the project



Developers need(2)

- **Developer driven project: concrete need, short-term goal**
- **A larger number of developers and expert users is less likely to be wrong than only a few 'Experts'**
- **A few Experts opinions back in 2003:**
 - **Software consultant A: "A new software project can only be written in C+."**
 - **Software consultant B: "A new software project can only be written in Java."**
 - **GIS consultant C: "In near future, everything will be web based. No one will need a desktop GIS anymore."**

Large tester / co-developer base

- “Given a large enough beta-tester and co-developer base, almost every problem will be characterized quickly and the fix obvious to someone”
- “If you treat your beta-testers as if they're your most valuable resource, they will respond by becoming your most valuable resource”
- E.g. 150 bugfixes between 2.8.2 and 2.8.3:
https://github.com/qgis/QGIS/compare/final-2_8_2%E2%80%A6final-2_8_3

Release early. Release often

- “Release early. Release often. And listen to your customers”
- Longest period between releases between 0.7.3 (11. Oct 2005) and 0.8 (7. Jan 2007)
- Now fixed release schedule with 3 releases per year
- 3 Month feature window, 1 month feature freeze period

Uses you never expected

- “Any tool should be useful in the expected way, but a truly great tool lends itself to uses you never expected”
- Bazaar approach stimulates innovation.
Examples:
 - GRASS provider/plugin
 - Python bindings
 - Expressions / combine with python
 - QGIS server
 - Processing framework

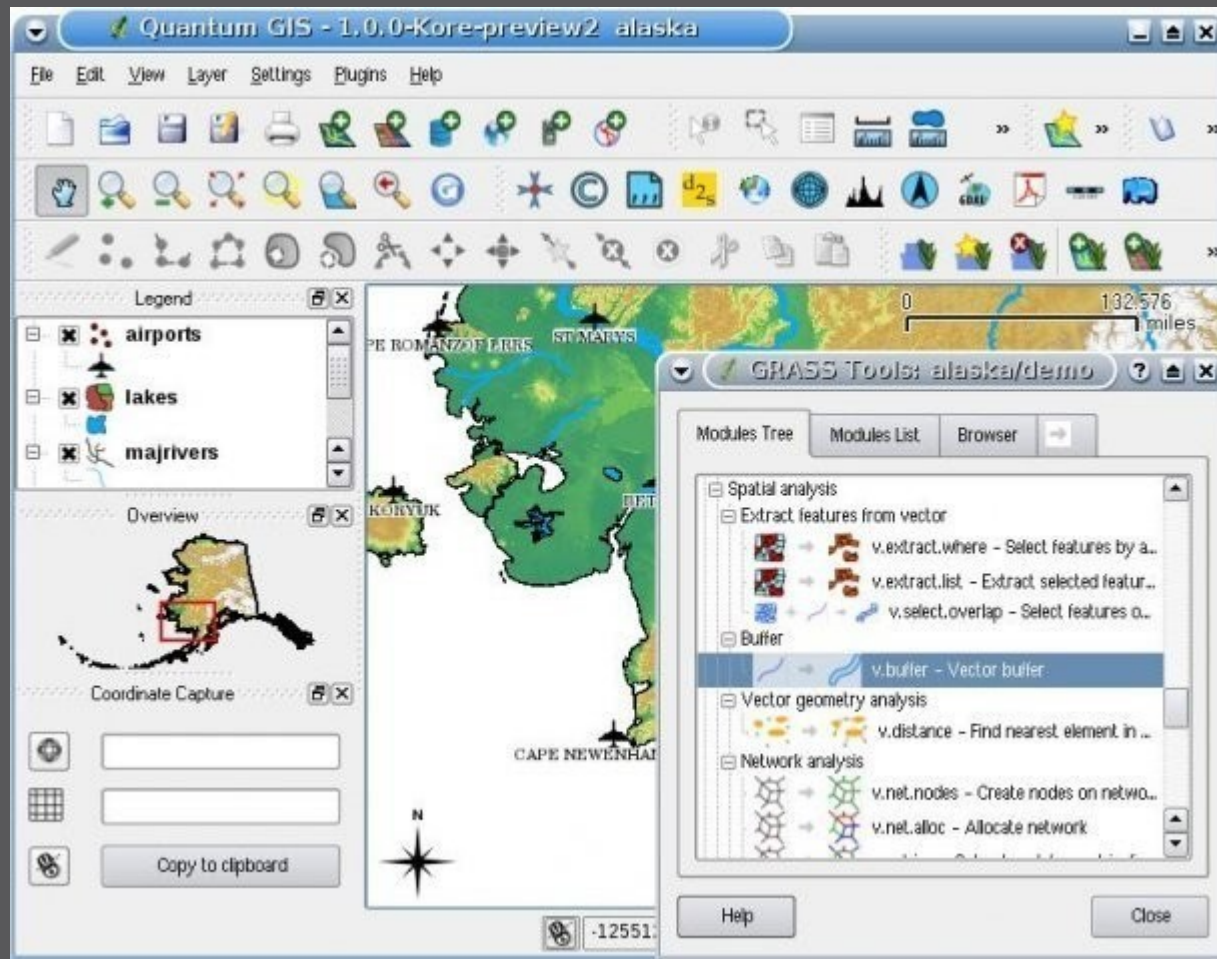
GRASS provider / plugin

- **QGIS developer mailing list, 16. May 2003: “I am GRASS user and contributor and I have done some initial experimental work on GRASS support for QGIS. ... My question is: Is this extension welcome in QGIS project? I think that GRASS support can bring to QGIS project more users and contributors (at least one ;)”**

GRASS plugin / provider (2)

- **Idea: Combine the analysis power of GRASS with the desktop of QGIS**
- **GRASS provider reads data into QGIS with using the GRASS library**
- **Toolbox executes GRASS commands and loads the result in QGIS**
- **“Good programmers know what to write. Great ones know what to rewrite (and reuse)”**

GRASS provider / plugin (3)



Expressions

- **Idea: Feature based calculator to evaluate expressions dynamically (usually depending on attributes and/or geometry) of a feature.**
- **Applied (as patch) on 10th September 2005**
- **First usage: search in attribute table**
- **Today: everywhere in the code, e.g. data defined symbology, atlas serial print, attribute table, virtual vector fields, ...**
- **Recent addition: possibility to add user-defined functions in Python**

Expressions (2)

- **QGIS-developer mailing list, 18th March 2005:**
“Hi all, finally I came to an agreement with my supervisor about my individual software project, here you can find list of things that have to be done till end of next semester – I hope I will manage to do all of them :-) ... “

Python bindings




- › C++ plugins nearly from the beginning of the project. Idea: keep core as small as possible to make the application modular
- › Python bindings since version 0.9 (October 2007).
- › Uses PyQt
- › Bazaar is when things start to get their own dynamics:
 - › Plugin installer
 - › Plugin repository (plugins.qgis.org)
 - › 525 plugins in the official repository

Python bindings (2)

QGIS Python Plugins Repository

All plugins

525 records found — [Click to toggle descriptions.](#)

	Name	★	↓	Author	Stars (votes)	St
	OpenLayers Plugin	—	459657	Sourcepole	★★★★★ (435)	1.3
	MetaSearch Catalogue Client	—	163082	Tom Kralidis	★★★★★ (35)	0.3
	Table Manager	—	152120	Borys Jurgiel	★★★★★ (102)	0.3
	mmqgis	✓	150047	Michael Minn	★★★★★ (71)	2.0
	Processing	✓	144762	Victor Olaya	★★★★★ (59)	2.3
	GEarthView	—	101178	geodrinx	★★★★★ (98)	2.3
	CadTools	—	82982	Stefan Ziegler	★★★★★ (92)	0.3
	Profile tool	—	78208	Borys Jurgiel - Patrice Verchere - Etienne Tourigny	★★★★ (66)	3.3
	XyTools	—	73170	Richard Duivenvoorde	★★★★★ (31)	0.3
	Google Maps Engine Connector	—	69623	Google	★★★★ (68)	1.3

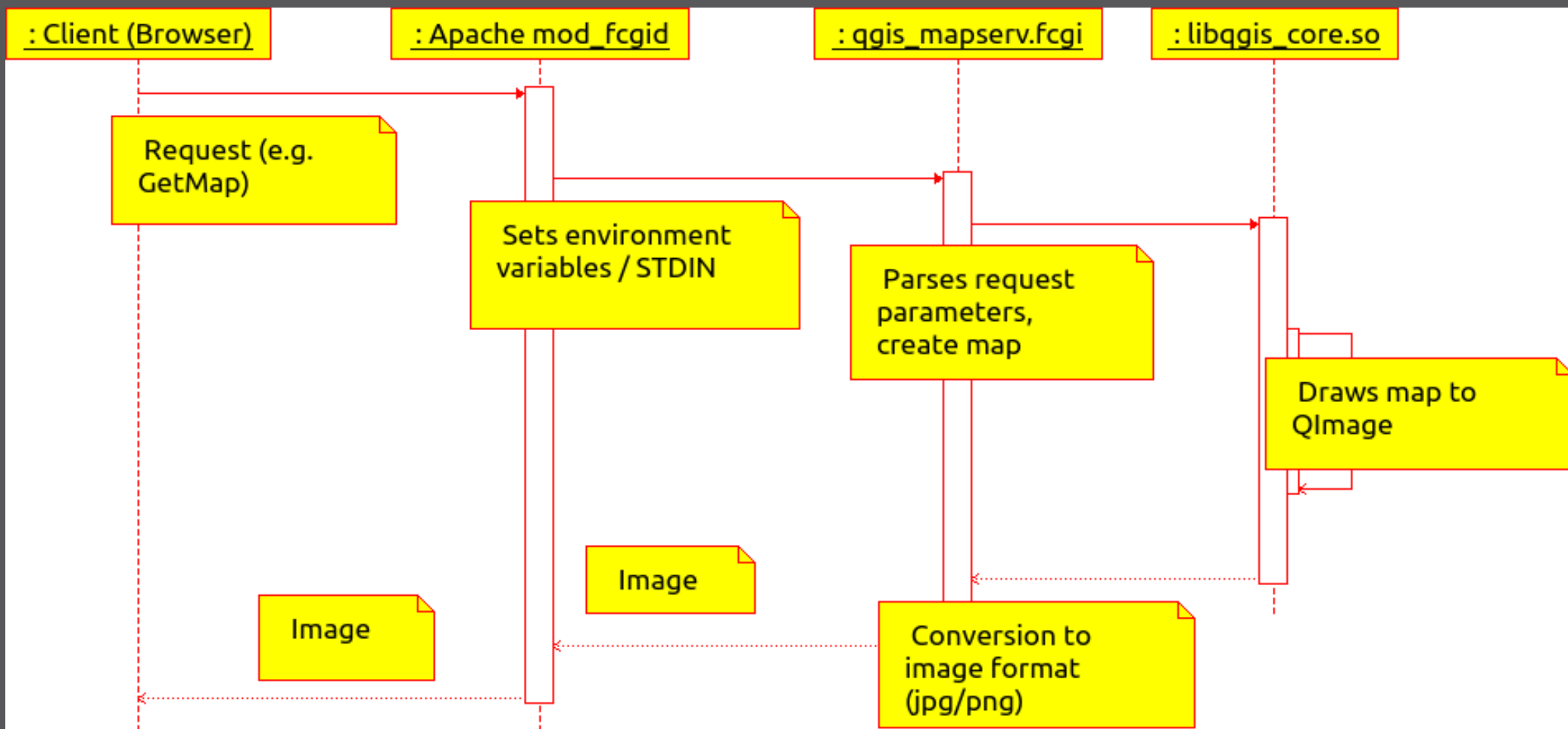
- In the meantime (2006), QGIS is not only a desktop GIS, but also a library
- QGIS mapserver has been developed in a university research project
- Desktop GIS is 'out', service based geodata infrastructure is 'in'
- No problem, why not build a service with QGIS as a rendering engine?

QGIS server (2)

- **QGIS-developer mailing list, 11th May 2007:**
“Dear QGIS developer and users I'm happy to announce the start of the 'QGIS mapserver' project ... The idea of QGIS mapserver is simple: instead of using QGIS just as a desktop GIS, it can also be used as a server. The benefit is that bug fixes and extensions for the server also improve the desktop GIS (and the other way round) ... Contact me if you are interesting in joining development of QGIS mapserver, there is still a lot to do...”

QGIS server (3)

- Idea of QGIS server: Parse http request parameters, let QGIS library render the map, send result image back to the client



QGIS server (4)

- **The bazaar also happens here:**
 - QGIS mapserver is part of the QGIS source tree in 2010
 - A developer adds support for WFS and WCS in QGIS mapserver
 - => QGIS mapserver is now QGIS server
 - Python plugins for QGIS server

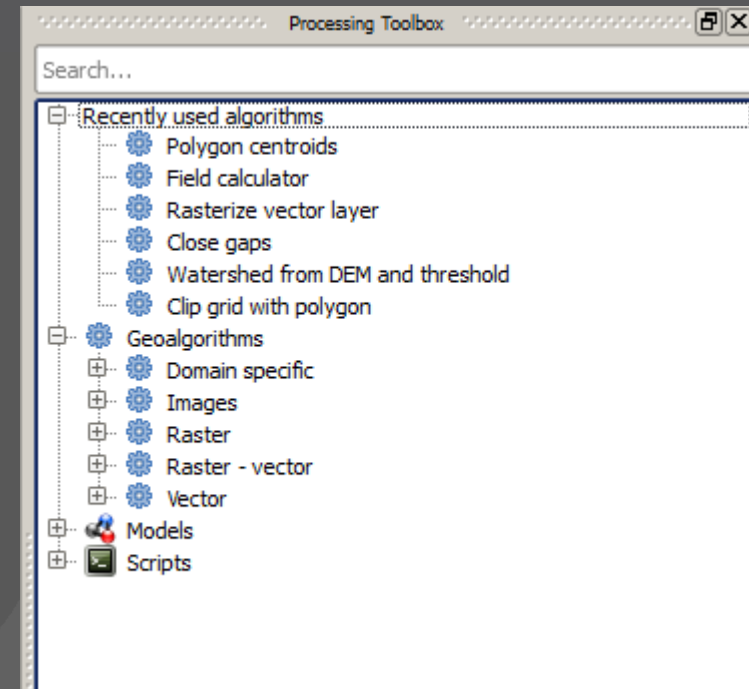
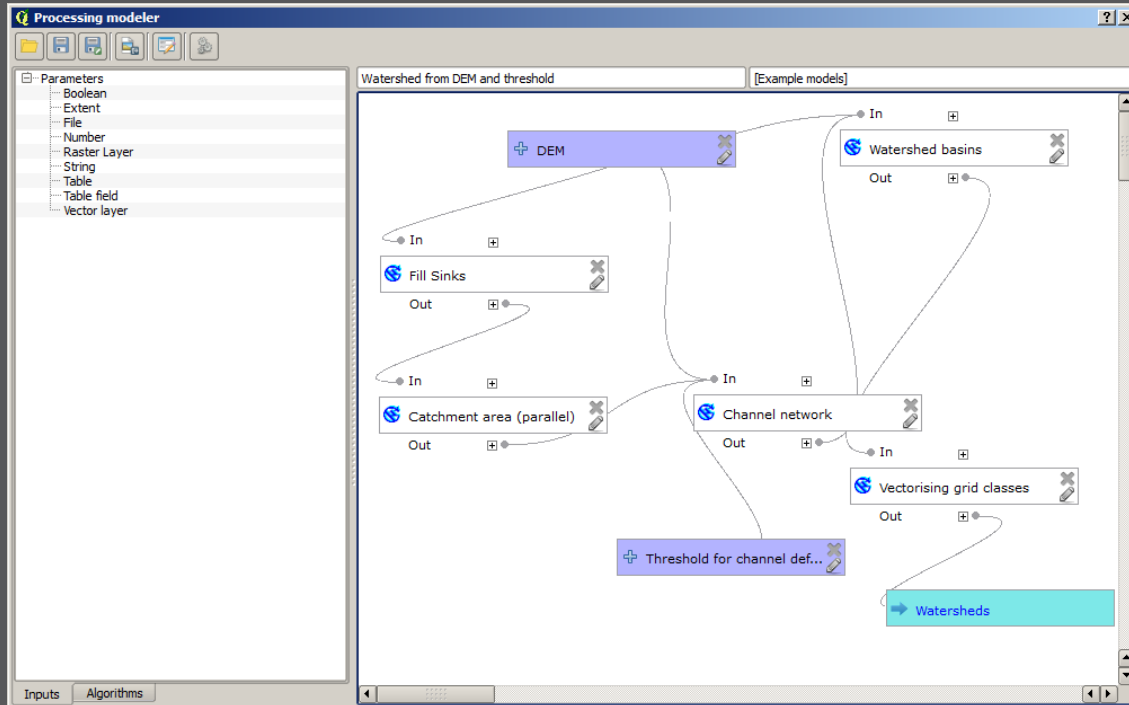
Processing framework

- **QGIS-developer mailing list, 21st March 2012:**
”Just a quick comment that might be interesting related to that topic. I am about to release the first version of the SEXTANTE platform for QGIS. It contains a toolbox, a graphical modeler, script creator, ..., a batch processing interface, history, and much more. ... I wanted to wait a bit more until it is more or less stable, but since I see some action in the QGIS processing area, I think it is worth mentioning it now, so you can consider it. ... “

Processing framework (2)

- › Formerly known as 'Sextante'
- › Combines processing algorithms from different open source software (e.g. GRASS, SAGA, Orefo Toolbox, R, QGIS)
- › Benefit: create analysis chains which run automatically and can be reused multiple times
- › Graphical editor
- › Export as python script possible

Processing framework (3)



Conclusions

- **Raymonds conclusion in 'The Cathedral and the Bazaar': “Perhaps in the end the open-source culture will triumph not because cooperation is morally right ... , but simply because the closed-source world cannot win an evolutionary arms race with open-source communities that can put orders of magnitude more skilled time into a problem”.**
- **In the case of QGIS, bazaar was really the key to success**

Thank you!



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