introduction to open source geospatial software

Carson J. Q. Farmer
National Centre for Geocomputation
National University of Ireland Maynooth
from the source
what is open source?
what are open standards?
working with open source
why all the fuss?
Get right down to the source...

- Source code
- Collection of statements or declarations written in some **human-readable** computer programming language
- Source code = Instructions

Compare to recipe...
Convert from human-readable to **computer-executable** form

- Compiler

Compare to mixing bowl?

- Execute the program...

Compare to oven?
So what can you do with source code?

- Fix bugs (problems)
- Change the program
- Compile your own version
- Figure out how the program works
- Basically do whatever you want...
... If you have access, and the right to use it...
Open source doesn’t just mean access to the source code.
what is open source?

- Source code
- Relaxed copyright restrictions
- Use for any purpose
- Share
- Free...
what is open source?

“free as in freedom – not as in free beer”
what is open source?

- Improve software
- Fix bugs
- Add new features
- Create something new
what is open source?

SAY "FREE SOFTWARE" THAT SAYS FREEDOM MATTERS
what is open source?

'Open Source'
- Free redistribution
- Source code
- Derived works
- No tie-ins

'Free Software'
- Use for any purpose
- Study and change
- Copy the program
- Share the program
what is open source?

- 'Open Source'
- 'Free Software'

Licensing

Freedoms
what is open source?

- 'copyleft'
- 'all rights reversed'
- Public Domain

 Licenses
- M.I.T. License
- Apache License
- BSD, Modified BSD
- Mozilla Public License
- GNU General Public License
what is open source?

- Access to code!
  - Read
  - Learn
  - Improve

- Distribute!
  - Share
  - Fix
  - Improve
**what is open source?**

- Different from *proprietary* software
- Legal property of *one party*...
  
  Not you...

- You are only *licensing* the software...
what is open source?

Not all about licensing and legal issues...
what is open source?

community

open communication...

...like science...

...Transparency
what are open standards?

“Collecting data is only the first step towards wisdom...

...but **sharing data** is the first step towards **community**”

- Prof. Henry Louise Gates, Jr.
what are open standards?

- *who holds the key to your data?*

- access your own data and information
  - Open file formats
  - Open communication standards
what are open standards?

- Proprietary standards
- Open standards

- Also applies to communication
what are open standards?

- Just like open source
- But applies to much more than software...
- ISO has been doing this for years!
- It means everyone knows how to share
what are open standards?

What about **geospatial** data/communication?
what are open standards?

Open Geospatial Consortium

non-profit, international, voluntary consensus standards organisation

ontology... coordinate transformations... sensors... markup languages... simple features
what are open standards?

what are open standards?

what are open standards?


what are open standards?

what are open standards?


what are open standards?
what are open standards?

- Everyone knows how to interact with OCG standards
- Which means we can all share data and communicate with one another!
- Which makes us a community!

scientific, geospatial, academic, local, global, etc.
working with open source
who creates geospatial software?
Anyone and Everyone

working with an open source community...

How do they work?
working with open source
working with open source
working with open source
working with open source
working with open source
working with open source
working with open source
Good ideas need never be ignored
working with open source

internet feedback...

instant bug fixes

instant support

mailing lists, instant messaging
working with open source

Inquiry

12:13:30 arkygeek: timlinux: was there an issue with feature info for rasters not staying in front
12:14:34 ADKPete: arkygeek: feature info?
12:14:51 arkygeek: identify features sorry
12:15:23 cfarmer: timlinux: sorry about that, started watching some tv.... no API complaints here!
12:15:58 ADKPete: arkygeek: ok, that is what I thought but wanted to double check. Dialog not staying on top?
12:16:55 timlinux: cfarmer: good
12:17:44 cfarmer: timlinux: and your rotation addtribute idea wouldn't be too hard to implement... I can add this to the next release... do you think it would be better as a separate tool, or part of the current tool?
12:17:46 arkygeek: ADKPete: just checking its happeining in head
12:18:15 arkygeek: it IS NOT staying in front on head
12:18:37 ADKPete: hmmm...don't get that here what OS?
12:18:39 arkygeek: open a raster, identify feature, then on the second identify attempt it goes to the back
12:18:41 arkygeek: osx
12:18:50 ADKPete: well there you go....
12:18:52 ADKPete: : )
12:19:01 arkygeek: :P
12:19:11 arkygeek: svn updating
12:20:47 arkygeek: it was the same in v.11
12:21:40 arkygeek: yeah, still there in r9644
12:32:30 ADKPete: arkygeek: Think I have the fix for you.....building now
12:43:10 CIA-7: ersts * r9645/trunk/qgis/src/app/qgsmaptoolidentify.cpp: -Added a raise call to keep the identify results dialog on top when clicking through rasters
12:43:20 ADKPete: arkygeek: try that...
12:54:12 arkygeek: updating
12:55:07 arkygeek: compiling
12:55:53 arkygeek: ADKPete: that did it. well done :- )
12:56:02 ADKPete: groovy
working with open source

12:13:30 arkygeek: timlinux: was there an issue with feature info for rasters not staying in front
12:14:34 ADKPete: arkygeek: feature info?
12:14:51 arkygeek: identify features sorry
12:15:23 cfarmer: timlinux: sorry about that, started watching some tv.... no API complaints here!
12:15:58 ADKPete: arkygeek: ok, that is what I thought but wanted to double check. Dialog not staying on top?
12:16:55 timlinux: cfarmer: good
12:17:44 cfarmer: timlinux: and your rotation addtribute idea wouldn't be too hard to implement... I can add this to the next release... do you think it would be better as a separate tool, or part of the current tool?
12:17:46 arkygeek: ADKPete: just checking its happening in head
12:18:15 arkygeek: it IS NOT staying in front on head
12:18:37 ADKPete: hmmm...don't get that here what OS?
12:18:39 arkygeek: open a raster, identify feature, then on the second identify attempt it goes to the back
12:18:41 arkygeek: osx
12:18:50 ADKPete: well there you go....
12:18:52 ADKPete: : )
12:19:01 arkygeek: :P
12:19:11 arkygeek: svn updating
12:20:47 arkygeek: it was the same in v.11
12:21:40 arkygeek: yeah, still there in r9644
12:32:30 ADKPete: arkygeek: Think I have the fix for you.....building now
12:43:10 CIA-7:  ersts * r9645 /trunk/qgis/src/app/qgsmaptoolidentify.cpp: -Added a raise call to keep the identify results dialog on top when clicking through rasters
12:43:20 ADKPete: arkygeek: try that...
12:54:12 arkygeek: updating
12:55:07 arkygeek: compiling
12:55:53 arkygeek: ADKPete: that did it. well done : - )
12:56:02 ADKPete: groovy
working with open source

12:13:30 arkygeek: timlinux: was there an issue with feature info for rasters not staying in front
12:14:34 ADK Pete: arkygeek: feature info?
12:14:51 arkygeek: identify features sorry
12:15:23 cfarmer: timlinux: sorry about that, started watching some tv.... no API complaints here!
12:15:58 ADK Pete: arkygeek: ok, that is what I thought but wanted to double check. Dialog not staying on top?
12:16:55 timlinux: cfarmer: good
12:17:44 cfarmer: timlinux: and your rotation addtribute idea wouldn't be too hard to implement... I can add this to the next release... do you think it would be better as a separate tool, or part of the current tool?
12:17:46 arkygeek: ADK Pete: just checking its happeining in head
12:18:15 arkygeek: it IS NOT staying in front on head
12:18:37 ADK Pete: hmmm...don't get that here what OS?
12:18:39 arkygeek: open a raster, identify feature, then on the second identify attempt it goes to the back
12:18:41 arkygeek: osx
12:18:50 ADK Pete: well there you go....
12:18:52 ADK Pete: : )
12:19:01 arkygeek: :P
12:19:11 arkygeek: svn updating
12:20:47 arkygeek: it was the same in v.11
12:21:40 arkygeek: yeah, still there in r9644
12:32:30 ADK Pete: arkygeek: Think I have the fix for you.....building now
12:43:10 CIA-7:  * r9645 /trunk/qgis/src/app/qgsmaptoolidentify.cpp: -Added a raise call to keep the identify results dialog on top when clicking through rasters
12:43:20 ADK Pete: arkygeek: try that...
12:54:12 arkygeek: updating
12:55:07 arkygeek: compiling
12:55:53 arkygeek: ADK Pete: that did it. well done :-)  
12:56:02 ADK Pete: groovy
working with open source

12:13:30 arkygeek: timlinux: was there an issue with feature info for rasters not staying in front
12:14:34 ADK Pete: arkygeek: feature info?
12:14:51 arkygeek: identify features sorry
12:15:23cfarmer: timlinux: sorry about that, started watching some tv....no API complaints here!
12:15:58 ADK Pete: arkygeek: ok, that is what I thought but wanted to double check. Dialog not staying on top?
12:16:55 timlinux: cfarmer: good
12:17:44 cfarmer: timlinux: and your rotation addtribute idea wouldn't be too hard to implement...I can add this to the next release...do you think it would be better as a separate tool, or part of the current tool?
12:17:46 arkygeek: ADK Pete: just checking its happeining in head
12:18:15 arkygeek: it IS NOT staying in front on head
12:18:37 ADK Pete: hmmm...don't get that here what OS?
12:18:39 arkygeek: open a raster, identify feature, then on the second identify attempt it goes to the back
12:18:41 arkygeek: osx
12:18:50 ADK Pete: well there you go....
12:18:52 ADK Pete: : )
12:19:01 arkygeek: :P
12:19:11 arkygeek: svn updating
12:20:47 arkygeek: it was the same in v.11
12:21:40 arkygeek: yeah, still there in r9644
12:32:30 ADK Pete: arkygeek: Think I have the fix for you.....building now
12:43:10 CIA-7: ersst * r9645 /trunk/qgis/src/app/qgsmaptoolidentify.cpp: -Added a raise call to keep the identify results dialog on top when clicking through rasters
12:43:20 ADK Pete: arkygeek: try that...
12:54:12 arkygeek: updating
12:55:07 arkygeek: compiling
12:55:53 arkygeek: ADK Pete: that did it. well done : - )
12:56:02 ADK Pete: groovy

Fix verified
working with open source

12:13:30 arkygeek: timlinux: was there an issue with feature info for rasters not staying in front
12:14:34 ADK Pete: arkygeek: feature info?
12:14:51 arkygeek: identify features sorry
12:15:23 cfarmer: timlinux: sorry about that, started watching some tv.... no API complaints here!
12:15:58 ADK Pete: arkygeek: ok, that is what I thought but wanted to double check. Dialog not staying on top?
12:16:55 timlinux: cfarmer: good
12:17:44 cfarmer: timlinux: and your rotation addtribute idea wouldn't be too hard to implement... I can add this to the next release... do you think it would be better as a separate tool, or part of the current tool?
12:17:46 arkygeek: ADK Pete: just checking its happeining in head
12:18:15 arkygeek: it IS NOT staying in front on head
12:18:37 ADK Pete: hmmm.. don't get that here what IOS?
12:18:41 arkygeek: osx
12:18:50 ADK Pete: well there you go....
12:18:52 ADK Pete: : )
12:19:01 arkygeek: : P
12:19:11 arkygeek: svn updating
12:20:47 arkygeek: it was the same in v.11
12:21:40 arkygeek: yeah, still there in r9644
12:32:30 ADK Pete: arkygeek: Think I have the fix for you.....building now
12:43:10 CIA-7:  ertsk * r9645 /trunk/qgis/src/app/qgsmaptoolidentify.cpp: -Added a raise call to keep the identify results dialog on top when clicking through rasters
12:43:20 ADK Pete: arkygeek: try that...
12:54:12 arkygeek: updating
12:55:07 arkygeek: compiling
12:55:53 arkygeek: ADK Pete: that did it. well done : - )
12:56:02 ADK Pete: groovy
Approximate time to release new bug fix: 4 – 6 months!
working with open source

- Best part about open source community...  
  ... don't have to be a programmer to get involved!
  - Bug reporting
  - Documentation
  - Website design and maintenance
  - Donations
  - Marketing
  - Teaching
  - etc...
Why all the fuss?

- Even proprietary software companies use open source software!
- ESRI, CADCorp, Google Earth etc. all use open source software to read/write spatial data
- But there are better reasons for us to use open source software...
why all the fuss?

- It can be quite economical!
- Cost of software is free

Oracle Spatial ---> PostGIS
€38,000 + €8,000 = €46,000

ArcGIS ------------> QGIS + GRASS
€2200
why all the fuss?

- What about support?
why all the fuss?

The software developer... ... is also a user!

```c
int iField;
for (iField = 0; iField < poFdoC->GetFieldCount(); iField++)
{
    iField++; 
    if (poFieldDef->Get_type() == OFTInteger)
        printf("%d,", poRecord->GetFieldAsInteger(iField));
    else if (poFieldDef->Get_type() == OFTReal)
        printf("%.2f,", poFeature->GetFieldAsDouble(iField));
    else if (poFieldDef->Get_type() == OFTString)
        printf("%s,", poFeature->GetFieldAsText(iField));
    else
        printf("%s,", poRecord->GetFieldAsText(iField));
}
```

```c
OGREntries *poPoints = (OGREntries *) poGeometry;
printf("%d,%d,%d,%d", poPoints->getx(), poPoints->gety(), poPoints->getz());
```
why all the fuss?

Fixing bugs... ...helps you and them
why all the fuss?

- Baring that...
  ... you have the source code, so you can fix things yourself!

  ... but you don't have to!
why all the fuss?

- Open source support
  - No one vendor to call
  - Anyone with expertise can help
  - Not locked-in to one vendor...
  - Open market of support suppliers

- Proprietary software support
  - Call the **lone** vendor
  - The don't have to fix it...
  - ... unless you pay them for support
  - Which **only they** provide!
why all the fuss?

- Many companies making money from open source software
  - Training
  - Customization
  - Support
  - Bug fixing
  - Etc.
why all the fuss?

- How do we find these companies?
- Open Source Geospatial Foundation

“Created to support and build the highest-quality open source geospatial software. Our goal is to encourage the use and collaborative development of community-led projects”
why all the fuss?

Some OSGeo commercial support companies...

OA Digital

CampToCamp

Global Image

OSGIS Services

Faunalia

WhereGroup

OpenApp

RadiantBlue
I leave you now with Jo to talk more about what OSGeo does, and how you can get involved!