Become an Open Source Developer

of Geographic Information Systems

With …

OSGeo

”Si no quieres hacerlo vas a encontrar la excusa,

si quieres hacerlo vas a encontrar los medios”

En un camión del transporte público en Mazatlán, México.

Contents

Topics

1. Who is …
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5. Free Open Source Software
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Who is ...

Vicky Vergara

Celia Virginia Vergara Castillo

- OSGeo Charter Member
- pgRouting project main developer
- PSC of OSGeoLive project
- Licenciado en Economía
- Maestro en Ciencias de la Computación
- Twitter: **@VickyVvergara**

Open Source Geospatial Foundation

Empower everyone with open source geospatial

Empower everyone with open source geospatial

- OSGeo is a not-for-profit software foundation
  - Provides projects financial, organizational and legal support
- Outreach and advocacy
  - Promoting global adoption of open source geospatial technology
  - Partnerships on open approach to standards, data and education.
- OSGeo is a volunteer driven
  - Passionate membership of individuals from around the world.

Open Geospatial

Working with our partners:

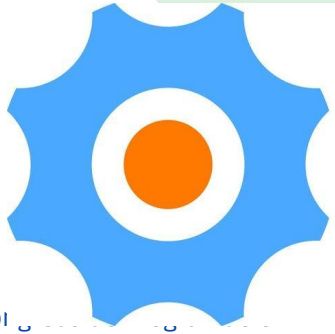
- **Open Source:** a collaborative approach to software development.
- **Open Data:** freely available information to use as you wish
- **Open Standards:** avoid lock-in with interoperable software
- **Open Education:** Removing the barriers to learning and teaching

Software Foundation

- **We are responsible for**
  - Supporting our great collection of projects
  - Fostering new talent and innovation.
- **OSGeo supports projects**
  - Technically with community of their peers
  - Socially with community building and outreach
  - Professionally ensuring each project is governed in a fair and sustainable manner

Success with

OSGeo



Google Code-in

What is Google Code-in?

Online, global contest for 13-17 year old pre-university students

Introduction to open source software development

Students have the opportunity to work with real open source organizations

How does Google Code-in work?

- Orgs create tasks for students to work on
- Students choose tasks that interest them
- Tasks take 3-5 hours to complete
- 1+ mentor assigned to each task
- Student submits work for review
- Mentor reviews work
- If accepted, student can claim another task

Types of Tasks

Generally take 3-5 hours to complete

- Coding
- Documentation/Training
- User Interface
- Outreach/Research
- Quality Assurance

Beginner tasks

Generally take 3-5 hours to complete

- Great way to get started in the contest
- Become familiar with how the org works
- Build confidence
- Students can complete up to 2 beginner tasks

Why should you participate?

Apply skills from class to a real software organization

Learn new skills: creating patches, using version control, distributed development, working collaboratively

Become part of the community

Easy entry, mentors there to help guide you (online)
OS software isn't just about coding - variety of types of tasks

See your work being used by thousands, even millions, maybe even become a committer on a project

Success with

OSGeo

Google Summer of Code


PROJ.4
GeoMoose
MapGuide
Open Source
OSSIM
GEOS
Geometry
Engine
Open
Source
GeoWebCache
MapServer
GRASSGIS
mapfish
PyWPS
esa
NASA WorldWind
GeoNetwork
ZOO
GDAL
deegree
ist
SOS

Be Proactive

OSGeo Projects

What is your interest?

What will convert you from novice to expert?

What will you enjoy working on?

Become familiar with the projects.

Play with the projects.

Contact Project

Read the latest news.

Register to mailing lists.

E-mail a short description.

Start a discussion.

Get feedback.

Make a Calendar

Electronically or on paper.

Adjust to your time zone.

Add GsoC program dates.

Include your region's Holiday.

Know the project

Read the user documentation.

Read the developer documentation.

Read the project wiki.

Read the bug tracker issues.

Coding Language

Get familiar with the code.

- C, C++
- Java,
- Python
- JavaScript

Improve your language skills.

Contribute

Learn different repository platforms:

- GitHub
- SVN
- Gogs

Practice contributing code fixes.

Practice contributing documentation fixes.

Proposal

Application Review

Aim for a complete proposal.

OSGeo guidelines.

OSGeo project guidelines.

Guidelines

Listen To Community

Don't reinvent the wheel.

Discuss timeline.

Discuss derivables.

Be Patient

Mentors are also waiting.

Bonding

Weekly Report

Essential activity of project management.

Your actions or inactions affects all.

Adjust due dates to your time zone.

Research Skills

Gather information about the proposal.

Study your topic.

First write your code in pseudocode.

Infrastructure

Install software.

Install the data.

Participate in project meetings.

Set up your wiki.

Coding

Listen To Mentors

Project members faced the same walls.

Ease your way through the project.

Document the code

Let the users know how to use your code.

Developer's documentation.

Helps troubleshooting.

Helps production issues.

Follow Standards

Uniform engineering.

Uniform technical criteria.

Uniform methods.

Uniform processes.

Uniform practices.

Links

OSGeo

OSGeo Links

Main page http://www.osgeo.org/
Twitter: **@OSGeo**

GCI: https://wiki.osgeo.org/wiki/Google_Code_In_2017_Recommendations_for_Students

GSoC:
https://wiki.osgeo.org/wiki/Google_Summer_of_Code_Recommendations_for_Students

Posters:
https://github.com/OSGeo/osgeo/blob/master/marketing/collateral/one-page-info

Google Links

https://developers.google.com/open-source/gci/resources/getting-started

https://google.github.io/gsocguides/student/

FOSS

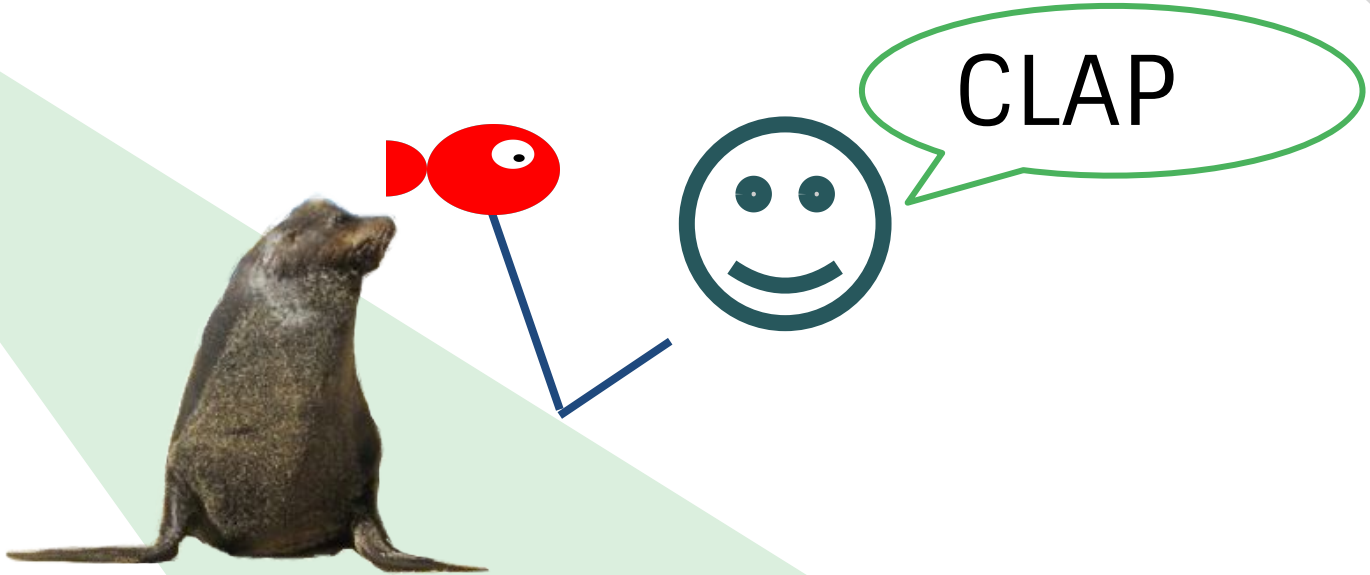
OSGeo

Free Open Source Software

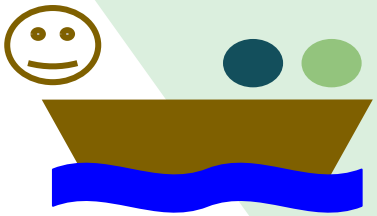
Pancho

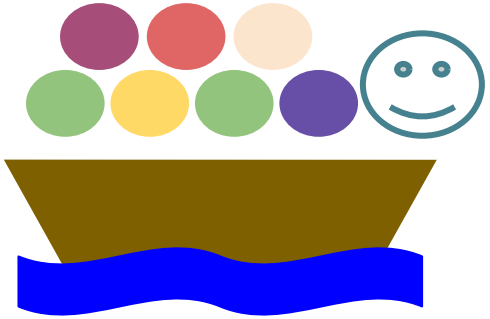
Using FOSS

Improving FOSS

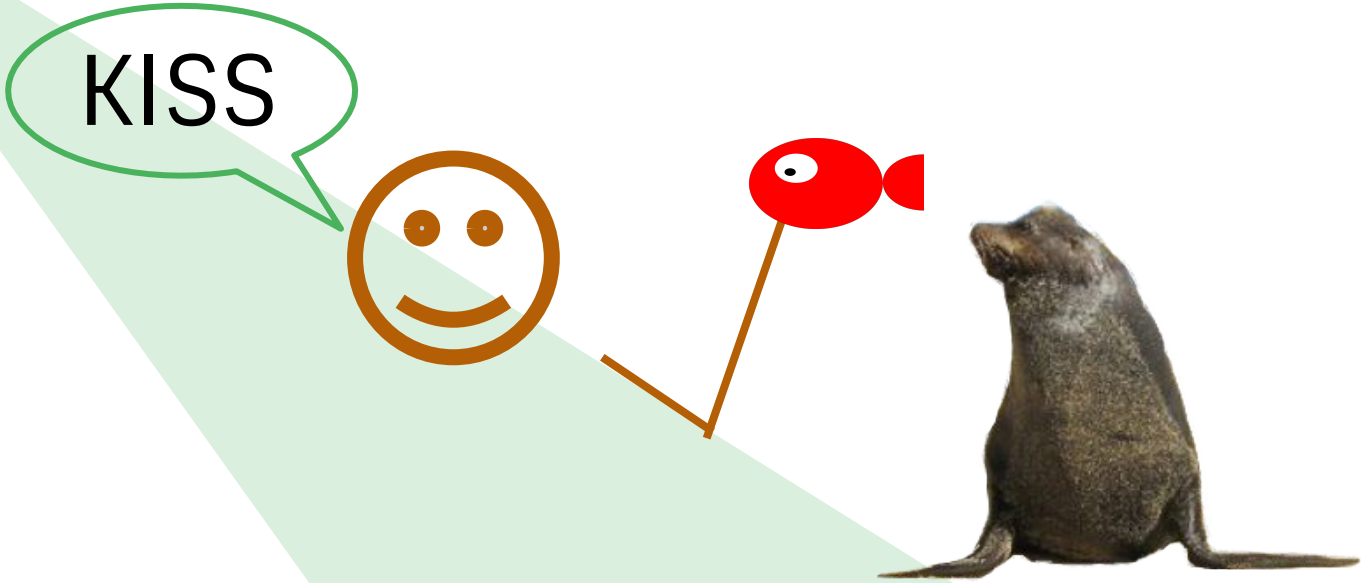


Using FOSS



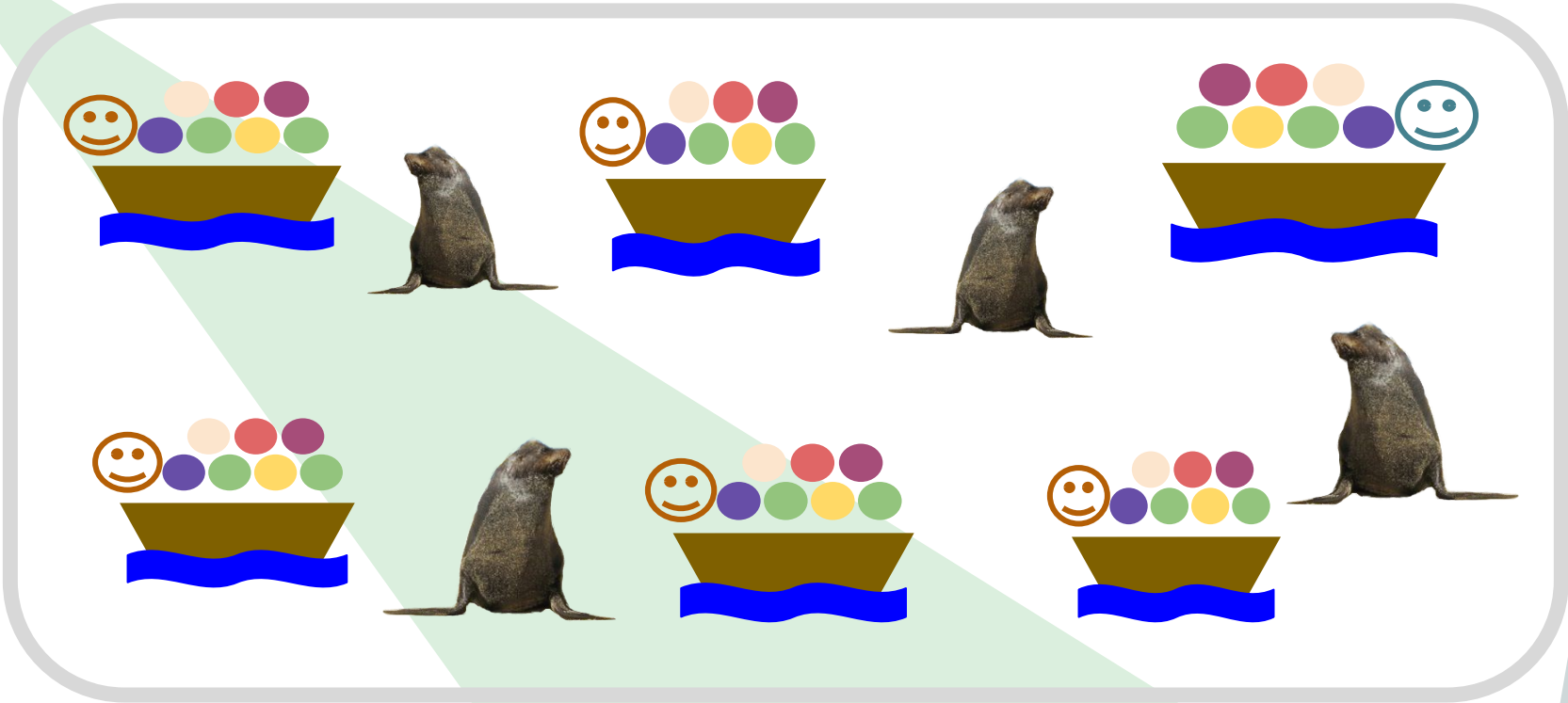


Improving FOSS



Using FOSS

Using FOSS



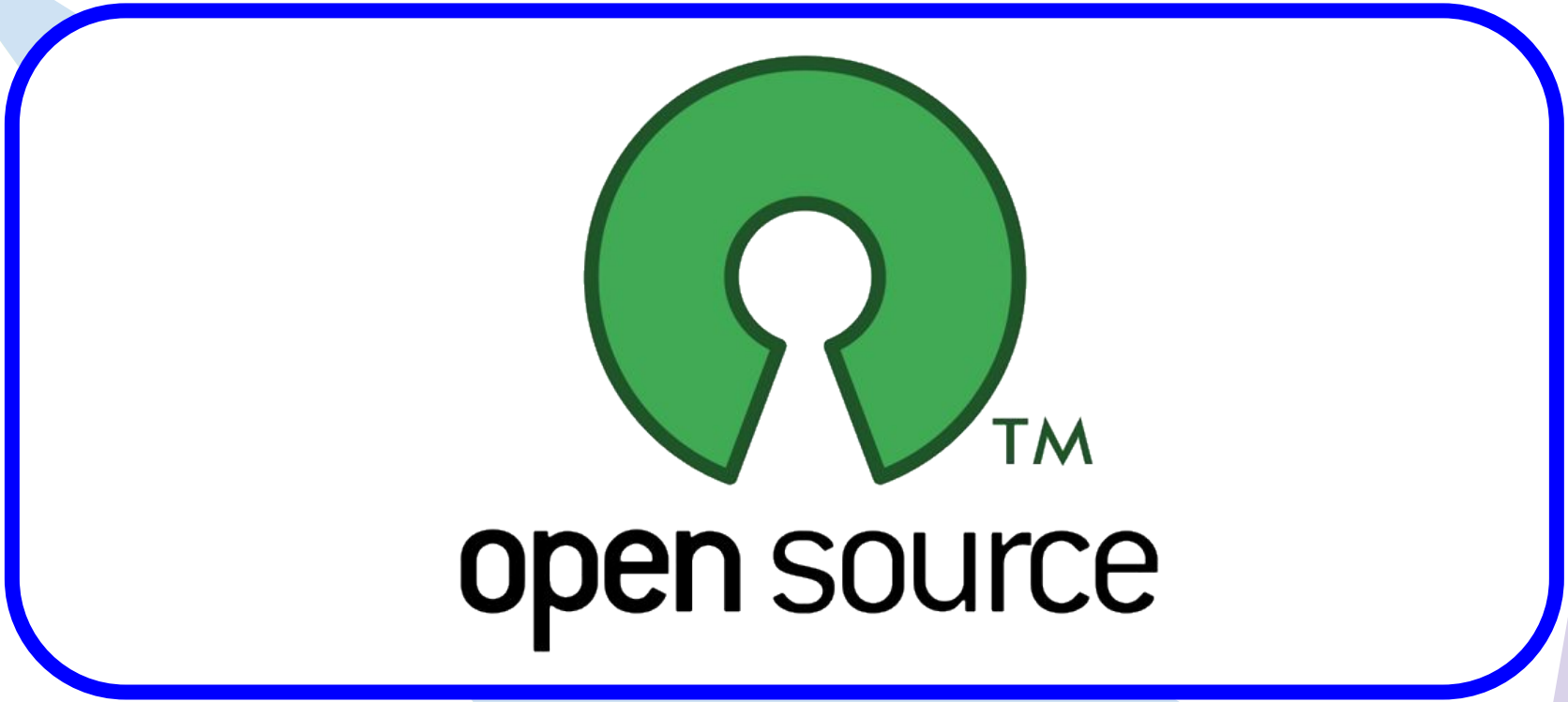
pgRouting

Qué es?

pgRouting

Proyecto comunitario de OSGeo

De Código Abierto



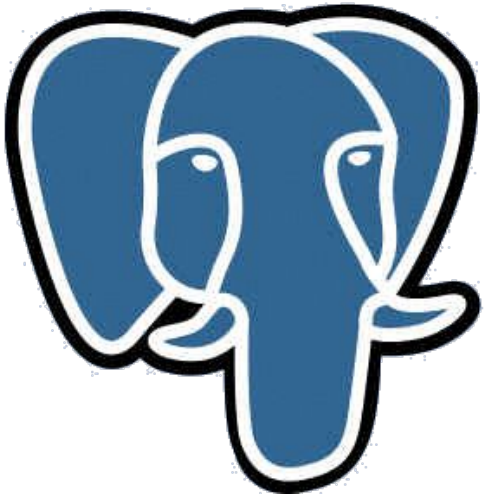
Que encuentran en GitHub

Usando librerías C++ boost

Como extensión de PostGIS

Para ser usado en PostgreSQL

PostgreSQL



Qué hay?

pgRouting

osm2pgRouting

pgRoutingLayer

Qué es el proyecto pgRouting?

Como se usa?

pgRouting

Crear la base de datos

```
createdb argentina;

psql -c "CREATE EXTENSION postgis" -d argentina

psql -c "CREATE EXTENSION pgrouting" -d argentina
```

Obtener los datos

```
BBOX="-58.44370, -34.57352, -58.43700, -34.57043"

wget --progress=dot:mega \

    -O "argentinafoss4g.osm" \

    "http://www.overpass-api.de/api/xapi?*[bbox=${BBOX}][@meta]"
```

Importar datos a la Base de datos

```
osm2pgrouting \
    -f argentinafoss4g.osm \
    -d argentina \
    --clean
```

Conectarse a la base de datos

```
psql argentina
```

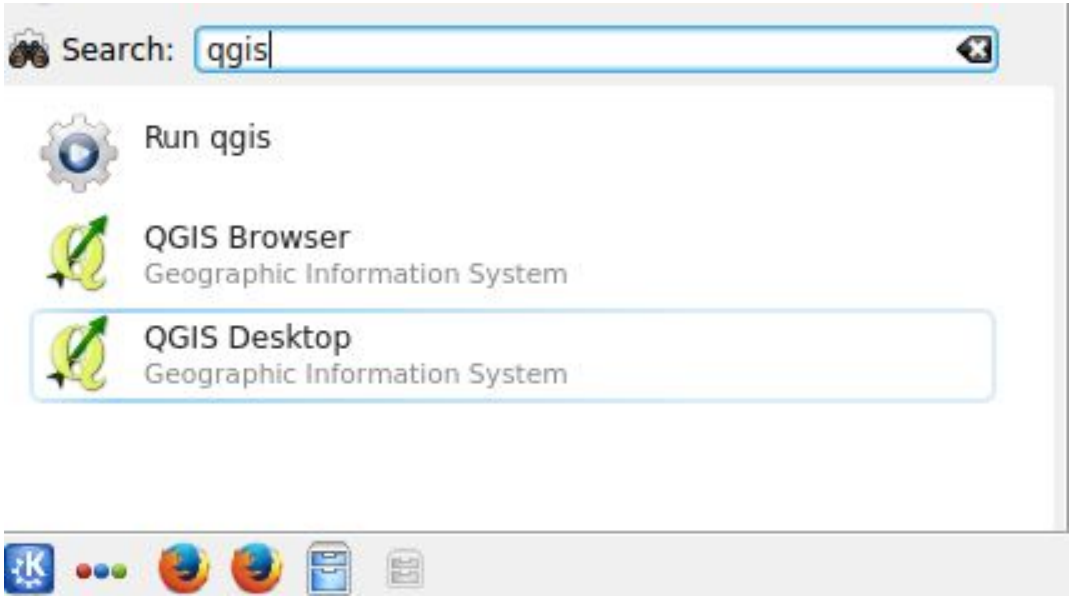
Ejecutar una consulta

```
SELECT * FROM pgr_dijkstra(
'SELECT gid AS
     id,
     source,
     target,
     cost_s AS cost,
     reverse_cost_s AS reverse_cost FROM ways',
    18, 16);
```

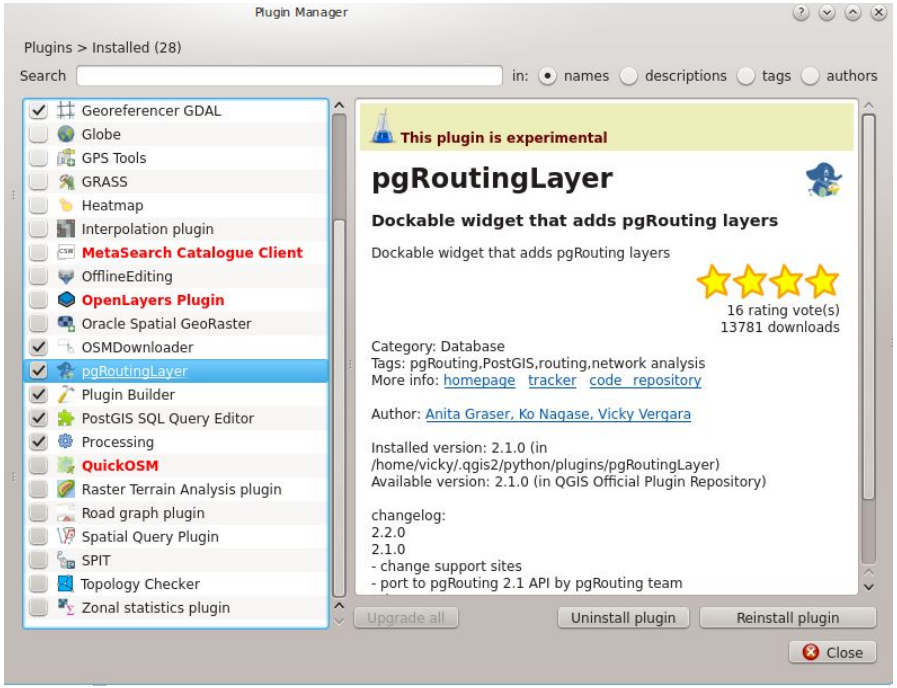
Obtener resultados

```
seq | path_seq | node | edge |       cost        |     agg_cost
----+----------+------+------+-------------------+------------------
   1 |        1 |   18 |   98 | 0.729963776732285 |                0
   2 |        2 |   65 |  188 | 0.609540796785944 | 0.729963776732285
   3 |        3 |  139 |   34 | 0.779552735077638 |  1.33950457351823
   4 |        4 |   15 |   67 |  12.7287743080311 |  2.11905730859587
   5 |        5 |   42 |   36 |  10.6159737661904 |   14.847831616627
   6 |        6 |   16 |   -1 |                 0 |  25.4638053828173
(6 rows)
```

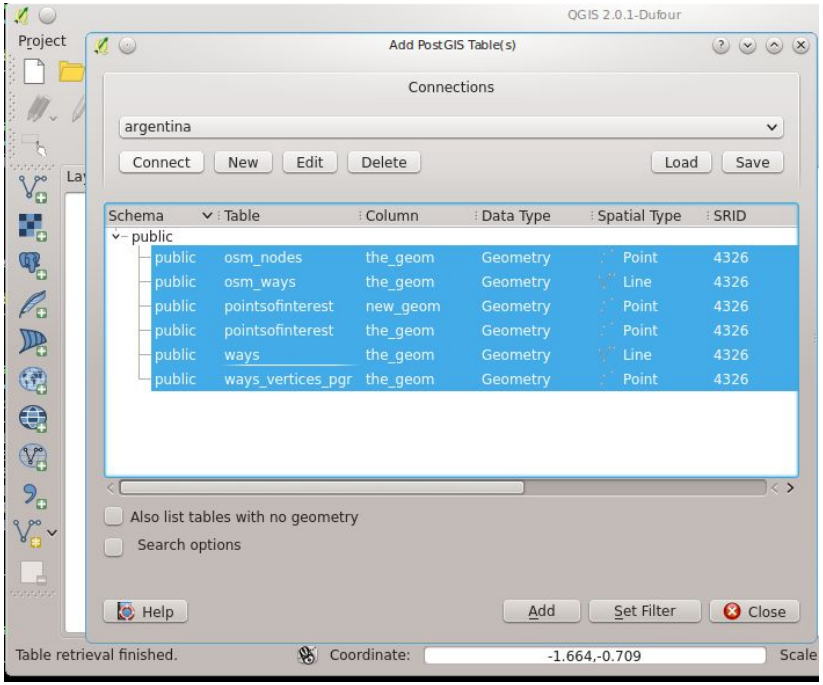
Abrir QGIS


Search:
qgis
Run qgis
QGIS Browser
Geographic Information System
QGIS Desktop
Geographic Information System

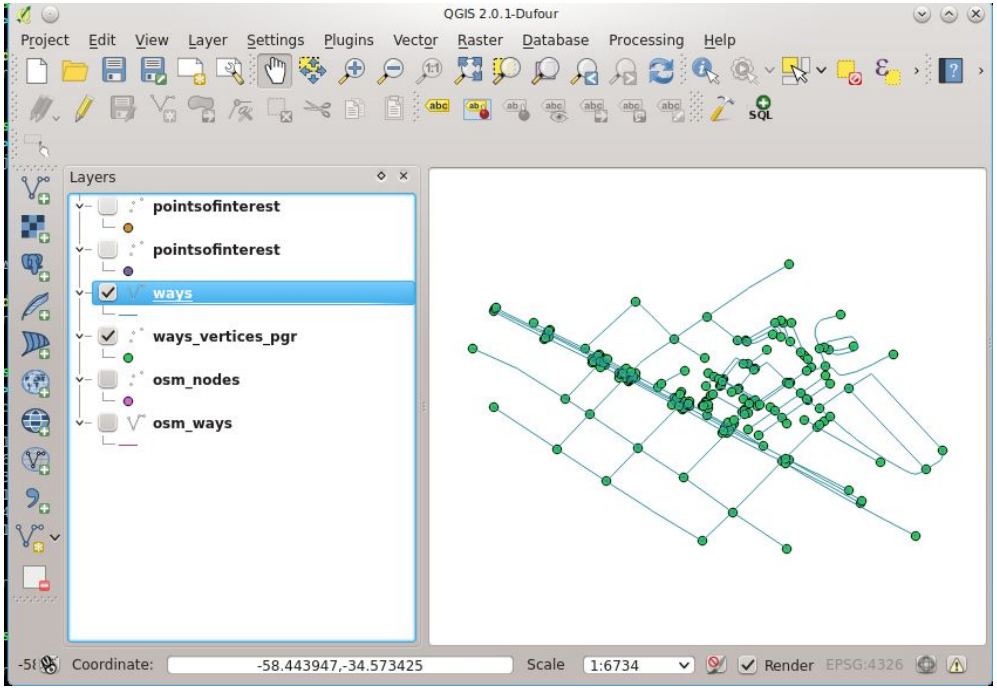
Instalar pgRouting Layer



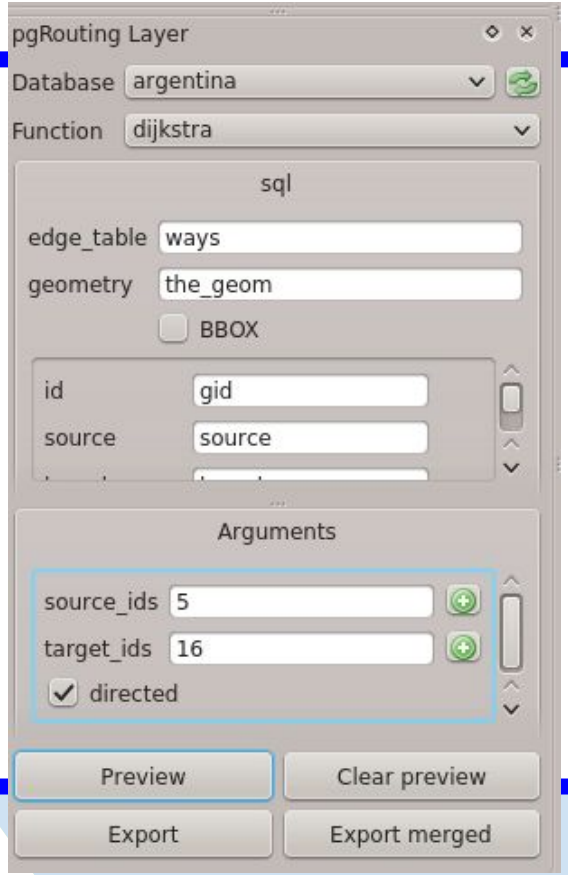
Cargar las tablas



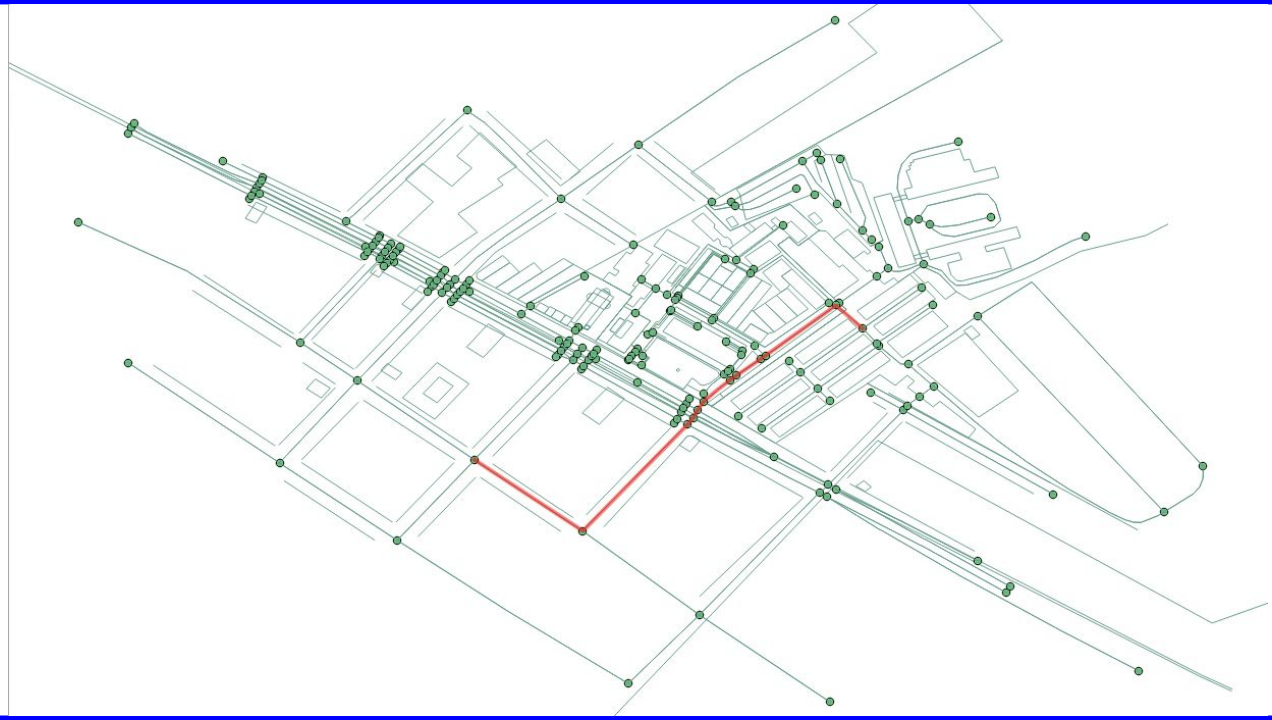
Ver el grafo (mapa)



Hacer una ruta



Ver la ruta



Contribuciones de estudiantes

pgRouting

Xi'an Jiaotong University

Maoguang Wang

GSoC 2017

Componentes

Familia de funciones

- pgr_connectedComponents - Experimental - Return the connected components of an undirected graph.
- pgr_strongComponents - Experimental - Return the strongly connected components of a directed graph.
- pgr_biconnectedComponents - Experimental - Return the biconnected components of an undirected graph.
- pgr_articulationPoints - Experimental - Return the articulation points of an undirected graph.
- pgr_bridges - Experimental - Return the bridges of an undirected graph.

Documentación:

http://docs.pgrouting.org/2.5/en/components-family.html

Mira su código

https://github.com/pgRouting/pgrouting/blob/a9fcb12d31070769d1fda68744f499bfcf2cfd85/src/components/src/connectedComponents_driver.cpp

Mira como trabaja

https://www.youtube.com/watch?v=rZ_68kz-oAg

LNM Institute of
Information Technology

Vidhan Jain

GSoC 2017

pgr_labelGraph

Transformación de grafos

- pgr_lineGraph - Experimental — Transforms a given graph into its corresponding edge-based graph.

Documentación:

http://docs.pgrouting.org/2.5/en/pgr_lineGraph.html

Mira su código

https://github.com/pgRouting/pgrouting/blob/a9fcb12d31070769d1fda68744f499bfcf2cfd85/src/lineGraph/src/lineGraph_driver.cpp

Mira como trabaja

https://www.youtube.com/watch?v=WBKJYc0keU0&t

Università degli Studi di Trento

Andrea Nardelli

GSoC 2016

Max Flow

Familia de funciones de Análisis de flujos

- pgr_maxFlow - Proposed - Only the Max flow calculation using Push and Relabel algorithm.
- pgr_boykovKolmogorov - Proposed - Boykov and Kolmogorov with details of flow on edges.
- pgr_edmondsKarp - Proposed - Edmonds and Karp algorithm with details of flow on edges.
- pgr_pushRelabel - Proposed - Push and relabel algorithm with details of flow on edges.
- Applications
  a. pgr_edgeDisjointPaths - Proposed - Calculates edge disjoint paths between two groups of vertices.
  b. pgr_maxCardinalityMatch - Proposed - Calculates a maximum cardinality matching in a graph.

Documentación:

http://docs.pgrouting.org/2.5/en/flow-family.html

Mira su código

https://github.com/pgRouting/pgrouting/blob/a9fcb12d31070769d1fda68744f499bfcf2cfd85/src/max_flow/src/maximum_cardinality_matching_driver.cpp

International Institute Of Information Technology, Hyderabad

Rothith Reddy

GSoC 2016

Contraction

Contracción de grafos

- pgr_contractGraph - Experimental - Reduce network size using contraction techniques

Documentación:

http://docs.pgrouting.org/2.5/en/pgr_contractGraph.html

Mira su código

https://github.com/pgRouting/pgrouting/blob/a9fcb12d31070769d1fda68744f499bfcf2cfd85/src/contraction/src/contractGraph_driver.cpp

Let’s Have Fun as an

Open Source Developer