OGR2OSM

A powerful tool for converting geodata to .osm format

SOTM-US 2012

About

- What ogr2osm can do for you
- How ogr2osm works
- A case study of a data conversion
- Why care about converting?

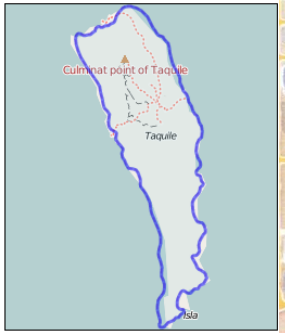
Why care? To avoid this

Way: 141322228

« 141322227 | 141322229 »

Edited at: Thu, 15 Dec 2011 10:50:49 +0000
Edited by: ovruni
Version: 1
In changeset: 10122385
Comment: Modificando fronteras distritales de Puno
Tags:
AREA_MINAM = 1394.26
DCTO = LEY
FECHA = 09/04/1965
IDDIST = 210103
IDDPTO = 21
IDPROV = 2101
LEY = 15489
NOMBDEP = PUNO
NOMBDIST = AMANTANI
NOMBPROV = PUNO
NOM_CAP = AMANTANI
OBJECTID = 176
SHAPE_AREA = 0.00116706227
SHAPE_AR_1 = 0.00116706194
SHAPE_LENG = 0.23321000322
SHAPE_LE_1 = 0.23321042956

Nodes:
1546977627
1546977638
1546977664
1546977688
1546977708



View area on larger map
Edit area
View way on larger map
Edit way

History

- Written in 2009 by Iván Sánchez Ortega
- Rewritten 2012 by Andrew Guertin for UVM buildings
- I now maintain it

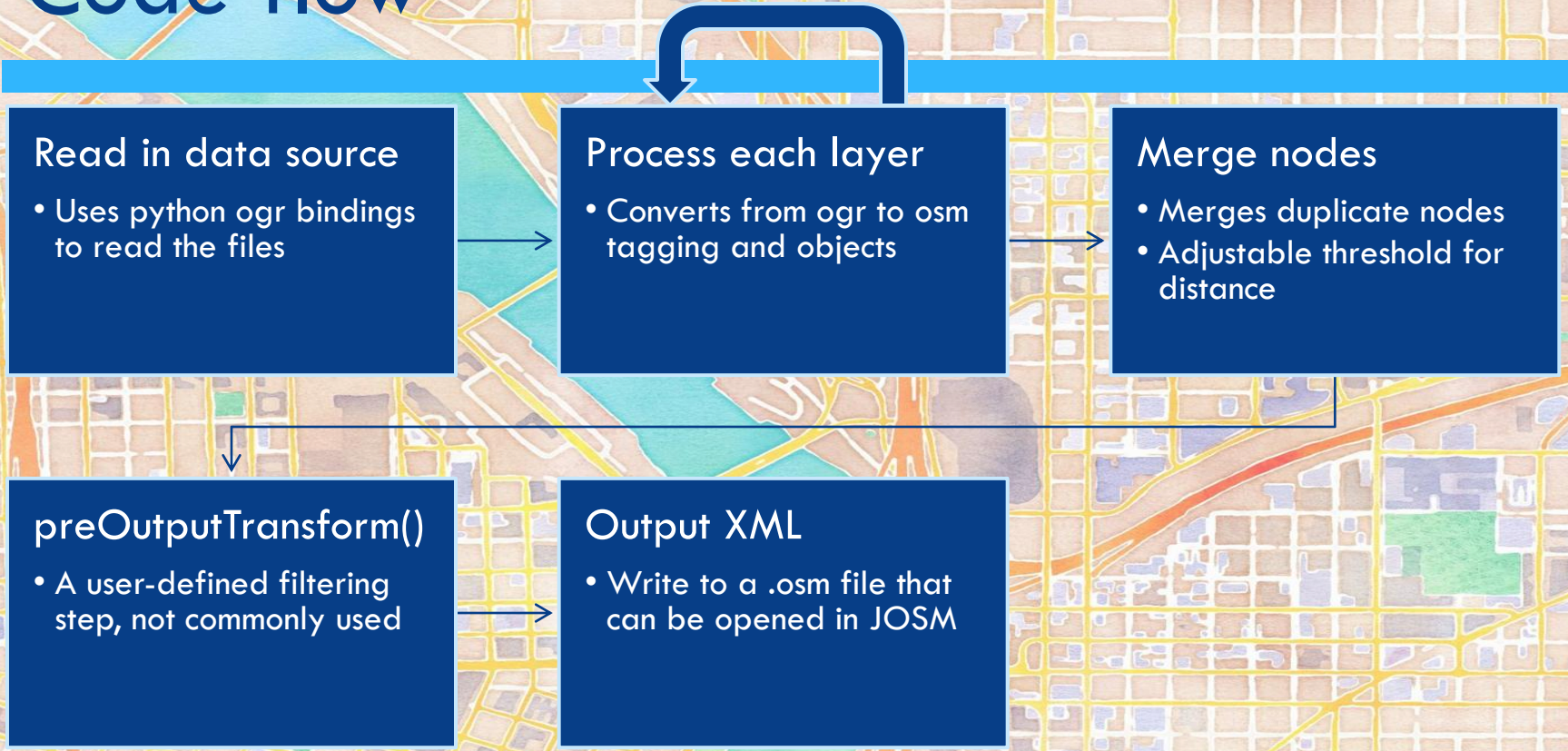
Features

- Can read any ogr supported data source
  - .shp, .mdb, .gdb, sqlite, etc
- Reprojects if necessary – eliminates a step with many sources
- Works with multiple layer sources or shapefile directories
- Uses python translation functions that you write to convert source field values to OSM tags
  - This allows you to use complicated logic to get the tagging right
- Documentation

Installing

- Requires gdal with python bindings
  - Simply `sudo apt-get install python-gdal git` on Ubuntu
  - May require compiling gdal from source and third-party SDKs for some formats (.mdb, .gdb)
- Run `git clone --recursive https://github.com/pnorman/ogr2osm` to install
- Full instructions at https://github.com/pnorman/ogr2osm

Code flow


Read in data source
• Uses python ogr bindings to read the files
Process each layer
• Converts from ogr to osm tagging and objects
Merge nodes
• Merges duplicate nodes
• Adjustable threshold for distance
preOutputTransform()
• A user-defined filtering step, not commonly used
Output XML
• Write to a .osm file that can be opened in JOSM

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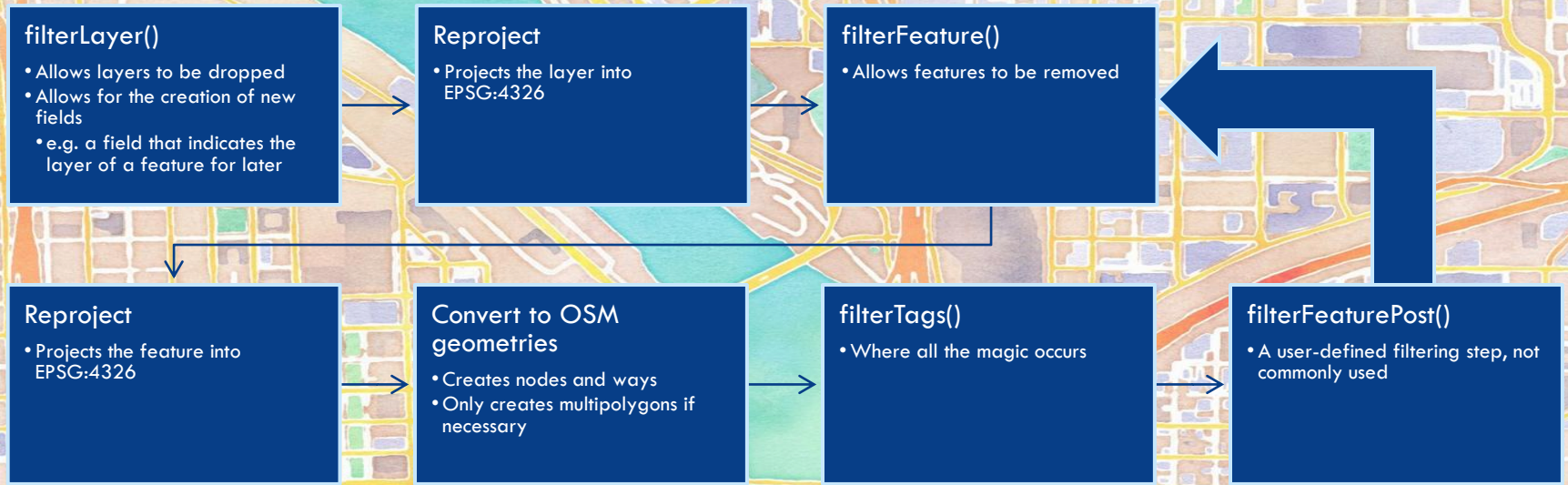
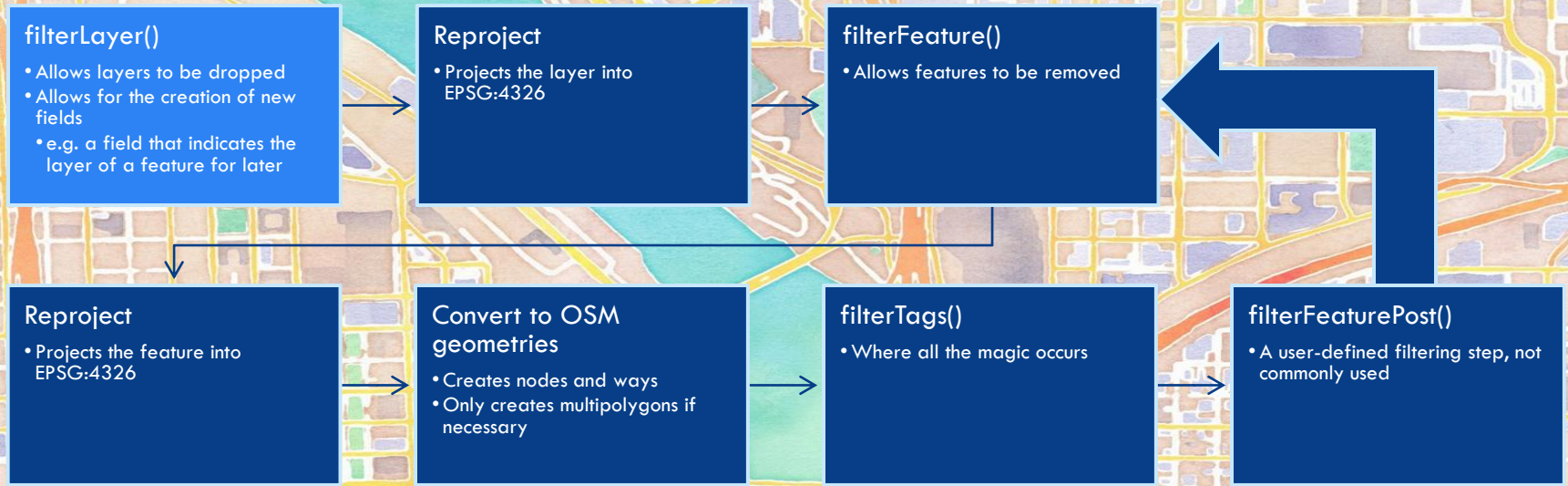
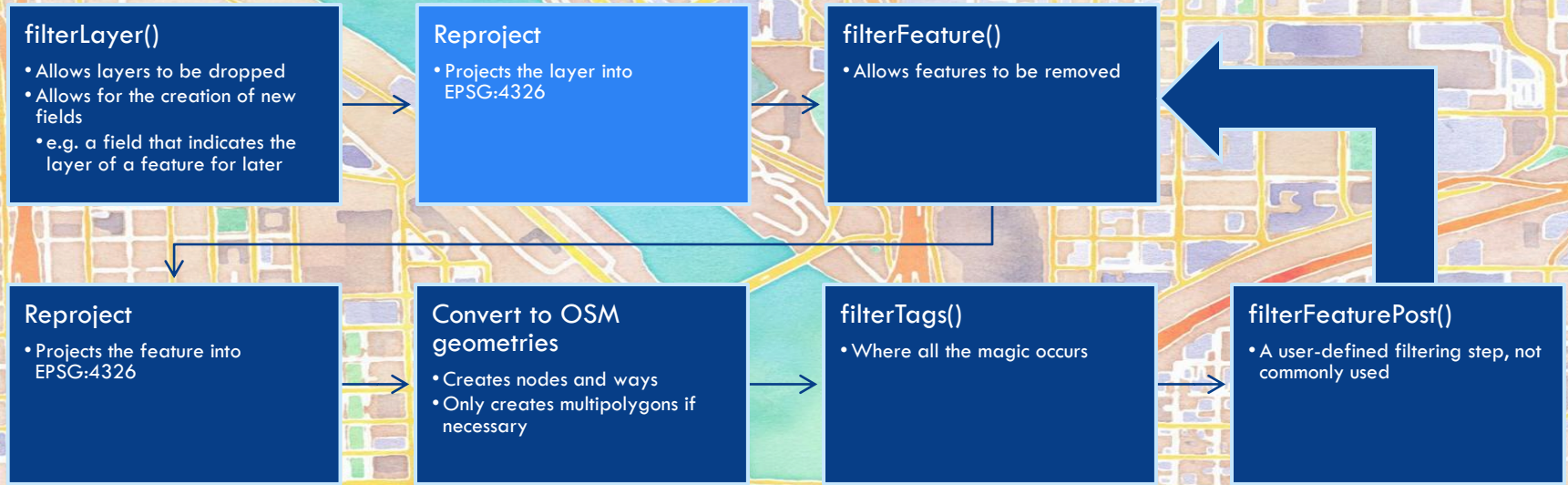
Layer processing



Layer processing



Layer processing



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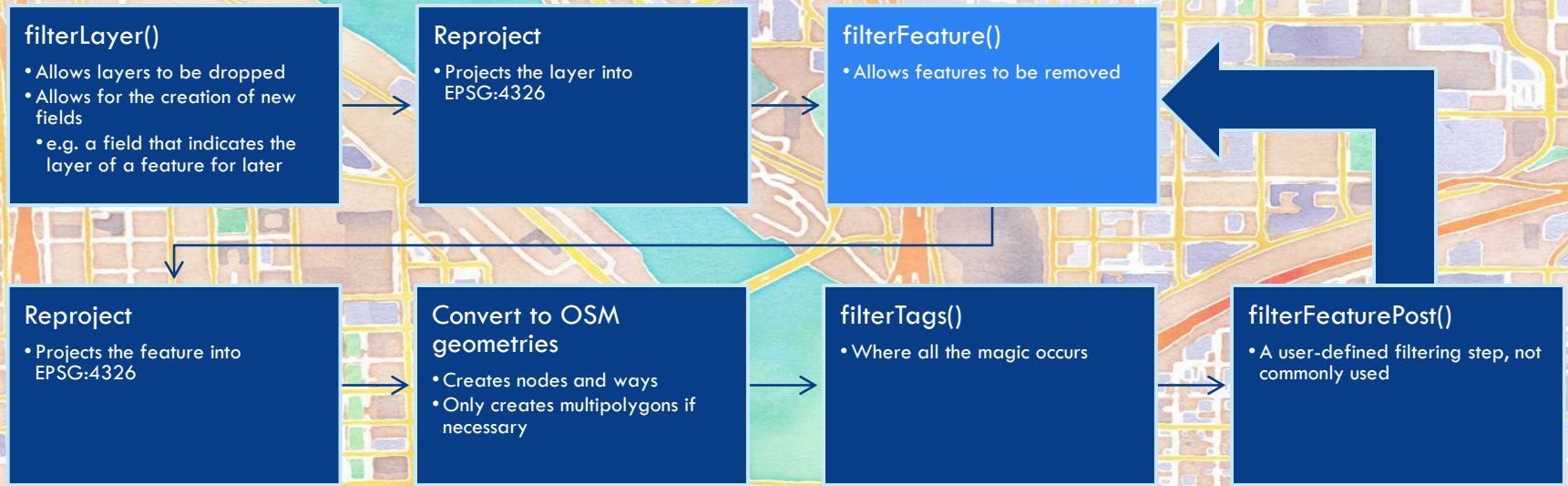

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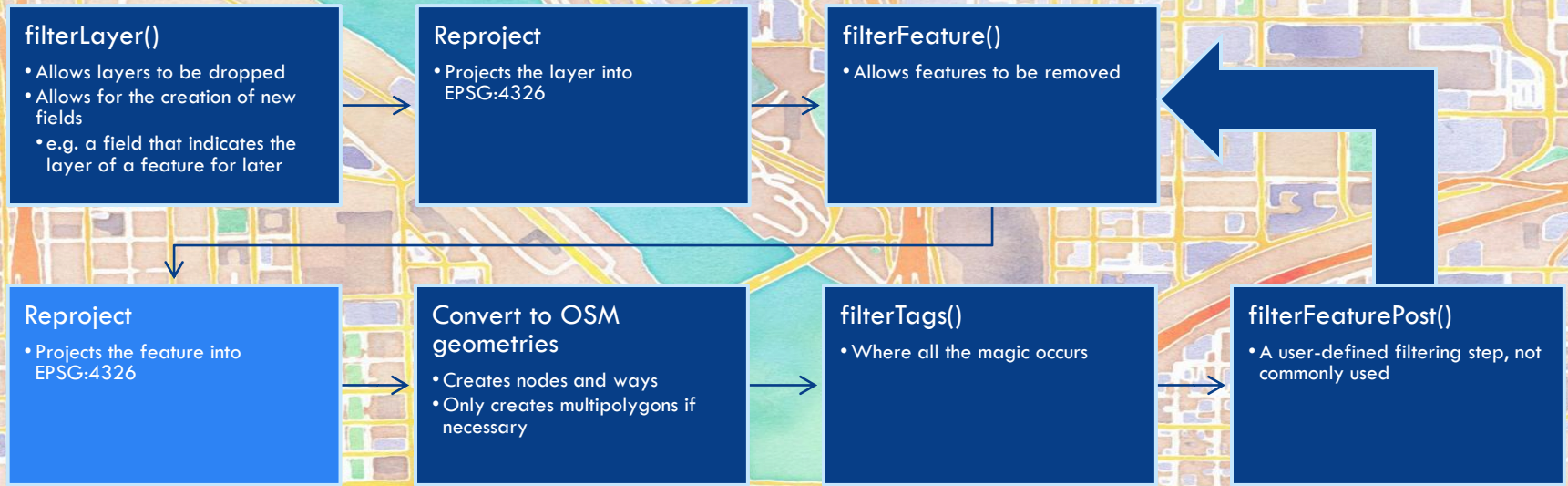

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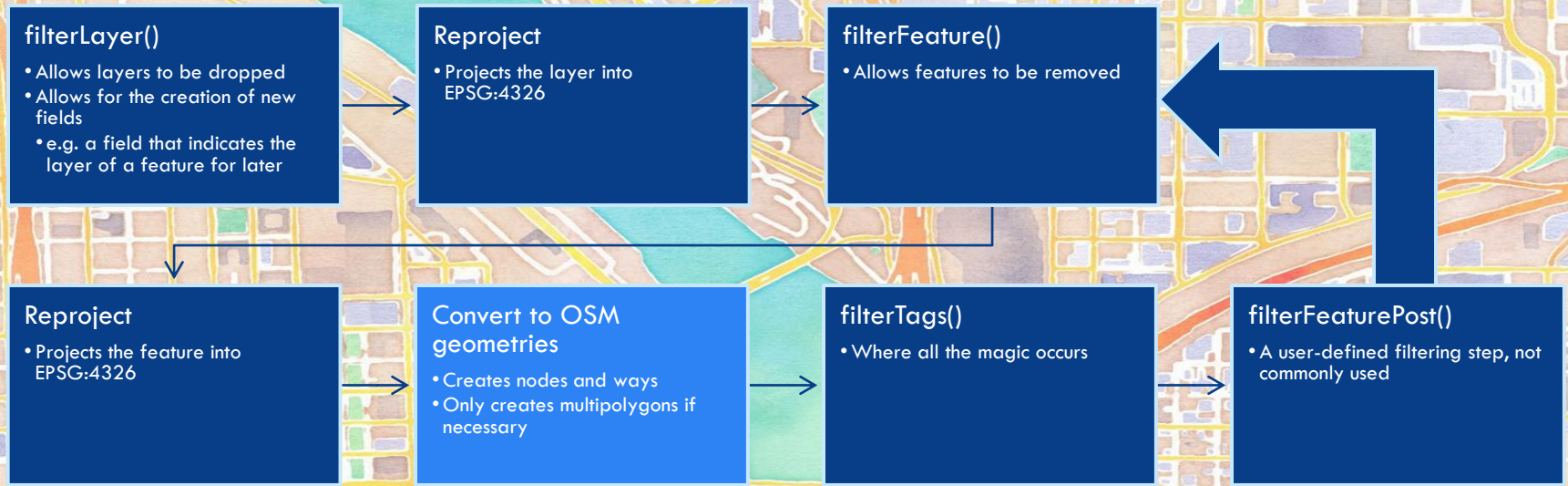
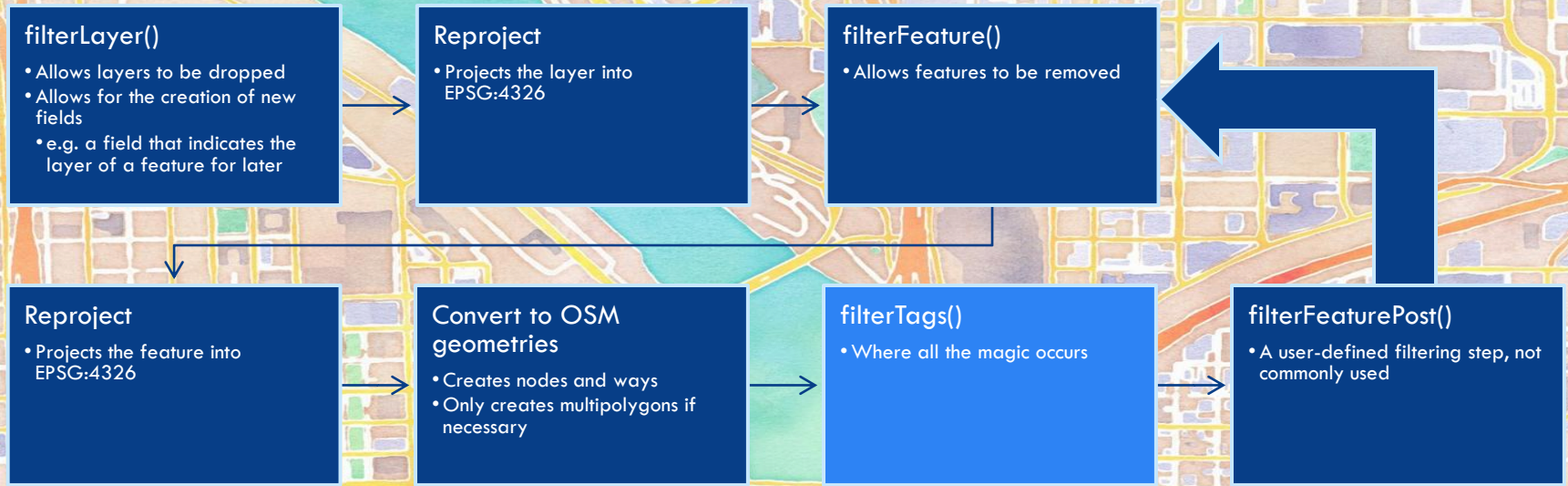


Layer processing



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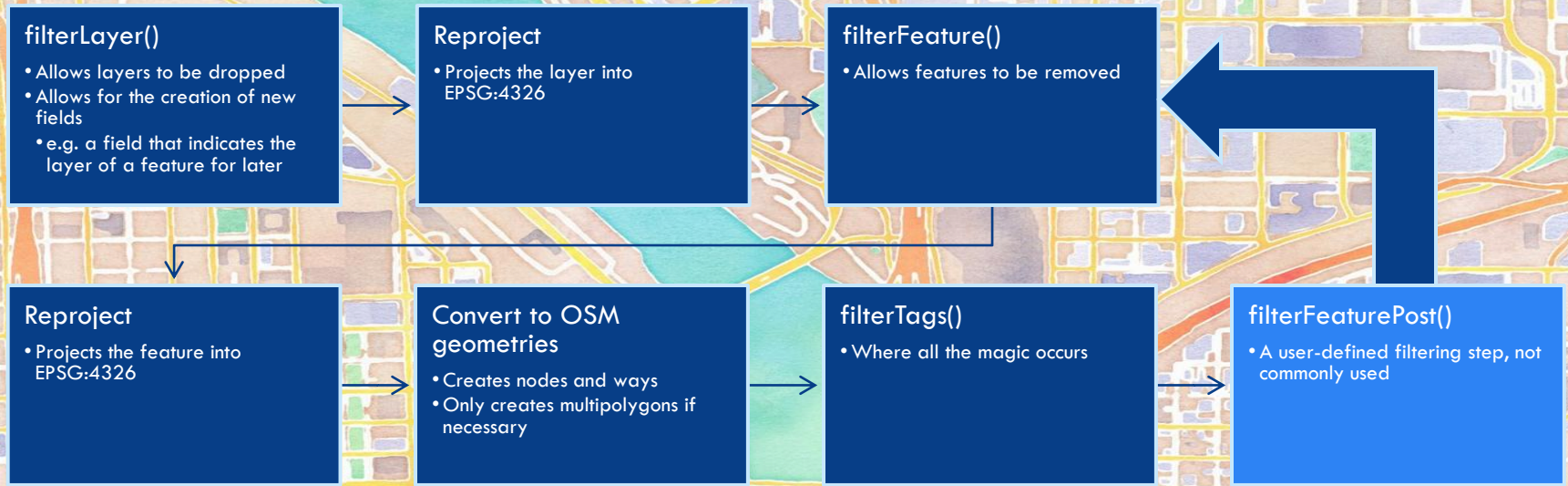

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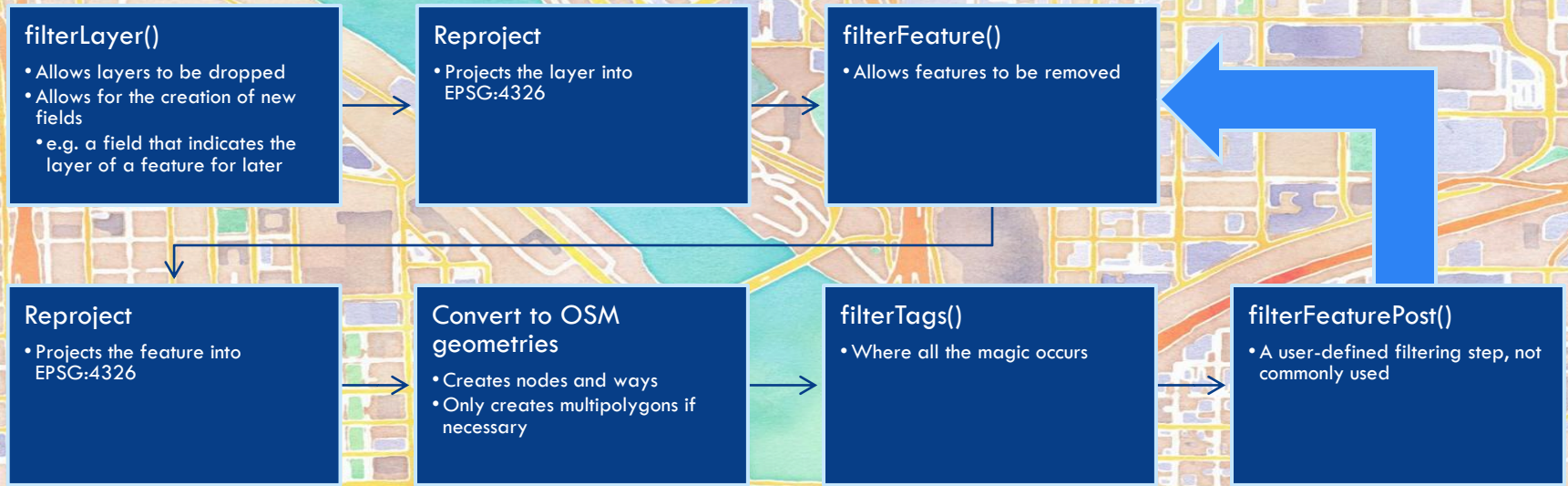

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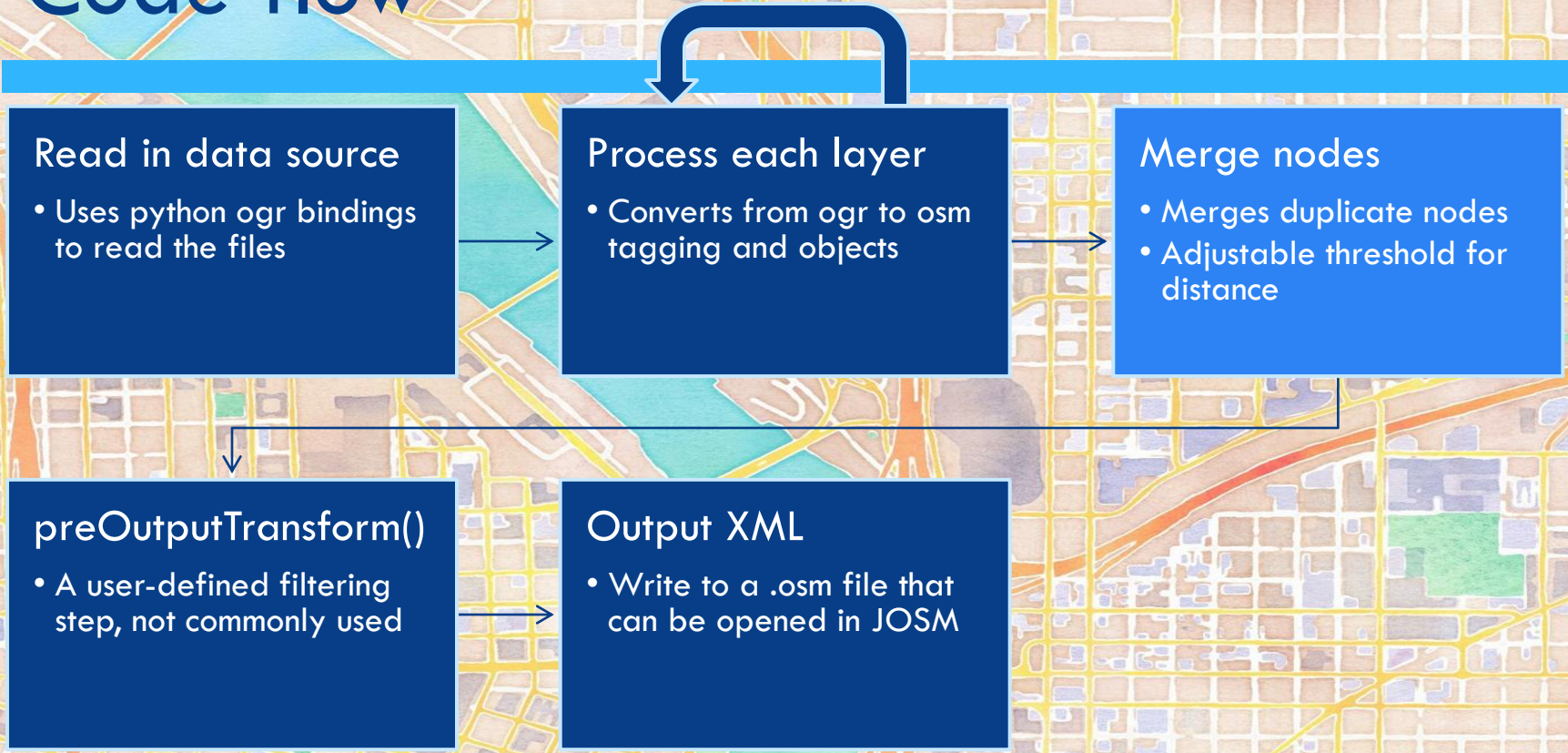
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Surrey case study

- Shapefile fields similar to other government GIS sources
- Fields or values periodically change with no notice
- 58 layers in 7 zip files
  - Not counting orthos and LIDAR-derived contours
- 153 MB compressed, 1.7 GB uncompressed
- Covers 187 km^2
- Too much data to write conversions for without a method

Reduce the amount of data

- ogr2osm will happily turn out a gigabyte .osm but good luck opening it
- Use `ogr2ogr -spat` to trim the input files down
  - Converting from some formats to shapefiles will truncate field names
    - Can use .gdb when coming from a format with long field names and layers
  - `-spat` wants coordinates in layer coordinate system
    - Use `gdaltransform` to turn latitude/longitude into desired coordinates

Drop layers

- Use the layer translation (`-t layer`) and see what layers should be dropped
- Most multi-layer sources have layers that should not be imported
- In the case of the Surrey data filtering is done in the script that downloads the data

```
def filterLayer(layer):
  layername = layer.GetName()
  if layername in ('WBD_HU2', 'WBD_HU4', 'WBD_HU6'):
    return

  if layername not in ('NHDArea', 'NHDAreaEventFC'):
    print 'Unknown layer ' + layer.GetName()

  field = ogr.FieldDefn('__LAYER', ogr.OFTString)
  field.SetWidth(len(layername))
  layer.CreateField(field)

  for j in range(layer.GetFeatureCount()):
    ogrfeature = layer.GetNextFeature()
    ogrfeature.SetField('__LAYER', layername)
    layer.SetFeature(ogrfeature)

  layer.ResetReading()
  return layer
```

Writing a good filterTags(attrs)

- When testing you want unknown fields to be kept
- Delete items from attrs as you convert them to OSM tags
- Delete fields which shouldn't be converted to an OSM tag

```
def filterTags(attrs):
  if not attrs: return
  tags = {}

  if '__LAYER' in attrs and attrs['__LAYER'] ==
      'wtrHydrantsSHP':
    # Delete the warranty date
    if 'WARR_DATE' in attrs: del attrs['WARR_DATE']

    if 'HYDRANT_NO' in attrs:
      tags['ref'] = attrs['HYDRANT_NO'].strip()
      del attrs['HYDRANT_NO']
  elif '__LAYER' in attrs and attrs['__LAYER'] ==
      'trnRoadCentrelinesSHP':
    # ... More logic ...

  for k,v in attrs.iteritems():
    if v.strip() != '' and not k in tags:
      tags[k]=v

  return tags
```

What not to include

- Duplications of geodata
  - SHAPE_AREA, SHAPE_LENGTH, latitude and longitude
- Unnecessary meta-data
  - e.g. username of the last person in the GIS department to edit the object
  - A single object ID can be useful but generally isn't
- A good translation will often drop more than it includes

Identify the main field

- Convert to .osm with no translation
- View statistics about tags
  - Easiest way is to open in JOSM, select -untagged, select the tags, paste into a text editor
- Need to look at a large area for this

COMMENTS	LC_COST	RIGHTTO
CONDDATE	LEFTFROM	ROADCODE
CONDTN	LEFTTO	ROAD_NAME
DATECLOSED	LEGACYID	ROW_WIDTH
DATECONST	LOCATION	SNW_RTEZON
DESIGNTN	MATERIAL	SPEED
DISR_ROUTE	MRN	STATUS
FAC_ID	NO_LANE	STR_ROUTE
GCNAME	OWNER	TRK_ROUTE
GCPREDIR	PAV_DATE	WAR_DATE
GCROADS	PROJ_NO	WTR_PRIOR
GCSUFDIR	RC_TYPE	WTR_VEHCL
GCTYPE	RC_TYPE2	YR
GIS_ES	RD_CLASS	YTD_COST
GREENWAY	RIGHTFROM	

NOT INCLUDED IN ROADS TRANSLATION
NOT INCLUDED IN ANY TRANSLATION
MAIN FIELD

The main field

- A numeric field and a text field in this case
- Don't trust field descriptions when writing OSM tagging
- Always verify!
  - Access Lane would be `highway=service` from the description but this would be wrong
  - Use imagery, surveys or other sources

RC_TYPE	RC_TYPE2	Count	Tagging
0	Road	11375	highway=?
1	Frontage Road	38	highway=residential
2	Highway Interchange	54	highway=motorway_link
3	Street Lane	20	highway=service
4	Access Lane	1442	highway=?
5	Railway	28	railway=rail

Looking at a value in more detail

- Should be carried out for each value, even if you think you're sure on the tagging
- Look at all tags for just those matching the field value
  - In this case search in JOSM for `RC_TYPE2="Road"`

RD_CLASS	highway=	Count
Local	residential	8284
Major Collector	tertiary	1350
Arterial	primary secondary tertiary	1583
Provincial Highway	motorway primary	156
Translink	unclassified	1

Even more detail

- Gets very close to OSM tagging practice locally
- Loss of information with Arterial MRN=No and Major Collector both mapping to tertiary
  - Does this matter in this case? No, road classifications require some judgment

MRN	highway=	Count
Yes	secondary	504
No	tertiary	1079

Dropping objects

- You may come across objects that you shouldn't add to OSM
- In this case there are "paper roads" in the data
- Use filterFeature() to remove these

```
def filterFeature(ogrfeature, fieldNames, reproject):
  if not ogrfeature: return

  index = ogrfeature.GetFieldIndex('STATUS')
    if index >= 0 and ogrfeature.GetField(index) in
       ('History', 'For Construction', 'Proposed'):
        return None

  return ogrfeature
```

Putting it all together


```
def filterLayer(layer):
  layername = layer.GetName()

  field = ogr.FieldDefn('__LAYER', ogr.OFTString)
  field.SetWidth(len(layername))
  layer.CreateField(field)

  for j in range(layer.GetFeatureCount()):
    ogrfeature = layer.GetNextFeature()
    ogrfeature.SetField('__LAYER', layername)
    layer.SetFeature(ogrfeature)

  layer.ResetReading()
  return layer


def filterFeature(ogrfeature, fieldNames, reproject):
  if not ogrfeature: return

  index = ogrfeature.GetFieldIndex('STATUS')
    if index >= 0 and ogrfeature.GetField(index) in
       ('History', 'For Construction', 'Proposed'):
        return None

  return ogrfeature
```

- Code presented is a simplification and does not deal with all fields
- Filter features and layers

Putting it all together


```
def filterTags(attrs):
  if not attrs: return
  tags = {}

  if '__LAYER' in attrs and attrs['__LAYER'] ==
      'trnRoadCentrelinesSHP':
    if 'COMMENTS' in attrs: del attrs['COMMENTS']
    if 'DATECLOSED' in attrs: del attrs['DATECLOSED']
    # Lots more to delete

    if 'NO_LANE' in attrs:
      tags['lanes'] = attrs['NO_LANE'].strip()
      del attrs['NO_LANE']

    if 'RC_TYPE' in attrs and attrs['RC_TYPE'].strip() == '0': # Normal roads
      del attrs['RC_TYPE']
      if 'RC_TYPE2' in attrs: del attrs['RC_TYPE2']
      if 'RD_CLASS' in attrs and attrs['RD_CLASS'] == 'Local':
        tags['highway'] = 'residential'
        del attrs['RD_CLASS']
      elif 'RD_CLASS' in attrs and attrs['RD_CLASS'] == 'Major Collector':
        tags['highway'] = 'tertiary'
        del attrs['RD_CLASS']
      elif 'RD_CLASS' in attrs and attrs['RD_CLASS'] == 'Arterial':
        if 'ROAD_NAME' in attrs and attrs['ROAD_NAME'] in
            ('King George Blvd', 'Fraser Hwy'):
          tags['highway'] = 'primary'
        else:
          if 'MRN' in attrs and attrs['MRN'] == 'Yes':
            tags['highway'] = 'secondary'
          else:
            tags['highway'] = 'tertiary'
        del attrs['RD_CLASS']
      elif 'RD_CLASS' in attrs and attrs['RD_CLASS'] == 'Provincial Highway':
        # Special-case motorways
        if 'ROAD_NAME' in attrs and attrs['ROAD_NAME'] in
            ('No 1 Hwy', 'No 99 Hwy'):
          tags['highway'] = 'motorway'
        else:
          tags['highway'] = 'primary'
          del attrs['RD_CLASS']
        elif 'RD_CLASS' in attrs and attrs['RD_CLASS'] == 'Translink':
          tags['highway'] = 'unclassified'
          del attrs['RD_CLASS']
        else:
          l.error('trnRoadCentrelinesSHP RC_TYPE=0 logic fell through')
          tags['fixme'] = 'yes'
          tags['highway'] = 'road'
    elif 'RC_TYPE' in attrs and attrs['RC_TYPE'].strip() == '1':
      # More logic

  elif '__LAYER' in attrs and attrs['__LAYER'] == 'trnTrafficSignalsSHP':
    # More logic

  for k,v in attrs.iteritems():
    if v.strip() != '' and not k in tags:
      tags[k]=v

  return tags
```

Any questions?

Credits

- Background by Stamen Design under CC BY 3.0
- Surrey Data © 2012 City of Surrey under PDDL 1.0