SDI DAYS ZAGREB, Croatia 25 - 29 September 2012
φ 45°47'56"
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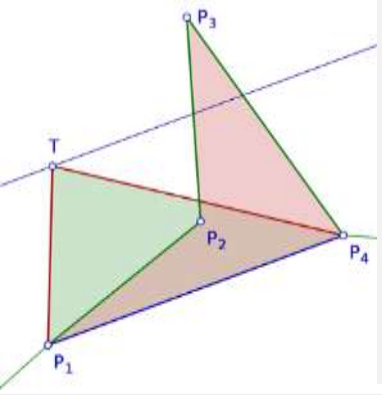
1st Regional INSPIRATION forum
4th NSDI INSPIRE DAY
8th Conference CARTOGRAPHY & Geoinformation

New line generalisation Algorithm implemented as a web service – our experiences



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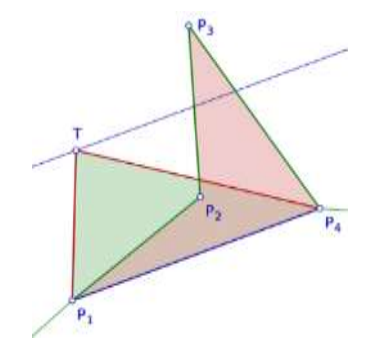
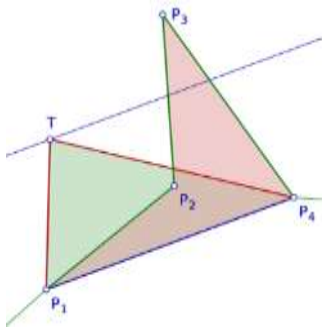


Developing New Algorithms

- Suppose that some idea has been proved and implementation should start
- Choice of programming language
- Choice of existing platform
- Commercial vs. free software



Web Services

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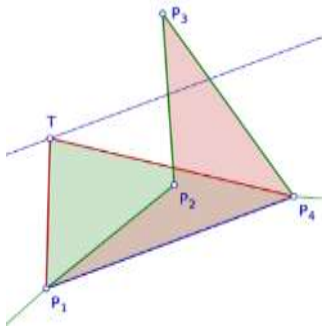
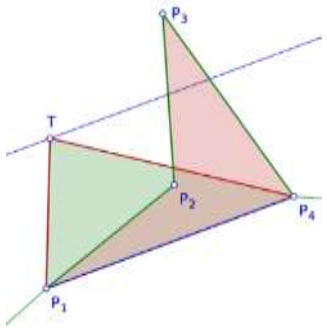
- Interface to any existing application software over HTTP
- Can be used anywhere in world from one place – if client is available
- One gets maximum potential user community for testing or usage

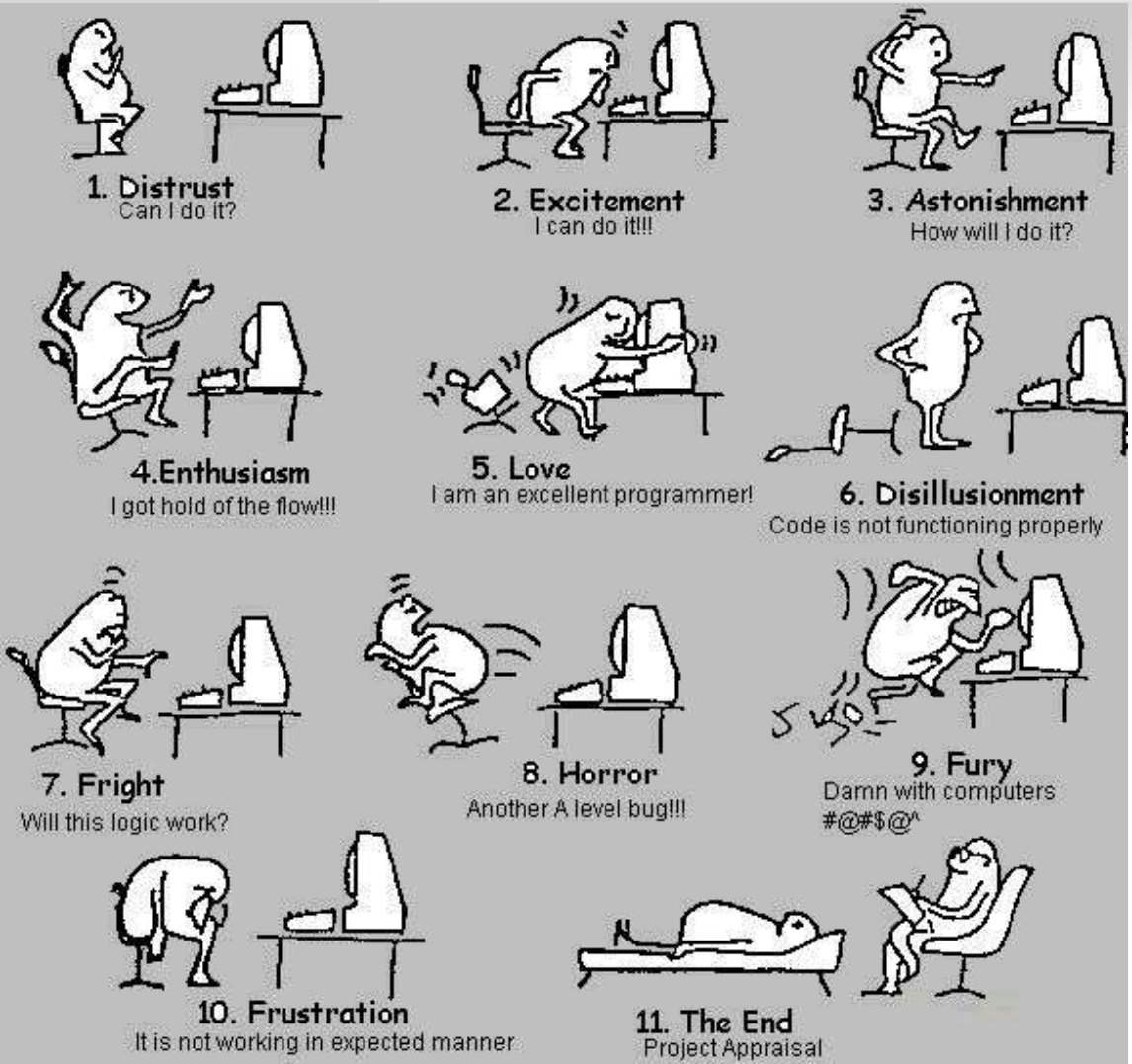


Before Web Services

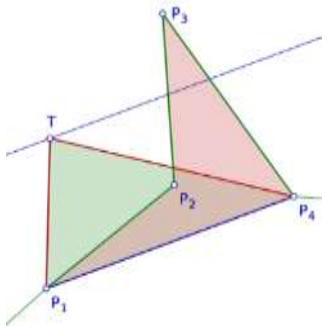
- User find algorithm described in literature
- If already implemented - must purchase application to test algorithm
- Rarely there are choice of many algorithms for the same task – developer already made a choice



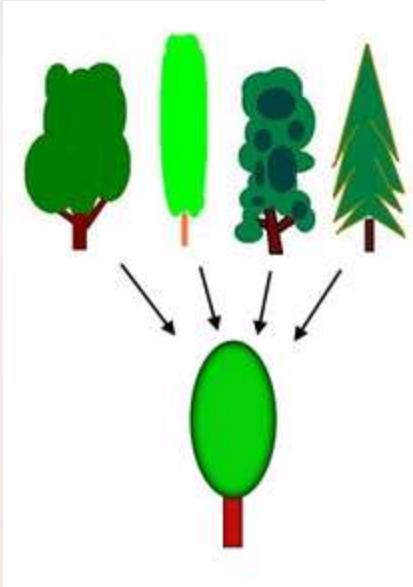
Before Web Services



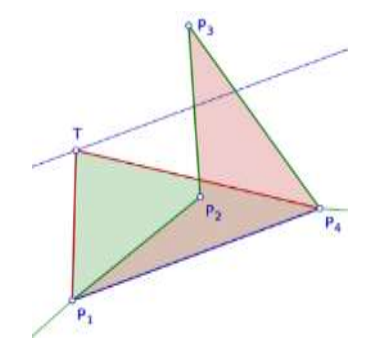
- User must accept offered algorithms in existing solutions
- Start to write his own implementation – tedious work which requires special programming skills and patience
- New developments are slowed down



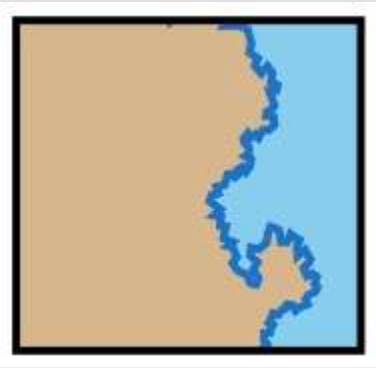
Cartographic Generalisation



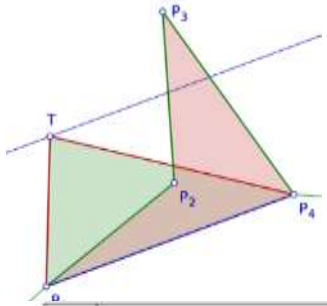
- “Complicated” cartographic discipline
- Automatisation was given high hopes
- Only trained cartographers deal with it in digital environment
- Result is large number of digital maps which does not follow most of the rules of cartographic generalisation, if any



Cartographic Line Generalisation

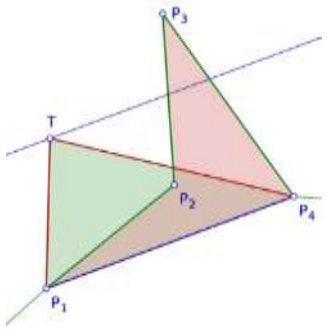


- Probably the most investigated problem
- Large number of published algorithms
- Probably most used is Douglas-Peucker algorithm – simple and available
- Not intuitive usage – questionable results for cartographic purpose



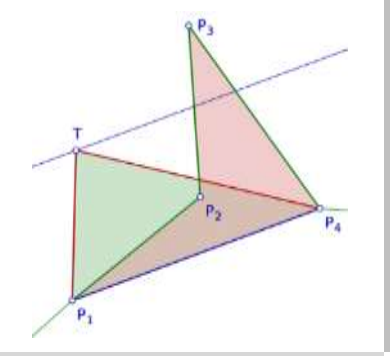
Douglas-Peucker algorithm

original coastline
simplified line
latitude
longitude
60
55
50
45
40
35
-30
-20
-10
0
10
20
30



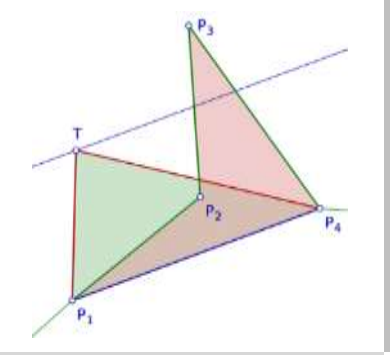
Cartographic Line Generalisation - Our Algorithm

- **Area of generalised objects is preserved – property of manual generalisation**
- Tutić, D. i Lapaine, M: (2009): Area Preserving Cartographic Line Generalisation, KiG, Vol. 8, No. 11, 84-100
  www.kartografija.hr/kig



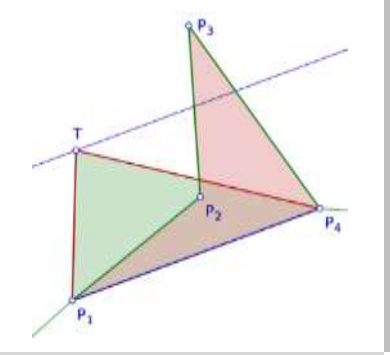
Cartographic Line Generalisation - Our Algorithm

SIMPLE



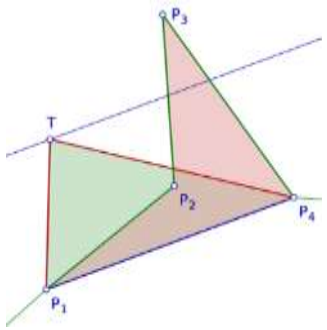
Cartographic Line Generalisation - Our Algorithm

ROBUST



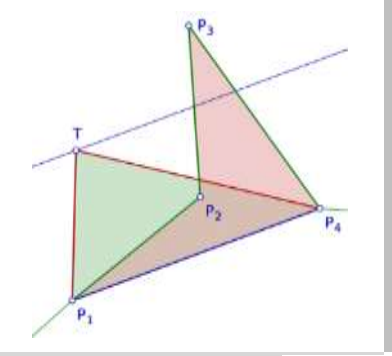
Cartographic Line Generalisation - Our Algorithm

FAST

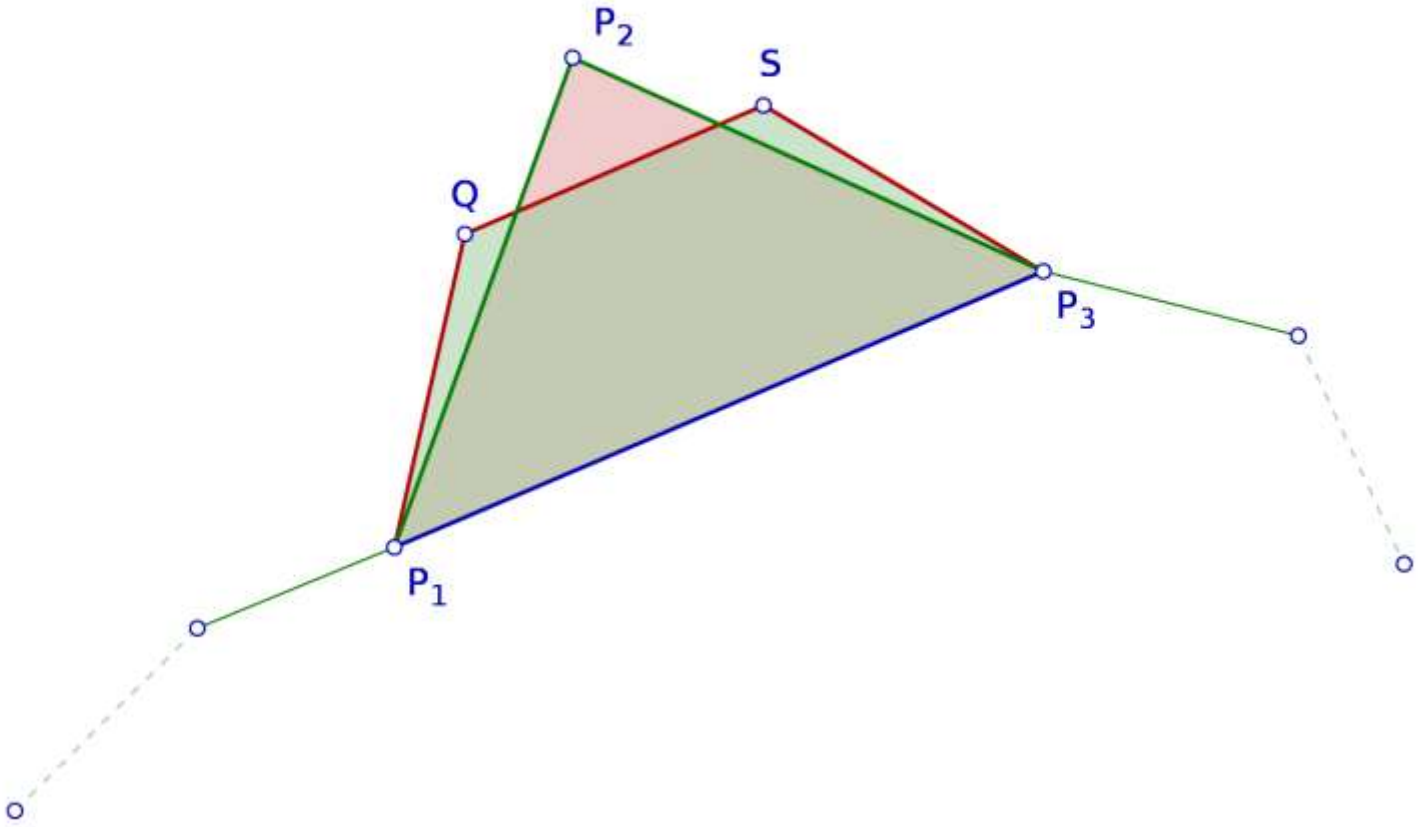


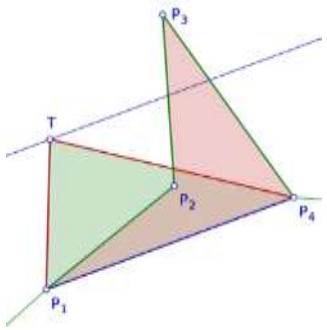
Cartographic Line Generalisation - Our Algorithm

- First testing gave acceptable – very good results
- We have developed area preserving smoothing to enhance the results (Kyoto, 2010)
- It has advantages and disadvantages



Area Preserving Smoothing

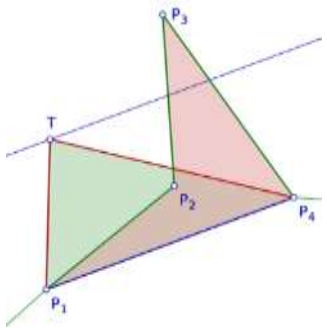




Implemetation

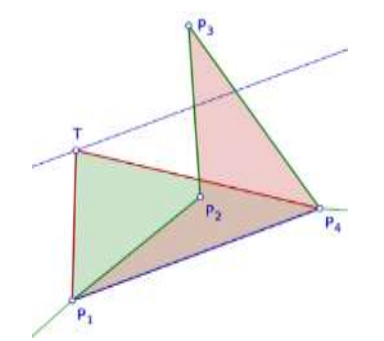
- Technology
  - New module for GRASS-GIS – the real process
  - OGC WPS (Web Processing Service) for publishing
  - PyWPS

http://wps.kartografija.hr/pywps/cgi-bin/pywps.cgi



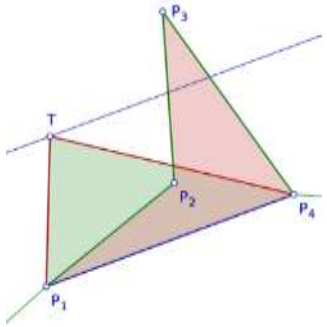
Intuitive Usage

- Parameters
  - **Map scale**
  - Medium (paper, screen, resolution)
  - Line width
  - Map type (topographic, school,waal...)
  - **All additional parameters are functions of map scale**

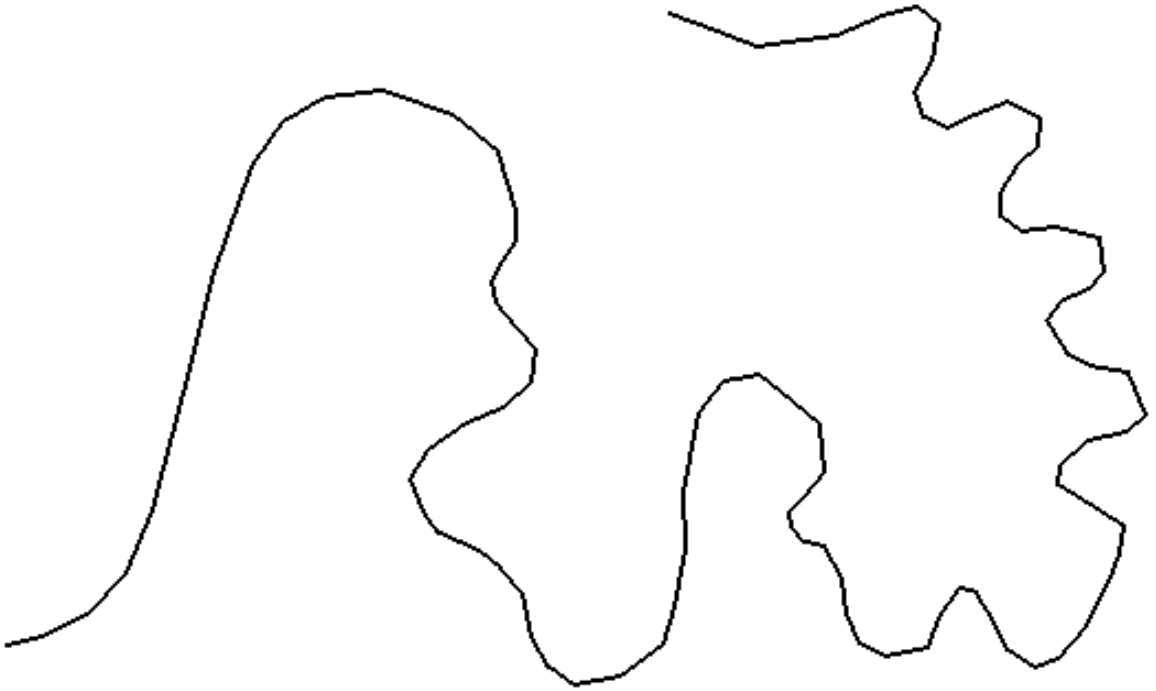


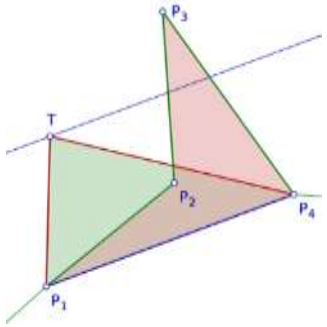
Why "Only Map Scale" is Important

- Map scale is always known or should be known even when map is prepared on the fly through some query
- Results should be acceptable even for the users who do not understand cartographic generalisation or algorithm details



Algorithm Properties





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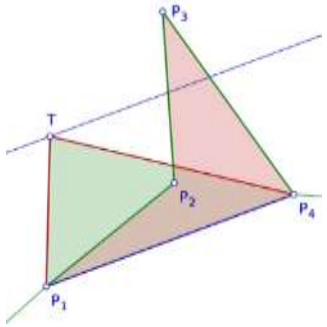

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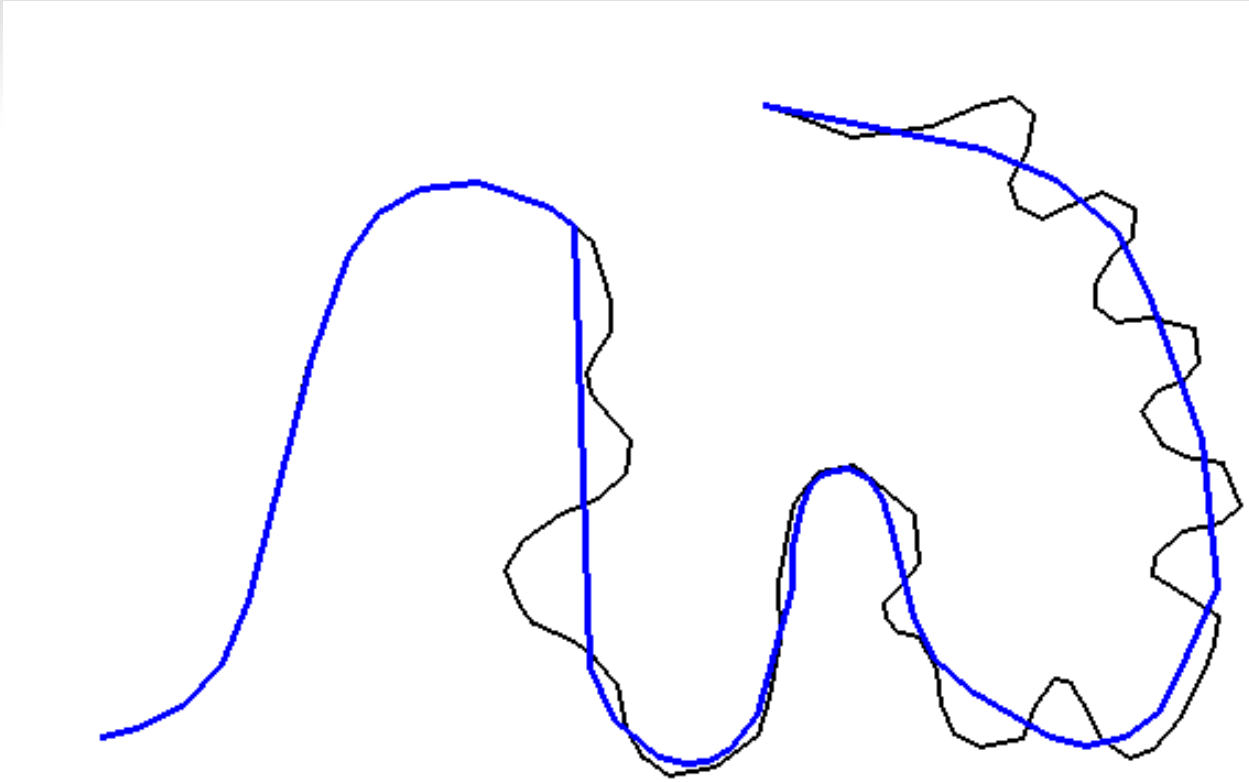

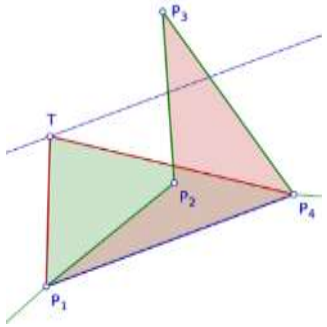

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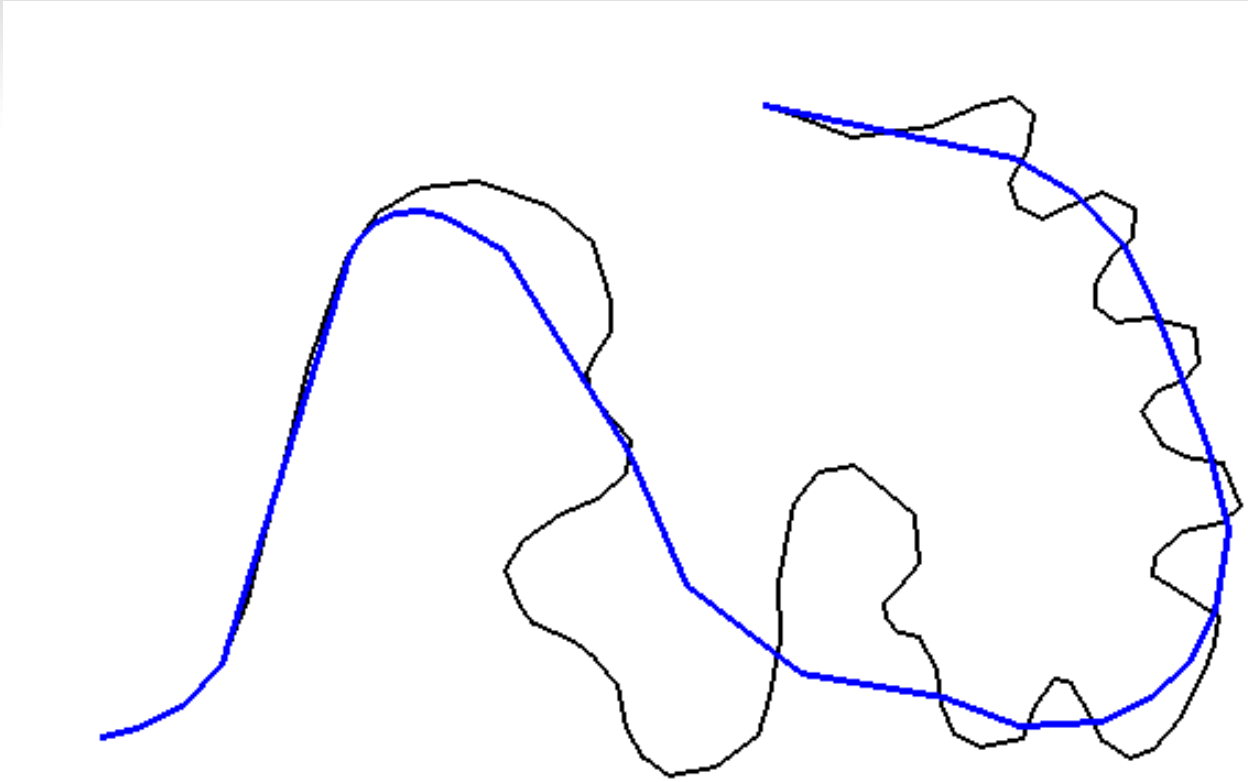

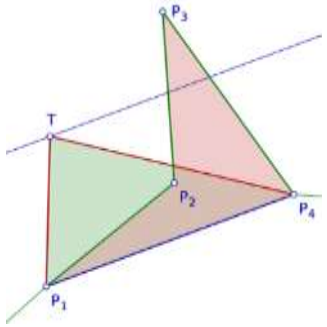

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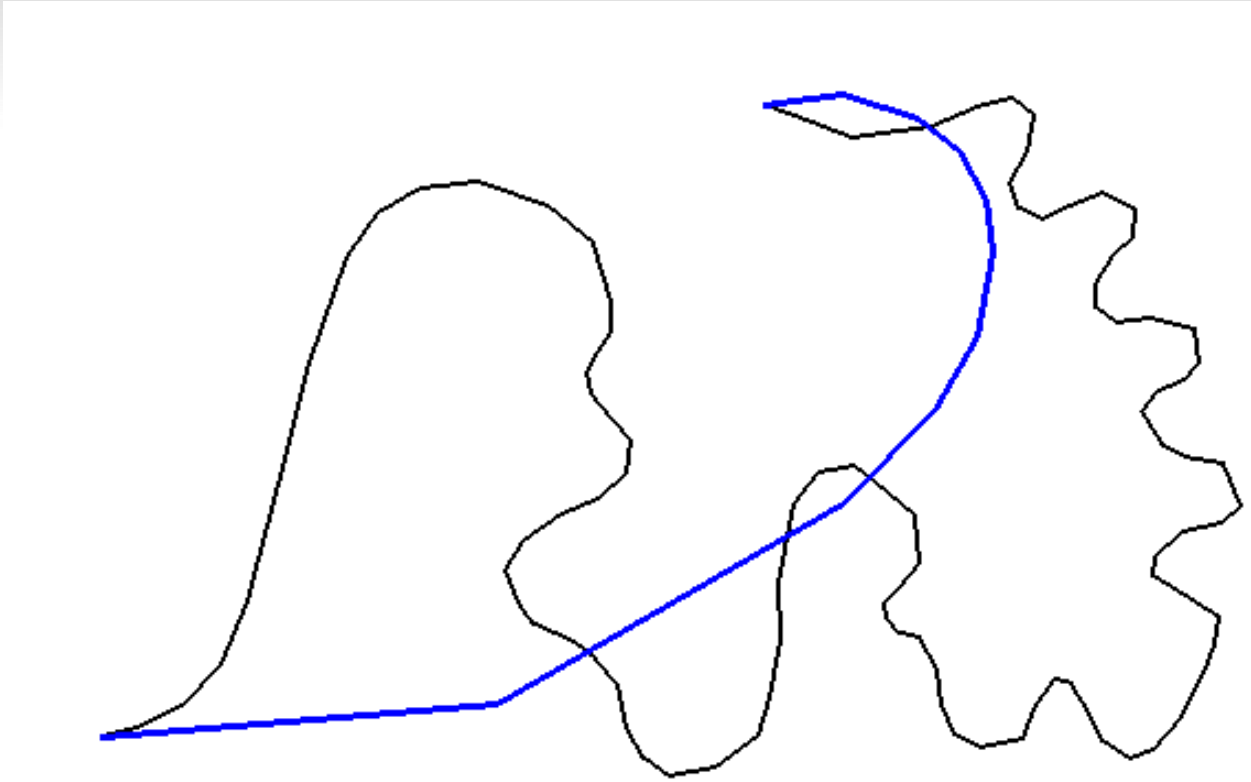
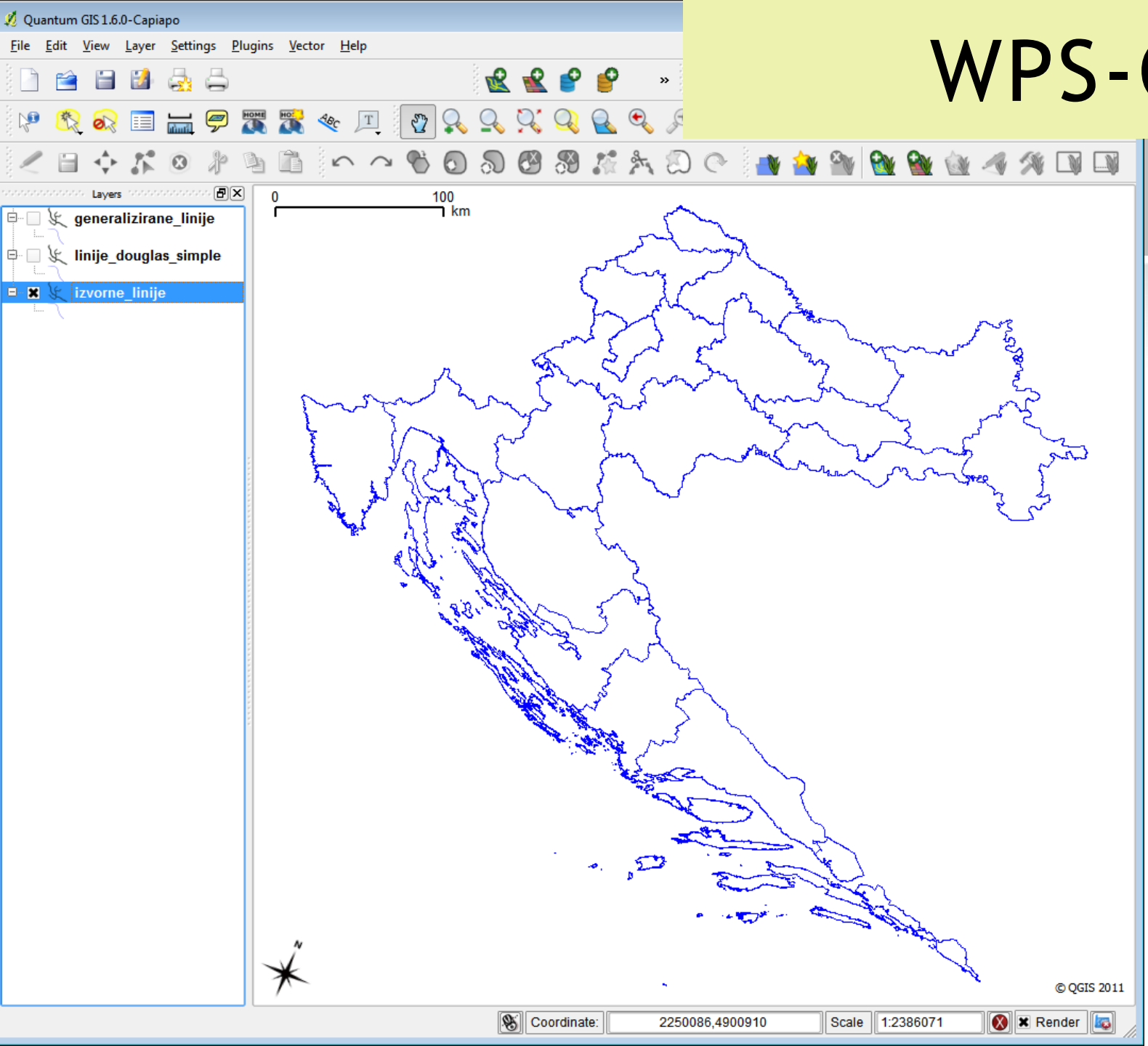


WPS-Client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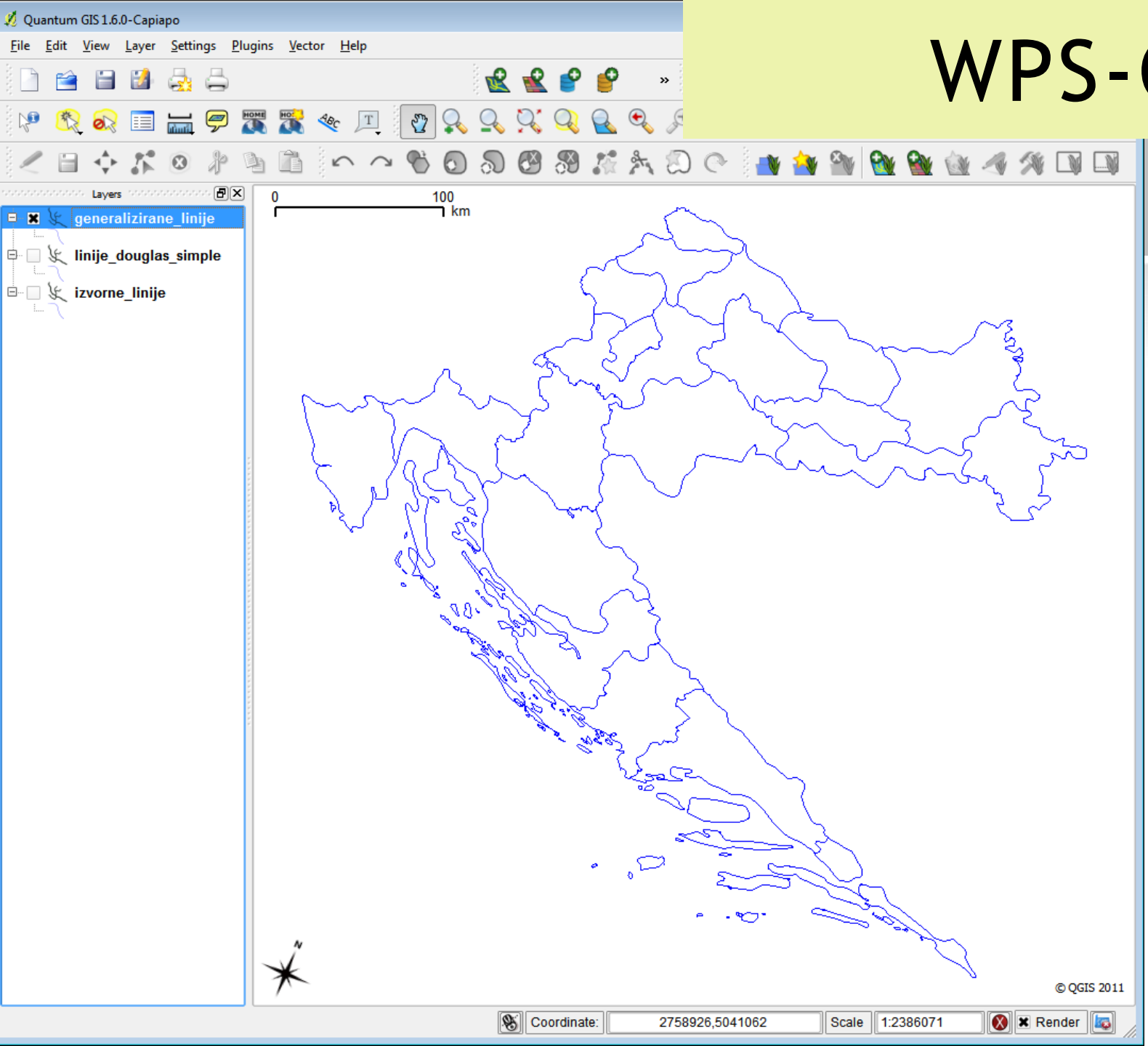
WPS-Client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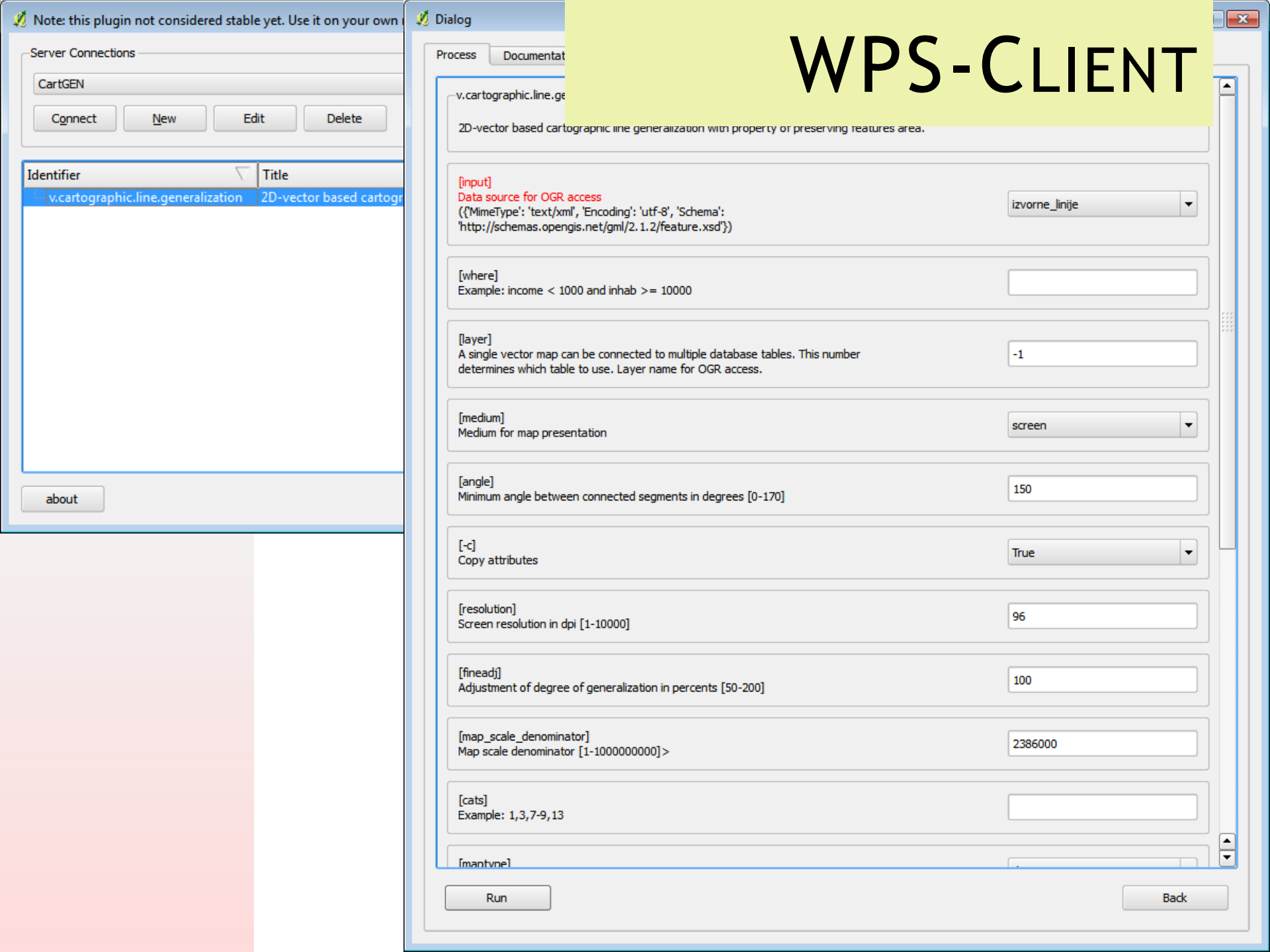
Note: this plugin not considered stable yet. Use it on your own
Server Connections
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Data source for OGR access
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A single vector map can be connected to multiple database tables. This number
determines which table to use. Layer name for OGR access.
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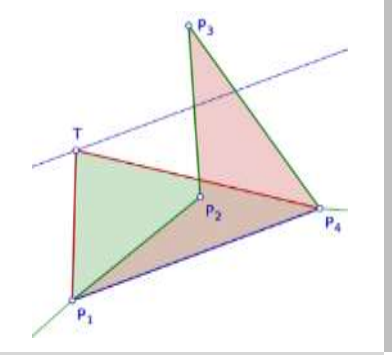
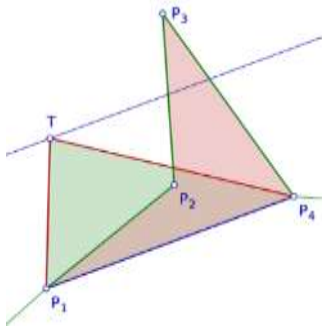


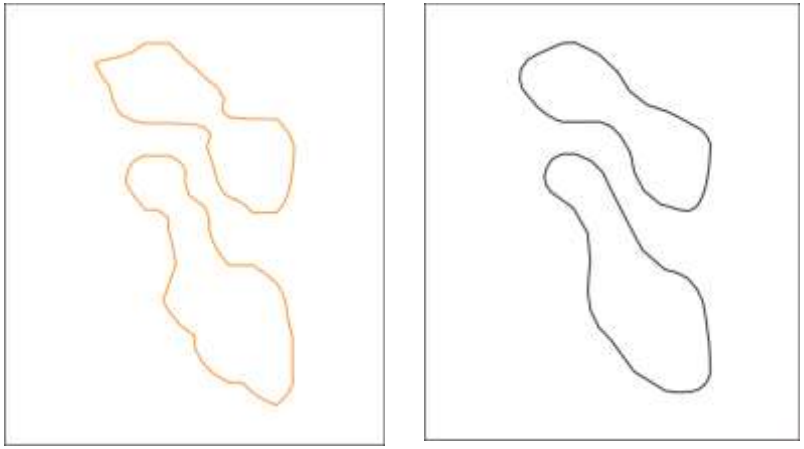
PROBLEMS

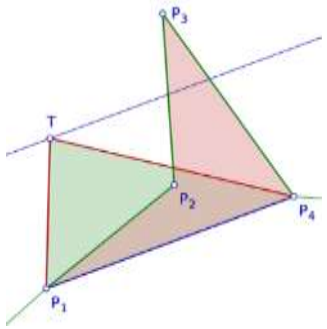
- Stability of numerical part of algorithm – can be improved
- WPS Servers and Clients in constant development
- Not as easy as expected
- Respond from user commnity



Applications

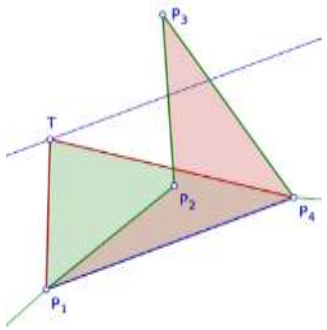
- Student works – exercises, thesis
- Commercial projects – improvement of map content representation





Conclusion

- Web services offer new and exciting possibilities
- Importance for very specific applications like cartographic generalisation
- Maybe we can expect new cycle in developing the automatisation in cartography



Useful Links

- http://wps.kartografija.hr/pywps/cgi-bin/pywps.cgi
- http://www.kartografija.hr/gshhs/
- http://www.kartografija.hr/kig/upload/clanci/kig11_Tutic2.pdf
- http://bib.irb.hr/datoteka/480211.Tutic_Lapaine_full_paper.pdf
- http://kartographie.geo.tu-dresden.de/webgen_wps/

Thank You!