

# Vario-scale geo-information

8-9-2015

1 minute project outline...

STW User Committee meeting, 8 September 2015

Delft University of Technology, Faculty of Architecture and the Built Environment

# Project outline

Vario-scale data structures (2D + scale) → tGAP structure in DBMS

Covert 2D+scale into smooth 3D → SSC

Better tGAP/SSC content → generalization operators / semantics

Processing large data sets (nation-wide) → parallel processing

Server-client architecture → streaming web-service protocols

Efficient interaction with SSC → GPU for slicing (smooth zoom)

...Update the data content, dynamic data structure

# Last results, more details later (1 / 2)

- Made website with results for project (docu and life demo):  
<http://varioscale.bk.tudelft.nl/>
- Re-organized tGAP prototype
- Implementation of splitting features (on-going work)
- Investigating straight skeleton base split operation
- Investigate detection of narrow parts → split part of features
- Released Python triangulation library →  
<https://pypi.python.org/pypi/tri> (as basis for splitting features)
- Start of implementation with using groups (on-going work) in order to generate better quality maps at the various scales
- Development of theory for large-scale road network data within in tGAP context (transition from area to line representation).

# Last results, more details later (2/2)

- Larger datasets converted to explicit 3D structure to visualize in client developed by Mattijs Driel
- GPU implementation of 3D space scale cube prototype/ demonstrator finished
- Designing metrics for objective assessment for the vario-scale generalization
- Improved content, simultaneous generalization multiple features changing at same scale/importance level
- Initial plan for more parallel processing techniques applied to generalization (new guest from Wuhan University China, Xuefeng Guan, expected arrival 8 sept'15).

# Recent Presentations

- Radan Suba
  - TU Delft GIST lunch seminar presentation 25 June 2015: Parallel Creation Of Vario-scale Data Structures For Large Datasets (trial ISPRS)
  - Presentation 'Parallel Creation Of Vario-scale Data Structures For Large Datasets' at 4th ISPRS International Workshop on Web Mapping and Geoprocessing Services, Sardinia, Italy. 1 – 3 July 2015.
- Martijn Meijers
  - TU Delft GIST lunch seminar presentation 21 November 2014: Processing large datasets into a vario-scale structure
  - ELF project meeting: TU Delft tools for generalization. ELF WP4 Meeting, Gävle, Sweden. June 8–9, 2015
- Peter van Oosterom
  - Presentation 'Large scale road network generalization for vario-scale map' the at 18th ICA Workshop on Generalisation and Multiple Representation, State University of Rio de Janeiro, Rio de Janeiro, Brazil. 21 August 2015

# New Publications

Martijn Meijers and Radan Šuba and Peter van Oosterom, **Parallel Creation Of Vario-scale Data Structures For Large Datasets**, In ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XL-4/W7, 2015, DOI 10.5194/isprsarchives-XL-4-W7-1-2015.

Radan Suba and Martijn Meijers and Peter van Oosterom, **Large scale road network generalization for vario-scale map**,  
[http://generalisation.icaci.org/images/files/workshop/workshop2015/genemr2015\\_submission\\_7.pdf](http://generalisation.icaci.org/images/files/workshop/workshop2015/genemr2015_submission_7.pdf)

Matthijs Driel. **Real time intersections on Space Scale Cube data**. MSc thesis Utrecht University, defended 15 July 2015.

H. Karim, A. Abdul Rahman, P. Boguslawski, M. Meijers and P. Van Oosterom. **The Potential of the 3D dual half-edge (DHE) data structure for integrated 2D-space and scale modelling: a review**, Accepted for presentation at 3D GeoInfo, Kuala Lumpur, Malaysia, 28 - 30 October 2015.

# Planning, last phase

- Include line simplification algorithms (store results in BLG-trees)
- Finish re-implement split operation
- Implement large scale road network generalization (area to line transition)
- Assess generalization quality improvements (grouping, simulations generalization)
- Convert improved tGAP generalization results in 3D SCC and use GPU prototype to explore the visual impact

# Conclusions

- Last year of project and PhD thesis Radan has started
- Fast slicing of SSC is feasible by using the graphics hardware; Populate with better SSC content → first usability tests
- International interest in the TU Delft vario-scale approach is still growing (EU ELF project, Shenzhen China, Univ Lund Sweden, IGN France, new visits Wuhan Univ, China, and on-going collaboration UTM Malaysia)
- TUD made patent NL2006630 openly available to community (theory open), now also more tools become available from project