

# Combining geometry simplification and coordinate approximation techniques for better lossy compression of GIS data\*

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The high bandwidth requirements of GIS data is usually one of the main bottlenecks in the development of client-server GIS applications. Nowadays, spatial information is generated with high resolution and thus it has high storage costs. Depending on the specific use case, the precision at which that spatial information is needed is significantly smaller, so reducing its precision (within a given margin of error) is a straightforward approach to reducing transmission costs. The main technique to reduce precision in vectorial spatial representations is geometry simplification [1]. Additionally, data compression techniques are usually applied in the communication layer to further reduce data transmission costs.

In this work, we show that the compressibility properties of the data should be taken into account when applying geometry simplification techniques. We present a naive two-stage approach that first applies geometry simplification using at most the 93% of the margin of error, and then applies coordinate approximation using the remaining 7%. Our approach leads to obtaining around 30-40% better compression with general-purpose compressors on the transformed data than when only simplification is performed.

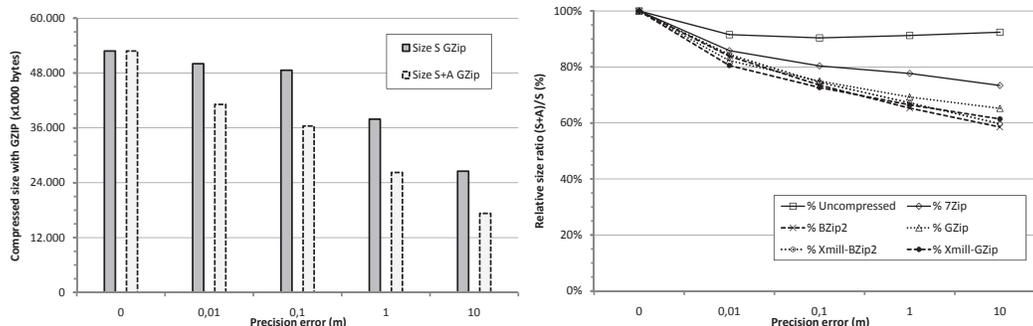


Figure 1: Simplification + approximation (S+A) vs simplification (S): (Left) GZip compressed sizes. (Right) relative compressed size ratio  $((S+A)/S) \times 100$ .

## References

- [1] David H. Douglas and Thomas K. Peucker. *Algorithms for the Reduction of the Number of Points Required to Represent a Digitized Line or its Caricature*, pages 15–28. John Wiley & Sons, Ltd, 2011.

\*Supported in part by MICINN [grants TIN2009-14560-C03-02, TIN2010-21246-C02-01, and CDTI CEN-20091048] and Xunta de Galicia (and FEDER) [grants 2010/17 and CN 2012/211].