Towards automatic web-based generalisation processing: a case study

Theodor Foerster, Jantien Stoter & Rob Lemmens

10th ICA Workshop on Generalisation and Multiple Representation

2 August 2007, Moscow

INTERNATIONAL INSTITUTE FOR GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

Overview

- The problem of interoperability
- Review on WGS
- Profiles for WGS
- Discussion & conclusion

Introduction

- GIS functionality is available as Web Services

- Web-based generalization is necessary to provide web-based information
  - Web Generalisation Service (WGS)
    - Process Service
    - Operator Service
    - Support Service

Idea of Web Services

- Web Services are
  - Accessible over the web through an well-known interface
  - Platform independent & self-describing
- Interoperability
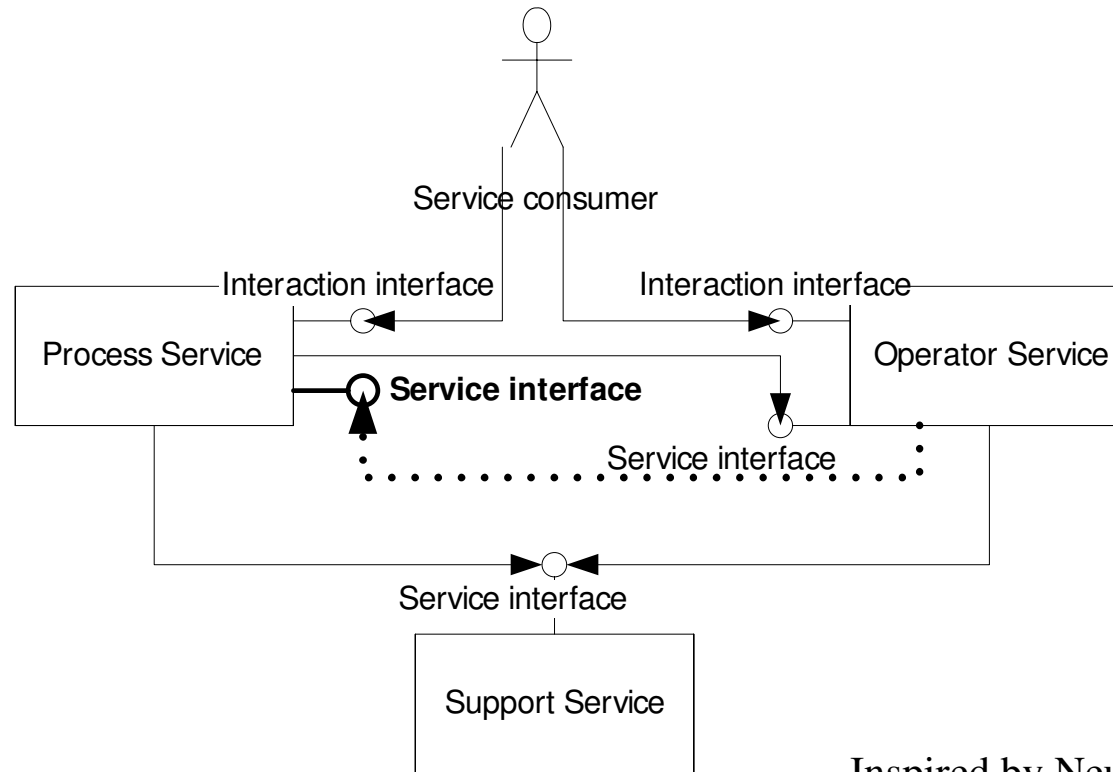 - Syntactic
  - Semantic

Web Processing Services

- OGC specifies different Web Services
  - Web Map Service, Web Feature Service ...
- Concepts for web-based processing
  - WSDL/SOAP
  - OGC WebProcessingService
- However, both concepts lack of interoperability to enable meaningful (generalisation) processing

Problem

- Current approaches for WGS lack of interoperability
  - Service level vs. process level
- Interoperability for operator services most demanding
  - Core functionality for other services
  - Meaningful web-based generalisation processes, even automated

Review on the WGS classification

Service consumer

Interaction interface   Interaction interface

Process Service   **Service interface**   Operator Service

Service interface

Service interface

Support Service

Inspired by Neun & Burghardt (2005)

- A Service interface for Process Services enables chaining of complex generalization processes

Concept of Operator Services

- Atomic functionality of generalization operator
- Stateless
- Consumes the process data through the interface
- Advertises the applicable data type through its interface

- Possible disadvantage
  - communication overhead increases
  - Although caching mechanisms could be introduced

Improving the interoperability of WGS

- ## WGS only provide service level interoperability
  - No meaning is attached to the interface
  - Only the data types of the interface are known
- ## Profiles for operator services introduce more meaning to the process-level
  - Specified for each generalization operator
  - Specified for a specific demand

Idea of ratio-based simplification

- Most common demand for simplification
  - Reduction of data
  - But, algorithms use different parameters
    - Distance vs. area measurement
- Introduce ratio as a concept
  - Meets the common demand
  - Can be applied to all algorithms (which provide a ranking of points)
- More information see:
  - Foerster, Stoter, Kobben, v. Oosterom (2007): A generic approach to Simplification of geodata for mobile applications, AGILE 2007.
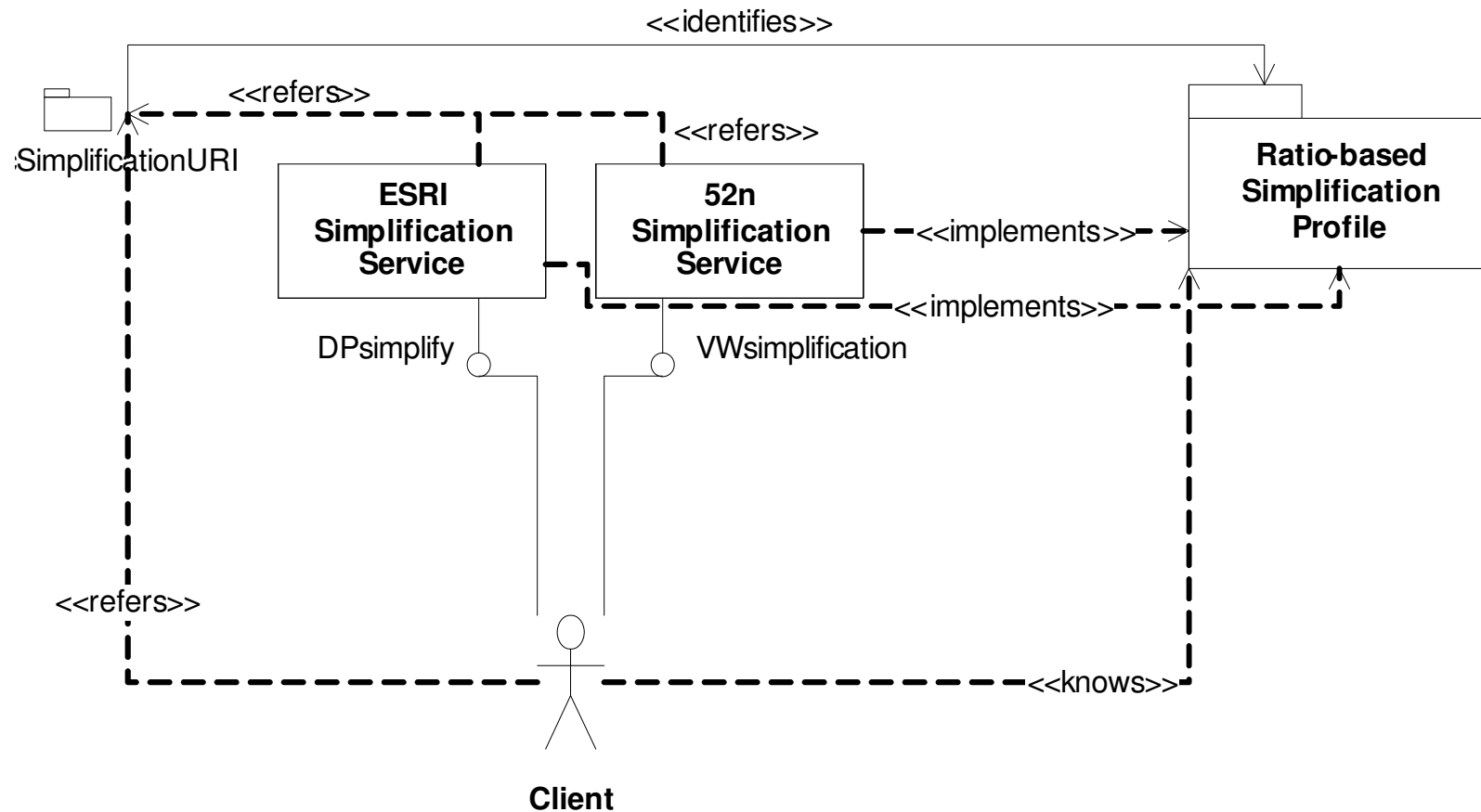
Profile for ratio-based simplification

- Profiles are encoded in XML
- XML-schema provide the description of the interface
- Namespaces allow to identify the profile by the client
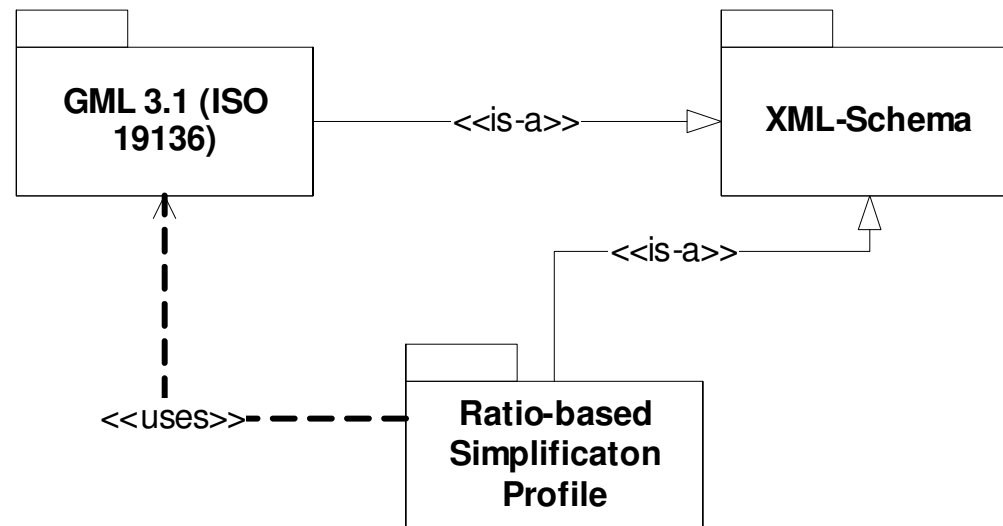
Profiles in action

Discussion & conclusion

- The combination of demand-oriented interfaces and profiles provide process-level interoperability
- Manual preparation is still required
- Profiles should be make public available (through the ICA commission?)
- Operator services provide the appropriate level of abstraction
  - For meaningful but non-trivial generalization processing
  - Also interesting for research on semantic and formalization (see ICC presentation)

Discussion & conclusion (contd.)

- Semantic description of WGS still an open issue
  - See Lemmens' phd thesis
  - See Lutz's work
- Interesting approach towards profiles at OGC (within WPS)
- Comprehensive implementation of a profile-based scenario is still missing