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Towards cartographic portrayal interoperability
The revision of OGC Symbology Encoding standard

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Roadmap

1) Introduction: what is cartographic portrayal interoperability all about?

2) Standardization:

   - Where we are, where we want to go, …

   - What's the problem?

3) On-going revision work:

   - Enhancement of styling capabilities

   - Good practices to favor adoption

4) Conclusion

Introduction

- Cartographic portrayal

  ➔ map as the portrayal of geographic information as a digital image file suitable for display on a computer screen (ISO/DIS 19128:2005)

- Interoperability ▶ Open Standards

  ➔ interconnected computing systems can work together to accomplish a common task (Sykora, 2007)

  ➔ different systems to communicate with each other without depending on a particular actor …

  … based on the presence of an open standard!

A little story

- *Tom does **create a map** with his X cartographic rendering system*

- *Tom does **share it** with Jerry*

- *Jerry shall visualize with his Y rendering system the **exact same portrayal** Tom does see*

- *Jerry shall be able to **re-work** Toms' map*

Sharing cartography

- When you **get some data** (e.g. shapefiles) you often do not **get symbology** (Fee, 2009)

- If you get a kind of side-car **style file**

  ➜ the used style language is neither standardized

  ➜ no guarantee to be able to visualize the exact same map

- Easy to share data but still complicated to **share cartography**

  ➜ A common symbology model to build styles to apply on geodata (just like CSS for HTML)

Open distributed systems with OGC standards

- SDIs = intense and crucial culture of sharing

- OGC standard **WMS** (Web Map Service)

  ➔ Visualize N cartographic facets based on predefined styles

- Take the control of the servers' underlying rendering engine

  ➔ **SLD** (Styled Layer Descriptor) profile

  ➔ **SE** (Symbology Encoding) language

➢ **Compliance with a standardized language to interact and combine more than one rendering system**

Standardized symbology model

- Capabilities to describe syntactically all the usual cartographic representations
  - ▶ **from topographic maps to thematic representations**

- Within the mapping process/cartographic recipe
  - ▶ **a focus on the graphical symbolization step**
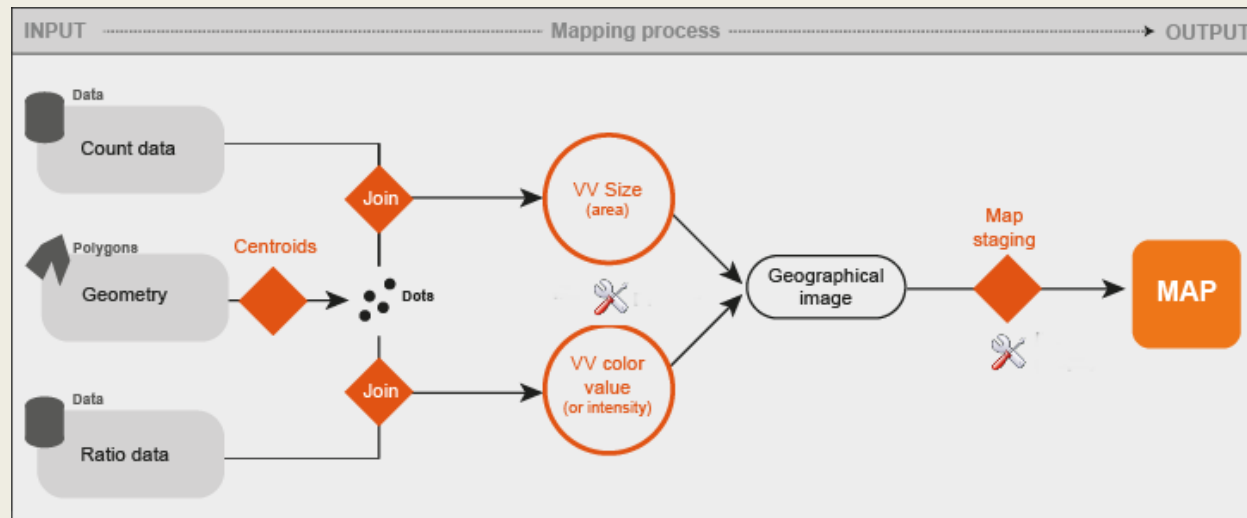
Open standard for sharing cartography

- **appropriation**: in addition to get some geodata, get styles to discover some of their cartographic facets

- **reuse&combine**: reusing and combining data from different sources hence increasing the production of maps and allowing infinite visual spatial analysis possibilities

- **do-not-reinvent-the-wheel**: creation of symbology repositories / librairies offering ready-to-use styles, often tailored for specific thematics (e.g. noise maps)

- **interoperate**: collaborative authoring where several users contribute to the creation of a map, each user using her/his own software

OGC SE symbology language

- Currently the more advanced **open standard for sharing cartography**, but …

  ➔ Largely adopted at server-side rendering systems

  ➔ Few at client-side softwares offering nice UI to build maps.

- Reasons

  ➔ **still moving** "from closed monolithic applications to open distributed systems" (Sykora, 2007)

  ➔ current SE standard does offer **limited capabilities** for describing advanced cartographic symbolizations

Standardization process:
a work of compilation and more ...

- Research projects results

  - Duarte Teixeira, 2005; Ertz, 2007; Dietze, 2007; Sykora, 2007; Envitia, 2008; Mays, 2008; Iosifescu-Enescu, 2010; Bocher, 2011; Ertz, 2012

- Change requests received by OGC SWG

  - CR07-105 : Change Request – extensions for thematic mapping

  - CR09-016: OWS-6 Symbology Encoding (SE) Changes

  - CR11-023 (chart extn), CR10-145 (hatch fill extn), etc.

  - Full list: Styled Layer Descriptor & Symbology Encoding **SWG Charter document*****
    http://www.opengeospatial.org/projects/groups/sldse1.2swg

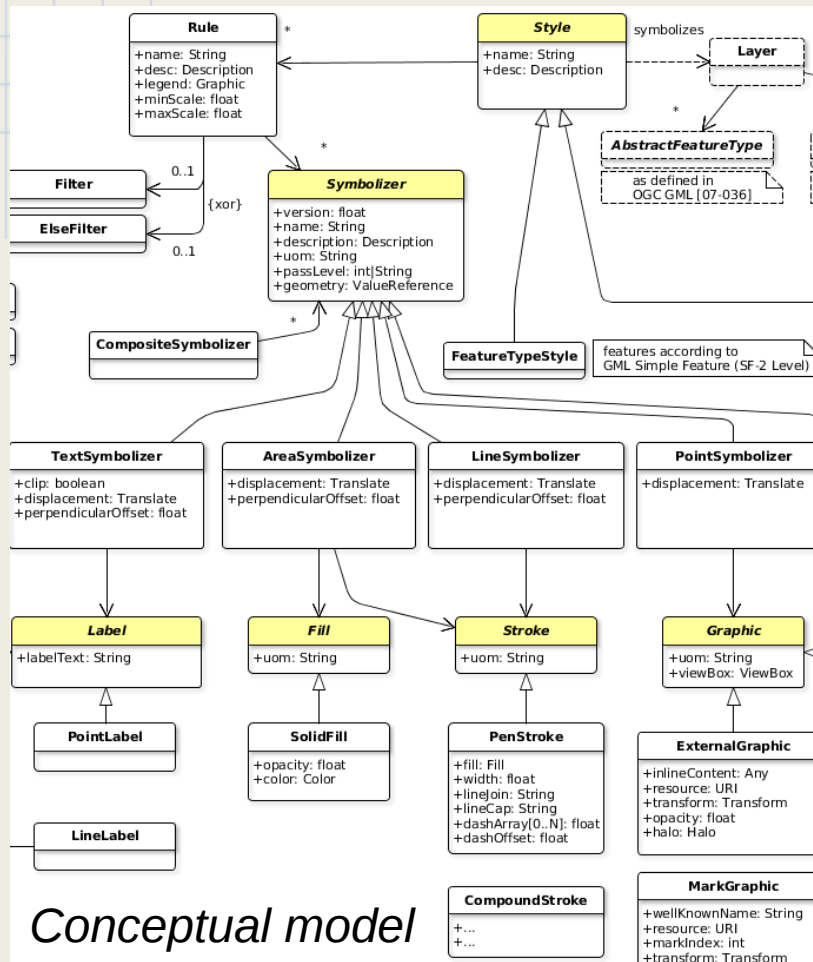# The ongoing revision of SE: enhance styling capabilities

- Compound stroke (CR09-016)

- Hatch/density/dotmap filling

- Perpendicular offset lines (for polygon and line feature type)

- Bar charts, pie charts, polar charts...

- Multiple drawing pass (e.g. draw nicely connected highway symbols)

- Absolute portrayal units of measure (e.g. mm, pt)

- Affine transformations (Translate, Rotate, Scale, Matrix)

- Composite symbolizer (grouping symbolizers as a single unit)

- etc.
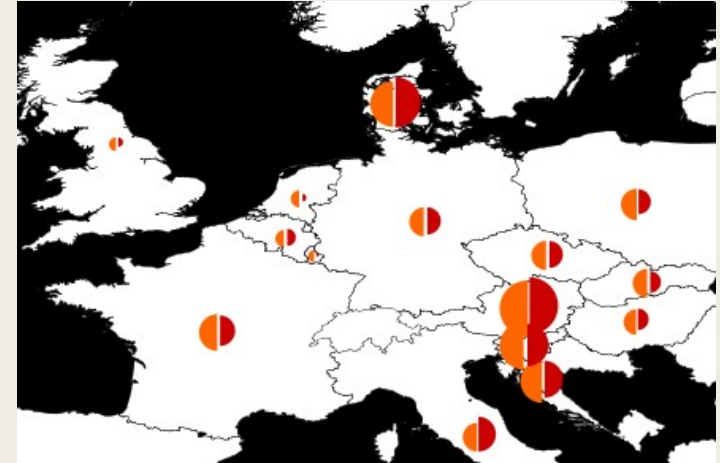
The ongoing revision of SE: some fundamental requirements (1)

- Good practices that should favor a largest adoption of the standard:

  - ➔ An essential **focus on the symbology model** before inserting new encodings of must-have styling capabilities

  - ➔ An approach of separation "one conceptual model / **many encodings** (XML, CSS-like, etc)"

  - ➔ A **modular approach** with an extensible core that allows to add new capabilities according to predefined extension points

  - ➔ A **minimalist core** with surrounding extensions to lower the implementation bar allowing step-by-step conformance

The ongoing revision of SE: some fundamental requirements (2)

Conceptual model

XML
(the default encoding?)

CSS-like

The ongoing revision of SE: some fundamental requirements (3)

- …

  ➔ A clear definition of the **rendering algorithm** (avoid ambiguity that would lead to divergent visualization from one rendering engine to another)

  ➔ A systematic definition to what kind of **data model** the styling capabilities are designed for (e.g. discrete point GridCoverage)

  ➔ Tend to design the integration of new capabilities in the symbology model with **consistency**, **genericity** and without **redundancy** (e.g. user shall not be able to describe one kind of representation in different ways)

Conclusion

- **OGC SE is still in the race**, but a standardization process may take time

    ➜ Last revision of SLD/SE dates from 2005; ~2010, the evidence is that the Symbology model needs **critical evolutions**; ~2015, we start to see the light in the far ;-)

- Standardization and research

    ➜ **Concensus position** within the standard working group members

    ➜ Standardization tends to be disregarded by research (rarely the main topic of a project, at the best it is "way of", not "the purpose")

    ➜ A topic for the **ICA Commission about SDI & Standards**

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Got some questions?

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