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Assignment of

Cartography and Map visualization

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TABLE OF CONTENT

Open Geospatial Consortium

Introduction:

Background:

Open Geospatial Consortium (OGC) is an international consortium of more than 500 companies, government agencies, research organizations, and universities collaborating to make geographic information an integral part of world's information infrastructure. OGC members- technology providers and technology users- work to develop open interface geospatial standards and associated encoding standards, and also best practices, that enable developers to create information systems that can easily exchange "geospatial" information and instruction with other information systems.

History of OGC:

- Mid 1980s : GIS was heavily in use but its limited extensibility and flexibility and inability to share geospatial data between other systems caused frustrations. Users were forced to use inefficient, time consuming and error-prone data transfer methods.
- 1980-1992: Several Agencies began to develop their own GIS software like : MOSS, GRASS, etc.
- 1992: Open GRASS Foundation (OGF), a nonprofit organization, was developed to stimulate private sector support for GRASS and create a consensus-based membership process for management of GRASS community affairs.
- 1992 -1994: Demand for more software choices, better and faster integration increased.
- 1994: Open GIS Project, which preceded the formal launch of OGC in 1994 defined (with participation of principal MOSS developers) a vision of diverse geoprocessing systems communicating directly over networks by means of a set of open interfaces based on the "Open Geodata Interoperability Specification"(OGIS).
- September 25, 1994: OGC was founded with eight charter members like: PCI Remote Sensing, QUBA, USDA soil Conservation Service, Intergraph, etc.
- 1994-2016 : The membership has grown from 20 to more than 500 government, academic and private sector organization including technology integrators, data providers, GIS vendors etc.
- Today OGC standards are key element s in the geospatial communication interfaces, encodings and best practices for sensor webs, location services, Earth imaging networks, climate models, disaster management programs and national spatial data infrastructures around the world.

Organizational Structure:

OGC has three operational units:

1. The Specification Program
2. The interoperability Program

3. Outreach and Community Adoption

2. Open standards and OGC:

Standards are the common system of sign, symbols or behavior that helps for better communication. A standard documents the use of rules, conditions, guidelines or characteristics for products or related process and production. The standards that are agreed upon by the public and private sector participants in the consensus process and are made freely available in a non discriminatory manner are called 'Open Standards'.

OGC has also developed several 'Open standards' that enable information systems to exchange geospatial information and instruction with each other. According to OGC, open standards are the standards that are:

- Freely and publicly available.
- Available to any person, organization at anytime and anywhere without any restriction.
- Neutral in terms of their content and implementation concept.
- Independent of any data storage model or format.
- Defined, documented and approved by a formal, member driven consensus process.

The Open Standards developed by OGC are the specification for interfaces and encodings that enable interoperability between geoprocessing systems form different developers. OGC's standards are free, publicly available specifications for interfaces, encodings and best practices. They are not software.

Need for open standards:

The geospatial industry comprise of different software which uses geospatial data in various formats. Making a combination of data from different sources is a frustrating task. The data conversion and integration requires massive amount of money and time. Although internet and Web Services open up new possibilities for obtaining geographic data, but in absence of open standards users will have to decide which geospatial web they want to access, obtaining the appropriate client software for each. Hence Open standards were created to eliminate this problem i.e. for creating interoperability among various geospatial software and web.

3. OGC's Open standards:

OGC standard are the technical documents that detail interfaces and encodings. OGC standard and supporting are available to public at no cost. OGC Web Services and OGC standards are created for use in World Wide Web applications.
The OGC standard baseline comprise more than 30 standards including:

1. CSW – Catalog Service for the Web : access to catalog information
2. GML - Geography Markup Language; XML- format for geographical information
3. GeoXACML - Geospatial eXtensible Access Control Markup Language

4. KML – Keyhole Markup Language: XML based language schema for expressing geographical annotation and visualization on existing web-based, 2D and 3D Earth browsers
5. OWS – OGC Web Service Common
6. SOS – Sensor Observation Service
7. SPS – Sensor Planning Service
8. SensorML – Sensor Model Language
9. SFS – Simple Features SQL
10. SLD – Styled Layer Descriptor
11. SRID – an identification for spatial coordinate systems
12. WaterML – information model for the representation of hydrological observation data
13. WCS - Web Coverage Service: provides access, subsetting and processing on coverage objects
14. WCPS – Web Coverage Processing Service: provides a raster query language for processing and filtering on raster coverage.
15. WFS – Web Feature Service: for retrieving or altering feature descriptions
16. WMS – Web Map Service : provides map images
17. WMTS – Web Map Tile Service ; provides map image tiles
18. WPS – Web Processing Service: remote processing service.
19. GeoSPRARQL – Geographic SPARQL Protocol and RDF Query Language; representation and querying of geospatial data for the Semantic Web

, etc

Detail explanation of Some Standards:

1. Web Map Service (WMS):

It provides a simple HTTP interface for requesting georegistered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer/s and area of interest to be processed. The response to the request is one or more georegistered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that the layers from multiple servers can be combined or not.

2. Web Feature Service (WFS):

It provides an interface for creating, editing and exchanging vector format geographic information on the internet. All WFSs support input and output data using Geography Markup Language (GML). Some WFSs also support other encodings such as GeoRSS or shapefiles. Users typically interact with WFSs through browser based or desktop geospatial client which allows them to access vector map layer from the external agencies, over the internet. An excellent example of using a WFS service to provide open and interoperable access to large amounts of geospatial content through a government portal is the USGS Framework Web Feature Services offered in the support of the development of National Spatial Data Infrastructure (NSDI).

3. Web Coverage Service (WCS):

It offers multi-dimensional coverage data for access over the internet. WCS provide access to potentially detailed and rich sets of geospatial information, in forms that are useful for client-side rendering, multi-valued coverage, and input into scientific models and other clients. It allows clients to choose portions of a server's information holdings based on the spatial constraints and other criteria. Unlike the WMS, which portrays spatial data to return static maps, the Web Coverage Service provides an available data together with their detailed descriptions; defines a rich syntax for requests against these data; and returns data with its original semantics which may be interpreted, extrapolated, etc- and not just portrayed.

4. Web Processing Service (WPS):

It provides rules for standardizing how inputs and outputs (requests and responses) for geospatial processing should be made. It defines how a client can request the execution of a process and how the output from a process is handled. It defines interface that facilities the publishing of geospatial processes and client's discovery of and binding to those process. The data required by the WPS can be delivered across a network or they can be available at the server. WPS is particularly useful for : reducing complexity in data processing by providing plug and play algorithms, enabling processing to be deployed once then used everywhere, easy and interoperable access to highly complex process, such as climate change models, etc.

THE END

MAP REPRODUCTION

Map reproduction is a process of printing of a map on paper or the electronic duplication. The printing of map on paper using inks is called map reproduction, whereas the electronic duplication is the process of duplicating of map in digital format.

The arrangement of things for map reproduction, designing and selection of map reproduction techniques is done on the planning phase, whereas the actual reproduction process occurs in implementation phase.

Steps in Map Reproduction:

1. **Planning Phase-**
   Selection of reproduction technique to be used:
   There are numbers of map reproduction techniques like offset printing (lithography), plotters, large-format printers, desktop printers ,etc. Depending upon the intended use of the map, quality and quantity desired and cost available any of these techniques can be used. For a large quantity or for high-quality printing, offset printing may be preferred whereas for small number of copies, personal printers or larger-format inkjet printers are better.

2. **Design and Editing of Map:**
   The cartographer now should design the map so that it meets the purpose of the map and expectation of the intended audience. He/she should decide appropriated scale of map, appearance of map (colorful/grayscale), size of the map, map folding techniques if required, materials to be used for the map, level of print or display quality, copies required for the map, etc.
   The map should be edited again and again. When editing it should be checked if the map design appropriately serve the map user and communicate effectively or not. The map features, type labels, map elements, etc should be checked and correctly placed or added if required. To avoid mistakes because of over-familiarity and fatigue of single cartographer a separate individual should be employed to correct mistakes in the map, large maps should be edited in sections and type should be read loud.

3. **Raster Image Processing:**
   The final map is in vector format so they cannot be processed directly by a raster-based printing device. At first the digital map file are converted into page description data using printer driver. Then, raster image processing technique is done by raster image processor, which converts the page description data into raster graphics images or map.

4. **Printing of map:**

   Finally printing device prints the map.

   While printing, a continuous-tone bitmap is converted into a halftone (pattern of dots). The dots are either placed in a fixed grid or are placed in random order to create darker or lighter areas of the image.

In case of color printing, CMYK color mixing technique is used.

When large numbers of maps are required, offset lithography is used instead of laser and ink-jet printers. In offset lithography, printing plates are used which is a sheet of aluminum mounted on a roller. One printing plate is created for each color (Cyan, Magenta, Yellow and Black). While printing maps, the image is transferred from the printing plate to the blanket cylinder, which then transfers the colored image into the print medium. In multi color printing, the print medium receives a different color ink from each printing unit.

Hence, in this way Map are reproduced.

REFERENCES

http://www.opengeospatial.org/docs/is

https://wiki.osgeo.org/wiki/Open_Source_and_Open_Standards

https://marinemetadata.org/references/ogcstandards

http://wwwdev.opengeospatial.org/docs/is

https://www.fgdc.gov/ngac/meetings/april-2012/open-geospatial-consortium-activities-reichardt.pdf

https://live.osgeo.org/en/standards/wfs_overview.html

http://www.ogcnetwork.net/wcs

https://live.osgeo.org/en/standards/wps_overview.html

https://www.accessscience.com/content/map-reproduction/404500

http://pages.geo.wvu.edu/~elmes/geog462/map_reproduction.pdf

http://csce.org/images/1965_09_TopographicMapReproduction.pdf

https://mapgeo.wordpress.com/2012/07/04/digital-printing-technology-a-way-of-map-reproduction/