

**ISO/TC 211 Geographic information / Geomatics
Newsletter No 4 April 2004**



Dear Colleagues,

This ISO/TC 211 Newsletter is intended for the members of

ISO/TC 211 and its Class A Liaison organizations.

As this Newsletter, a service provided by the ISO/TC 211 Advisory Group on Outreach, develops and evolves, we hope it will also become informative to the global geographic community and eventually to the public at large.

Our mission is to provide information on the standardization of geographic information and related activities.

Sincerely,

Henry Tom, Editor
ISO/TC 211 Newsletter.



Metadata Standard and Clearinghouses

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Mr. Ota, distinguished member of the Japanese Delegation to ISO/TC 211 since it was established in 1994, recently published this article (February 2004) in the GIS Development Magazine – ([Appendix 1](#))



Metadata Standard and Clearinghouses

“This paper aims (1) to report the history of Japanese metadata standardization that has been concurrently running with TC211 activity, (2) to introduce the concepts of ISO 19115 and the latest Japan Metadata Profile (JMP 2.0), (3) to explain the relationship between JMP 2.0 and ISO 19115, (4) to report the dissemination of metadata concept and clearinghouses in Japan. Finally, the author discusses aspects toward the future related to geographic data in Japan. “



NAVTEQ and Tele Atlas Collaborate to Develop Standard Traffic Codes for Digital Maps of the US

CHICAGO, March 31, 2004 -- NAVTEQ and Tele Atlas, the worldwide leading providers of digital map data and location content for vehicle navigation, Internet/wireless, business and government solutions, have formed a consortium to standardize traffic codes which will enable traffic information linkage to digital maps of the United States. This new set of traffic codes will become available on both Tele Atlas and NAVTEQ(TM) maps in Q3 of 2004.

Currently, no standard set of traffic codes exists for maps of the U.S., inhibiting the cross-platform use of traffic data solutions. For example, navigation systems operating with a NAVTEQ map are unable to link to or utilize Tele Atlas traffic information, and vice versa. A standard set of traffic codes addresses this challenge and, once available, will directly enable the delivery of real-time traffic information to navigation systems and portable navigation devices -- regardless of map provider -- in major markets across the country.

The traffic location tables and codes will be compliant with the European RDS-TMC Alert C specifications, a widely adopted traffic code format. The new standard set of codes will be backward compatible with NAVTEQ's existing traffic codes and will utilize Tele Atlas' broad geographic traffic code coverage. The consortium will begin licensing the codes to third parties beginning in Q1 of 2005.

"As two companies focused on growing the navigation market, NAVTEQ and Tele Atlas recognized the inherent value in partnering to create industry standard traffic codes," said John MacLeod, Executive Vice President - Global Marketing & Strategy for NAVTEQ. "We will continue to work together in the future to maintain and expand the codes to keep pace with the dynamic road network in the U.S."



"As a pioneer in real-time traffic offerings, Tele Atlas has long recognized the value to consumers of real-time information and the increased value this dynamic content adds to digital maps," Richard F. Pearlman, Vice President of Navigation and Telematics for Tele Atlas in North America. "The collaboration between Tele Atlas and NAVTEQ offers customers for the first time the ability to choose map data independent of the traffic data supplier. We are confident that in working together to establish this industry standard, our two companies will enhance the everyday value of our maps."

About NAVTEQ

NAVTEQ creates the digital maps and map content that powers navigation and location-based services around the world. The Chicago-based company was founded in 1985 and is <http://www.navteq.com/> privately held. The company's approximately 1,400 employees are in over 100 offices in 20 countries. For more information, visit www.navteq.com. NAVTEQ is a trademark in the U.S. and other countries.

About Tele Atlas

Founded in 1984, Tele Atlas is a worldwide leading provider of digital maps and dynamic location content for a variety of navigation, location-based services and geospatial products and database solutions. Tele Atlas database is a highly accurate reproduction of today's street network, enabling turn-by-turn route guidance on a high percentage of European, U.S. and Canadian roads. Tele Atlas compatibility with all major navigation systems and its open system design have placed the company's technology at the heart of both consumer and business-to-business applications worldwide. From logistics to marketing to traffic and fleet management, in almost every sector of today's business and consumer world, Tele Atlas has built a reputation as an acknowledged pioneer and leader in the digital map industry. Tele Atlas (TA6) is listed on the Frankfurt Stock Exchange in the Prime Standard segment. For more information, please visit at <http://www.na.teleatlas.com/>



LizardTech, Galdos Systems Collaborate to Develop ISO Standard for JPEG 2000

Rapidly distribute geospatial imagery over the Internet and across software systems and platforms

SEATTLE, WA – March 24, 2004 -- LizardTech, the worldwide leader in geospatial imagery software solutions, and Galdos Systems Inc, creator of the Geography Markup Language (GML) the "XML for geospatial," today announced a partnership that is expected to significantly extend the capabilities of JPEG2000 by jointly developing an ISO standard through the Open GIS Consortium (OGC). In addition, LizardTech and Galdos Systems, both OGC technical committee members, plan to jointly produce a GML implementation of JPEG2000, driving cross platform interoperability and rapid Internet distribution for geospatial imagery. This implementation will enable customers to disseminate geospatial imagery by providing a consistent image format that is vendor independent

"Customers are looking for reliable ways to distribute geospatial imagery using a number of disparate software systems and platforms," said Karen Morley, LizardTech's Vice President of Geospatial Solutions. "This collaboration with Galdos Systems, builds on LizardTech's strength in managing, distributing and accessing geospatial imagery, and demonstrates its commitment solving image distribution problems in an open environment."

LizardTech's Multi-resolution Seamless Image Database (MrSID) technology, a powerful wavelet based image encoder, viewer and file format has become the de facto standard for creating, viewing and publishing geospatial imagery. At the same time, GML, a geospatial specification for XML, is fast becoming the world standard for geographic information delivery over the Internet. So, as the JPEG2000 specification continues to develop as an accepted standard, customers will be better able to leverage their investment in geospatial imagery.



“Galdos Systems, the primary author of GML, is uniquely positioned to develop the metadata standards for the geospatial community while LizardTech, with its history of wavelet compression technology is well positioned to marry the two technologies and drive their adoption in the market,” said Carlos Domingo, LizardTech CEO. “Given the strengths of each company, this strategic relationship with Galdos Systems forms the strongest possible partnership to deliver a solution for customers who require interoperability.”

“Cross platform compatibility is an important end-user benefit. As a result of this new ISO standard for JPEG2000 and GML implementation, customers will have the ability to include imagery as a flexible component of geospatial applications. The combination of GML (ISO 19136) and JPEG2000 represents a major step forward for geographic imagery - offering the best of both technologies - flexibility and performance in a single package. This will significantly increase the power, flexibility and value of on-line GIS to customers,” said Ron Lake, Galdos System’s President and CEO. “Our history and experience with large geospatial implementations allows us to quickly leverage new ISO standards to offer complete end-to-end services to customers from products to implementation services.”

The first proposal for a GML standard for JPEG2000 will be introduced at the April OGC technical committee meeting.

Visit LizardTech at the Geospatial Information & Technology Association (GITA) Annual Conference & Exhibition in Seattle, WA, April 25 – 28. Visit Galdos Systems at the GeoTec Conference in Toronto, March 28 to 31. Galdos Systems will be exhibiting at booth 315.

About LizardTech, a Celartem Company
LizardTech was founded in 1992 to build valuable business solutions from technologies created by the world’s leading research organizations including Los Alamos National Laboratory (LANL) and AT&T Labs. LizardTech is a leader in applying state-of-the-art technologies to the real-world challenges of managing, distributing, and accessing large complex digital content such as aerial photographs, satellite imagery, and color scanned documents. LizardTech’s software is installed on millions of

desktops and integrated into a wide variety of platforms and applications. LizardTech has offices

in Seattle, London and Tokyo, and is part of Celartem Technology Inc. (Osaka Securities Exchange, Hercules:4330), a Japan-based technology company focused on storage and distribution technologies for digital images. For more information about LizardTech, visit www.lizardtech.com.

About Galdos Systems, Inc.
Founded in 1998, Galdos Systems revolutionized GIS Technology and mobilized the world-wide Geo-Web by authoring the Geography Markup Language (GML). Galdos is a world leader in the development of cost effective systems for delivering GML and XML based products for the integrated land and resource management, critical infrastructure protection, and telematic market sectors. www.galdosinc.com



Standards That Control Standards

December 16, 2003

Steve Barrie
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“The IT industry has a fascinating habit of developing multiple standards to support the same requirements. You see the same thing happening over and over again in different areas of functionality. It starts with a good idea that gathers momentum and results in an organizing body, usually populated with vendors and solution providers. Ultimately, self-interest and the need to compete cause splits and the standards become diluted. Given enough time, the cycle is completed when a new layer of software appears that is designed to unify the differing approaches. We create standards to control standards.

The handling of geographical data, unfortunately, is no different. “ Complete article ([Appendix 2](#))



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exactly what it should be doing, and that there is, both inside and outside the Consortium, a latency of

aspiration that can be harnessed to solve and promote increasingly challenging development and outreach programs.

But it is also useful to consider the question, "What do people really mean when they suggest that the OGC should move to the next level?" Do they mean more members? Do they suggest that OGC needs to expand into new areas of technology and new markets? Or is their interest in having OGC further evolve its business model? Since the measure of OGC's success is based on the outcomes that provide value for its members and the markets they represent, it is important for us to be able to answer these questions.

The consortium has already created a core group of specifications, known as the OGC Technology Baseline, that enable service and product suppliers to deliver new, interoperable, technologies into the globally networked computing environment. OGC Web Services, OpenLS (location based services), Geography Markup Language, Information Interoperability and Catalog Services, all consistent with a unifying baseline architecture, together have dramatically expanded the spatial technology envelope. Sensor Web, Imagery Archive access, alignment with mainstream IT standards, such as SOAP, are in progress. These significant technical accomplishments, along with the remarkable industry cooperation within the OGC, are together helping to define the future of spatial processing in our networked world. Thus, perhaps the really important question is: "With a set of mature specifications now implemented in a range of technologies, how much does 'going to the next level' in fact depend on technology providers committing the marketing investment necessary to make them succeed?"

OGC has so far carried much of the burden of promoting the potential of spatial interoperability for the market. Beyond facilitating the development of interoperability and working with organizations like ISO, OASIS, W3C and FGDC, OGC has put a great deal of effort into coalescing a message that members can use to motivate uptake and begin building a broader market base. Our assumption has been that if OGC members "sing from the same page" about interoperability, there can be a significant increase in market activity. The possibilities continue to expand. For example, we believe many markets beyond the traditional GIS

OGC Comments on Inaccuracies of Barrie Article

January 14, 2004

"Given a number of inaccuracies in the recent "Standards That Control Standards" article, I once again I find myself putting "pen to paper". It is unfortunate that there are number of misrepresentations and factually incorrect statements in this article. I am therefore providing corrections to several of the erroneous statements made by Mr. Barrie and am also providing the readily available references to sources that support my positions."

Complete article ([Appendix 3](#)). Both articles appeared on the Directions Magazine webpage <http://www.directionsmag.com/>



Going to the Next Level

President's Message March 2004



Now that users of spatial technology can rely on a strong standards based interoperability foundation, we frequently hear the question, "What is the next step for OGC?" Many supporters of our programs say it is time for OGC, on behalf of the spatial industry, "to move to the next level of growth as an organization," and begin acting more like the world leader in geospatial standardization.

It is encouraging for OGC staff and members to observe this level of expectation and to hear the community asking the same questions about "What Next" that we ask ourselves. In fact, such community expectation indicates that OGC is doing



market, such as remote sensing, LBS, RFID and Wi-Fi, all will require OpenGIS Specifications to reach their full market

potential. But for the potential of these awakening markets to be fully realized, it will take more than just the few of us "singing the same song." The key players in these markets need to show their customers the benefits of interoperability. This seems to me what "going to a new level" is really all about.

From the beginning, OGC has been a constant experiment in leveraging technology for broad market impact -- starting with the consortium's initial focus on basic GIS and remote sensing and continuing through its recent work with location based services and spatial enablement of the enterprise. As object-oriented computing in the 90's produced a requirement for standards-based object systems, innovative members of OGC collaborated to extend that approach to the spatial technology domain. Now that the Web services market is maturing, our members are again keeping pace by successfully addressing "spatial enablement of the Web." Each time OGC has broadened or changed its focus -- taken the risk, spent the resources, and made the effort -- the membership has succeeded in growing its collaborative capabilities and baseline architecture.

"The next level," then, refers to the question of whether market makers in the consortium will together follow through on their investment in building a broadly expandable technology infrastructure. What are the conditions for broad market adoption? The key requirement now is focused market development by the spatial technology leaders who command a huge base of users, as well as the database and IT infrastructure companies and integrators who serve major commercial and public sector clients. There is also a requirement for user organizations to pull the vendors and integrators in the right direction by demanding products that implement or are compliant with OpenGIS(R) Specifications. In market development as in specification development, going to the next level for all will require a shared vision and active participation by both users and providers.

There is no question that the infrastructure created by the OGC technology community is ahead of the market. That is to say, there hasn't been time enough for the larger IT community to assimilate the



concept of "spatial enablement of the enterprise." Or, more likely, there hasn't been enough focused investment for

significant conflicting forces to mature and begin a major struggle in our arena. In either case, the evolving requirements of physical infrastructure and environmental protection, security, transportation, energy, defense and logistics, and a dozen other traditional and emerging markets are certain to raise the profile of geospatial information and produce a level of market growth that will attract far greater interest.

I fully expect that this growth will spark the sort of competition among major IT forces that we have seen in other emerging "critical" markets. When this conflict occurs, we will see weekly articles about geospatial issues in the IT business press. Such articles may mention the difficulties inherent in geospatial processing and infer that it is not the small problem that the IT titans assumed could be handled in passing -- that the devil is indeed in the details, and that devil has already been mastered by the OGC membership. Then, perhaps, we will learn what "going to the next level" really means.

David Schell
President, OGC



Spatial Data Standards and GIS Interoperability
– ESRI White Paper, January 2003

This white paper discusses the value of being "open," the evolution of spatial standards with the development of new technologies, including the future of Web Services, and provides an overview of where ESRI is concentrating its efforts with regards to interoperability.

Geographic information system (GIS) technology is evolving beyond the traditional GIS community and becoming an integral part of the information infrastructure in many organizations. The unique integration capabilities of a GIS allow disparate data sets to be brought together to create a complete



communicate key concepts between

picture of a situation. GIS technology illustrates relationships, connections, and patterns that are not necessarily obvious in any one data set, enabling organizations to make better decisions based on all relevant factors. Organizations are able to share, coordinate, and

departments within an organization or between separate organizations using GIS as the central spatial data infrastructure. GIS technology is also being used to share crucial information across organizational boundaries via the Internet and the emergence of Web Services. To fully realize the capability and benefits of geographic information and GIS technology, spatial data needs to be shared and systems need to be interoperable. GIS technology provides the framework for a shared spatial data infrastructure and a distributed architecture. ESRI has developed its products based on open standards to ensure a high level of interoperability across platforms, databases, development languages, and applications. ESRI is also committed to supporting and actively leading efforts associated with interoperability and the development of standards.

Complete paper ([Appendix 4](#))

ESRI's Continued Commitment to Standards and Interoperability

Summer 2003

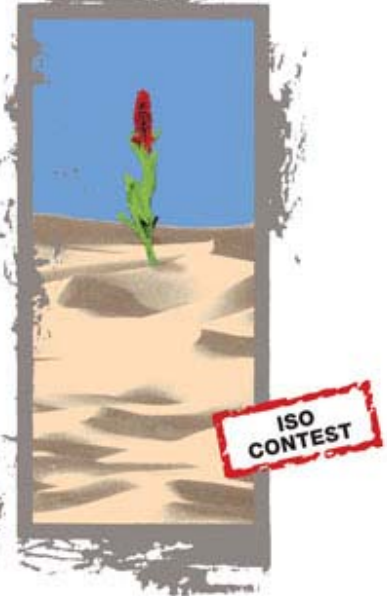
One of the hallmarks of GIS is its inherently collaborative nature. GIS illustrates relationships, connections, and patterns in data. The unique integration capabilities of GIS bring together data from many sources for visual display and analysis, creating a more complete picture of a situation than would otherwise be possible. This enables organizations to make better decisions based on all relevant factors. For this reason, GIS technology has become an integral part of the information infrastructure in many organizations.

Complete paper ([Appendix 5](#))



ISO Contest
for
Young
Standardizers
in developing
countries and
economies in
transition

ISO Helmut
Reihlen
2004 Award



Helmut Reihlen 2004 Award

The purpose of this Contest, held every second year within the framework of the ISO Programme for Developing Countries, is to encourage young professionals to embark on a successful career in standardization and to raise awareness of the importance of standards in promoting safe and sustainable economic development.

The Award is co-sponsored by ISO and the Deutsches Institut für Normung (DIN), ISO member for Germany. It is named after Professor Dr. Helmut Reihlen in recognition of his significant contribution to the ISO Programme for Developing Countries. Dr. Reihlen served as director of DIN from 1977 to 1999.

The theme

The theme for the 2004 Award is "International Standards to Access World Markets". Says Alan Bryden, ISO Secretary-General: "Today, International Standards are no longer a purely technical concern for engineers, but increasingly recognized as having important economic and social repercussions. This is particularly true with regard to trade and the globalization of markets, supported by the WTO Agreements. For businesses, in both developed and developing countries, the widespread adoption of International Standards means that suppliers can base their products and services on specifications

that have wide acceptance in their sectors. This, in turn, means that businesses using International Standards are increasingly free to compete on many more markets around the world.”

Entry requirements

The Contest is open to permanent employees of ISO member bodies and correspondent members, eligible for assistance under the ISO Programme for Developing Countries, including developing countries and economies in transition that have requested to benefit from the Programme.

Candidates must be 35 years old or under.

To take part in the contest, write an essay on the proposed theme and complete the [Contest Entry Form](#).

- **Submit your application to the ISO Central Secretariat by 3 May 2004.**
- **Your essay should not exceed 3000 words or 10 typescript pages, including illustrations, tables and charts.**
- **Papers must be written in English. If English is not your first language, we recommend you have your paper edited to do justice to your work and ideas.**
- **Format your essay in font size 11, with double line spacing and a margin of 30 mm on all four sides of the page.**
- **On the cover page, please type only the title of your paper, as it will be submitted to the jury anonymously.**
- **Please note that each participant can only submit one essay.**
- **Applicants grant publication rights to ISO. The winning essay may be published on ISO’s Web site and a summary of it in ISO Focus, the magazine of the International Organization for Standardization.**

Applications that do not comply with the above entry requirements will not be considered. Essays will not be returned.

The jury

A panel of independent judges nominated by ISO will review the essays and select the winning paper. In the event of no paper being of sufficient merit, the jury may decide to withhold the award.

The prize

The Award consists of a plaque, the publication of the winning essay in the ISO Bulletin and a cash prize of CHF 2 500 or, alternatively, CHF 1 000 and a trip to Geneva, Switzerland, to receive the Award at the 27th General Assembly, in September 2004.

First place and the second place (runner-up) will be announced in *ISO Focus* and recognized at the ISO General Assembly.

For more information, please contact:

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Programme for Developing Countries
1, rue de Varembé
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Appendix 1

Metadata Standard and Clearinghouses



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In Japan, the joint study group organised by GSI has provided the profile of metadata standard (JMP 2.0) in compliance with ISO 19115. Japanese users commonly use JMP for their clearinghouses, because they can describe metadata easier than the comprehensive one, and it will be included as the informative annex of JIS X 7115 - Metadata. In future, not only metadata but also actual data will interchange on the Web as documents

Since 1994, ISO/TC211 (chair: Olaf Østensen, Norway) has been working to establish a structured set of standards for information concerning objects or phenomena that are directly or indirectly associated with a location relative to the Earth. TC211 is now dealing with more than 40 standards and technical specifications and 12 of them have already published as IS or TS today. ISO 19115 Geographic Information - Metadata is a part of the family of TC211 standards and it defines the term METADATA as "data about data". Proper documentation to explain the data can be provided by using this standard for the people other than data producer. The objective of ISO 19115 is to specify a structure for describing digital geographic data.

In Japan, the domestic committee (chair: Masao Iri) contributing to the international standardization in ISO/TC211 was established at the Association of Precise Survey and Applied Technology in 1995. The author has been a member of project teams including Temporal Schema, Spatial Schema, Rules for Application Schema and GML in TC211 and a member of the secretariat in the domestic committee since they were established. In 1996, Geographic Survey Institute (GSI) under Ministry of Land, Infrastructures and Transportation has organized the Joint Study on Geographic Information Standards with Japanese private companies. This initiative provided the first draft standards for Geographic Information including the metadata (JMP 1.1a) in 2000 and the second edition JMP 2.0 in 2003.

This paper aims (1) to report the history of Japanese metadata standardization that has been concurrently running with TC211 activity, (2) to introduce the concepts of ISO 19115 and the latest Japan Metadata Profile (JMP 2.0), (3) to explain the relationship between JMP 2.0 and ISO 19115, (4) to report the dissemination of metadata concept and clearinghouses in Japan. Finally, the author discusses aspects toward the future related to geographic data in Japan.

History of Japanese Metadata Standardisation

GSI has started the Joint Studies with Japanese private companies with aims of the investigation for the domestic standards complying with TC211 and the dissemination of them since 1996 (Table 1.).

The project team dealing with Metadata in the first study group investigated the Content Standard for Digital Geospatial Metadata provided by FGDC, US and translated ISO/CD 15046-15 Geographic Information - Part 15: Metadata (1998-07-09). The project team in the second study group investigated ISO/DIS 19115 and specified Japan Metadata Profile (JMP) 1.1a, which aimed to ensure the accessibility of geographic datasets through clearinghouses [1]. The project team in the third study group improved JMP 1.1a and they specified JMP 2.0. During the study, the project team submitted comments on ISO 19115 to TC211 through the domestic committee several times and many of them were accepted.

GSI is setting up the clearinghouse gateway using Z39.50 and many node servers provided by public and private

organizations connect with this gateway. Metadata for these clearinghouses are JMP 1.1a or JMP 2.0. Local governments and research institutes are also testing and offering their own clearinghouses

In 2003, the project team (leader: Morshige Ota) to establish the Japanese Industrial Standard (JIS) on Metadata has been offered in accordance with that ISO 19115 became the international standard. We are expecting it will be accepted as JIS X 7115 before September in 2004. X 7115 is identical with ISO 19115 and it will contain two normative and two informative annexes for Japanese domestic use. Normative annexes are notations of temporal reference systems and notations of spatial reference systems. Informative annexes are JMP 2.0 and the Japanese example of the comprehensive metadata.

GSI is setting up the clearinghouse gateway using Z39.50 and many node servers provided by public and private organizations connect with this gateway. Metadata for these clearinghouses are JMP 1.1a or JMP 2.0. Local governments and research institutes are also testing and offering their own clearinghouses

As a related activity, Ministry of Economy, Trade and Industry is discussing to establish the standard on protocols for geographic information input, access, and output to be used by clearinghouses. It will comply with JIS X 0806, which is identical with ISO 23950:1998 Information and documentation - Information retrieval (Z39.50) - Application service definition and protocol specification. Geo-J Profile is the code name of this standard. Meanwhile, GSI is setting up the clearinghouse gateway using Z39.50 and many node servers provided by public and private organizations connect with this gateway (Table 2). Metadata for these clearinghouses are JMP 1.1a or JMP 2.0. Local governments and research institutes, for example, Okinawa, Gifu and Iwate prefectures and the University of Tokyo are also testing and offering their own clearinghouses.

Table 1 The joint studies and research products

| Studies | Members | Period | Research Products |
|---------|----------------------|-----------|---|
| 1st | GSI and 53 companies | 1996/1998 | 1. The first draft standards (Spatial data structure, Spatial data quality, Spatial referencing, Metadata, Encoding rules, Feature cataloging methodology, Terminology) 2. The manual for spatial data product specifications 2. The manual for spatial data product specifications |
| 2nd | GSI and 38 companies | 1999/2001 | 1. The second draft standards (Spatial schema, Temporal schema, Rules for application schema, Feature cataloging methodology, Spatial referencing by coordinates, Spatial referencing by geographic identifier, Quality principles, Quality evaluation procedures, Metadata, Portrayal, Encoding, Spatial data product specification) 2. The introduction of Japanese Standards for Geographic Information (JSGI) |
| 3rd | GSI and 18 companies | 2002/2004 | 1. The manual for quality evaluation 2. The manual for spatial data product specifications 3. The introduction of Japanese Standards for Geographic Information (JSGI), the 2nd edition 4. The software tools for the description of data product specifications 5. Japanese profiles of Metadata (JMP 2.0), Spatial schema, Temporal schema, etc. |

Concepts of ISO 19115

ISO 19115:2003 - Geographic Information - Metadata [2] has been discussed by the project team (leader: David Danko, US) since 1995 and finally TC211 has specified the comprehensive standard containing 14 packages and about 400 metadata elements (Table 3). Its schema is described in UML and detail specifications are defined in the data dictionary. Users may describe not only the comprehensive metadata but also core metadata for the discovery of geographic data. Currently, TC211 is discussing ISO 19139 for the implementation of metadata, because encoding rules and XML schema

are not contained in ISO 19115.

As the purpose of JMP 2.0 is the discovery of geographic data through clearinghouses, JMP 2.0 reduced ISO 19115 to 9 packages and about 70 metadata elements. It consists of the optional package for data quality in addition to the core metadata. The reason for the addition is that it is the important factor for data evaluation by users.

Table 2 Node servers connecting with GSI gateway

| Sectors | Organizations |
|--------------------------|---|
| Government | Ministry of Land, Infrastructure and Transport Ministry of Public Management, Home Affairs, Posts and Telecommunications Ministry of Education, Culture, Sports, Science and Technology Ministry of Health, Labour and Welfare Ministry of Agriculture, Forestry and Fisheries Ministry of Economy, Trade and Industry Ministry of the Environment |
| Research institute | Kyoto University National Research Institute for Cultural Properties, Nara |
| NPO, and private company | National Spatial Data Infrastructure Promoting Association Japan Map Center Japan Construction Information Center Hokkaido-Chizu Co., Ltd |

Core metadata and data quality definitions are defined in UML as subsets of ISO 19115, and metadata entities and elements are documented in the data dictionary. The schema for data quality is changed to simplify the implementation (Figure 1). However, JMP 2.0 ensures the semantic consistency between ISO 19115. Furthermore, JMP 2.0 contains XML schema for implementations. The project team in the joint study group also developed the metadata editor. Users can download the specification, the manual, and the editor (written in Japanese) from the home page of GSI [3].

Table 3 Packages in ISO 19115 and their concepts and JMP 2.0

| Packages(Entity sets) | Classes (Entities) | Concepts | JMP 2.0 packages |
|---------------------------------|---------------------------|---|------------------|
| Metadata entity set information | MD_Metadata | An aggregation of other entities. | yes |
| Identification information | MD_Identification | Information to uniquely identify the data. | yes |
| Constraint information | MD_Constraints | Information concerning the restrictions placed on data. | yes |
| Data quality information | DQ_DataQuality | A general assessment of the quality of the dataset. The prefix of this entity "DQ_" is different from others, because metadata reuse the classes defined in ISO 19113: 2002 Quality principles. | yes |
| Maintenance | MD_MaintenanceInformation | Information about the scope and frequency of | yes |

| | | | |
|--|------------------------------------|---|-----|
| information | | updating data. | |
| Spatial representation information | MD_SpatialRepresentation | Information concerning the mechanisms used to represent vector and/or grid information in a dataset. | no |
| Reference system information | MD_ReferenceSystem | The description of the spatial and/or temporal reference systems used in a dataset. | yes |
| Content information | MD_ContentInformation | Information identifying the feature catalogue used and/or the information describing the content of a coverage dataset. | no |
| Portrayal catalogue information | MD_PortrayalCatalogueReference | Information identifying the portrayal catalogue used. | no |
| Distribution information | MD_Distribution | Information about the distribution of, and options for obtaining. | yes |
| Metadata extension information | MD_MetadataExtentInformation | Information about user specified extensions. | no |
| Application schema information | MD_ApplicationSchemaInformation | Information about the application schema used to build a dataset. | no |
| Extent information | MD_Extent | A data type to describe spatial and temporal extents of the referring entities. | yes |
| Citation and responsible party information | MD_Citation MD_ResponsibleParty | MD_Citation provides a standard method for citing a resource (dataset, feature, source, publication , etc.). MD_ResponsibleParty contains identities of responsible parties associated with the resource. | yes |

Dissemination and Outreach

Currently, Japanese national government aims to establish so-called "e-Japan", which will realize the paperless management of information. The government has established the liaison conference by related ministries on geographic information since 1995. It is working to establish the National Spatial Data Infrastructure (NSDI) as a part of "e-Japan". GSI constructed the clearinghouse gateway to realize the resolution of this conference. Although the meaning and value of metadata are easily acceptable for users, the clearinghouse construction is the first step for geographic information interoperability. The next step is that geographic data takes an interchangeable form (e.g. XML document) between GISs and other information systems. However, many public and private organizations in Japan have already established their own interchange formats for acceptance. Therefore, these organizations such as road and river management, city planning, forestry, agriculture and fixed property management are starting to change and examine their spatial data product specifications to comply with TC211 standards.

Although the meaning and value of metadata are easily acceptable for users, the clearinghouse construction is the first step for geographic information interoperability. The next step is that geographic data takes an interchangeable form (e.g. XML document) between GISs and other information systems

The issue is the lack of specialists to respond these demands. GSI and related organizations recently have held seminars for government personnel, consultants and engineers to improve the situation. For example, the Spatial-IT SIG in

Geographic Information Systems Association and the Center for Spatial Information Sciences at University of Tokyo are co-organizing "Studio on Standards for Spatial Information" two times (August and December in 2003) and more than 110 people from public, academic and private sectors have participated. The purpose of this "studio" is that participants will be able to understand and create a simple product specification in compliance with TC211 standards. Participants take 24 hours lectures and drills during 3 days to achieve this purpose. The instructors are Japanese experts of TC211 and consultants experiencing the construction of Japanese Industrial Standards and specifications. The next studio will open in Nagoya in May 2004. By the way, the language used in the studio is Japanese.

Clearinghouses are useful to access the legacy data. However, the policy for the privacy protection and copyright are increasing more and more as they are commonly used. Currently, national and local governments are setting up the committees for disclosure of information and copyright issues to establishing policies and byelaws

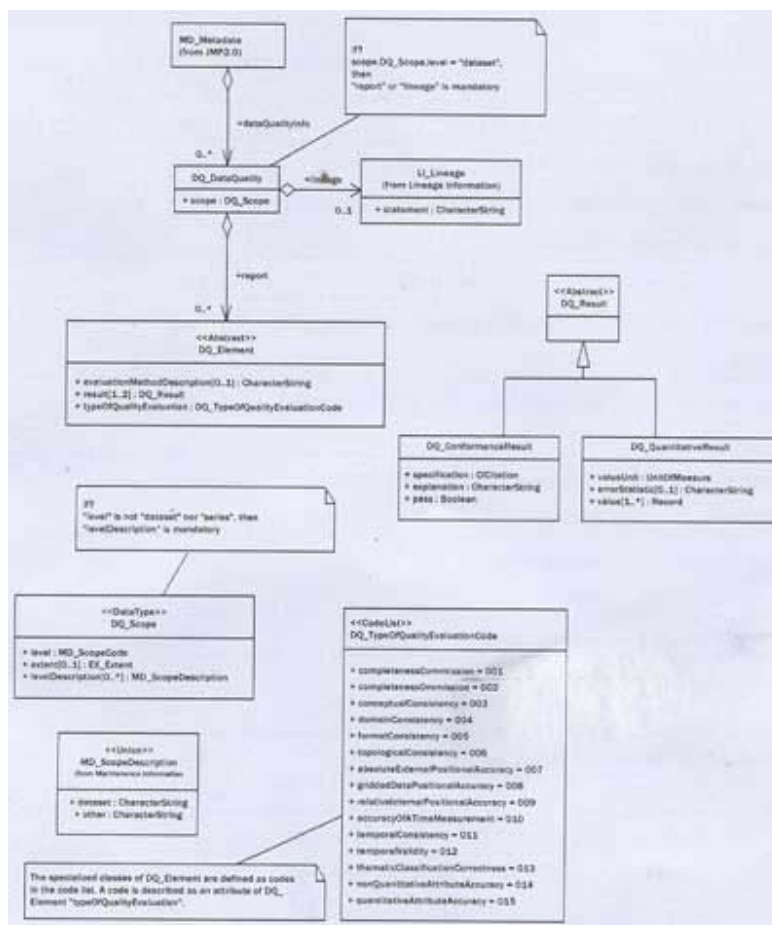


Fig 1 UML class diagram for Data Quality

Aspects toward the future

Clearinghouses are useful to access the legacy data. However, the policy for the privacy protection and copyright are increasing more and more as they are commonly used. Currently, national and local governments are setting up the committees for disclosure of information and copyright issues to establishing policies and byelaws.

Geographic data are used in daily business and we should not put them in sleep. Users want to apply geographic database that ensures updating by newly accepted data. The people in each business step, for example, planning, designing, executing or managing should be able to get appropriate information for their own purposes.

To reply these demands, several initiatives are studying interfaces between business steps, fusion of data constructed for different purposes (e.g. GIS and CAD), and the commercial system for the geographic content on the Web.

Summary

In Japan, the joint study group organized by GSI has provided the profile of metadata standard (JMP 2.0) in compliance with ISO 19115. Japanese users commonly use JMP for their clearinghouses, because they can describe metadata easier than the comprehensive one, and it will be included as the informative annex of JIS X 7115 - Metadata. In the near future, not only metadata but also actual data will interchange on the Web as documents in compliance with Japanese Standards for Geographic Information.

Acknowledgement

Special thanks go to Mr. Kazuhiko Akeno, GSI. He gave useful information about the GSI clearinghouse and JMP 2.0 for this paper.

References

- Ota, M., Japan Metadata Profile (JMP) for Geographic Information Clearinghouses, International Conference on Dublin Core and Metadata Applications 2001, 2001/10/22- 26, Tokyo
- ISO 19115:2003 - Geographic Information - Metadata, 2003/05/01
- http://zgate.gsi.go.jp/ch/jmp20/jmp20_eng.html, GSI

Appendix 2

Standards That Control Standards

By: [Steve Barrie](#)

(Dec 16, 2003)

The IT industry has a fascinating habit of developing multiple standards to support the same requirements. You see the same thing happening over and over again in different areas of functionality. It starts with a good idea that gathers momentum and results in an organizing body, usually populated with vendors and solution providers. Ultimately, self-interest and the need to compete cause splits and the standards become diluted. Given enough time, the cycle is completed when a new layer of software appears that is designed to unify the differing approaches. We create standards to control standards.

The handling of geographical data, unfortunately, is no different.

Recently, I have been on a quest to understand what is happening with geographical data. It all started when I attended an event with an associate who was looking to acquire a GIS solution for a large business with an extensive property portfolio spread across the UK. They were having problems getting the geographic data at a reasonable price because the agencies that sell it did not seem able to cope with private companies who wanted small areas of coverage. However, the issue that quickly arose with me was the way that commercial GIS solutions were selling compatibility.

ESRI .SHP Files

Time after time, as we discussed the various merits of GIS solutions with their sales teams, one of the key selling factors was compatibility with an ESRI Shapefile. Only one solution talked to us about GML and open standards before the ESRI format.

I am familiar with ESRI's strong position in the market but I am also fully aware of the standards that exist to enable geographical data to be shared between different solutions. After a while the whole ESRI dominance thing got me angry and I set out to find out what is causing this situation.

One thing that came out very quickly is that ESRI is one of those businesses you either love or hate. It's the Microsoft of the geographical world in that it defines its market and there are those that find that situation difficult to handle. It was one of those companies in the right place at the right time when the demand for geographical solutions exploded. The question is whether it exploits its dominance in a way that is bad for the user community in general.

It doesn't take long to find out that ESRI is a significant player in the development of standards. It does a great deal of work with the OpenGIS Consortium (OGC) and it has input at the FGDC level. What is interesting is that ESRI has employed some of the people that had independent input to standards. This implies that it has sought out the best minds to implement standards in its own products.

Certainly, a quick scan of the corporate marketing brochures and web site indicates that ESRI is strongly supportive of standards. There is much talk of the ISO standards and technical committee 211 (ISO TC211) that is doing much of the work in this area. There is support in the product for the National Spatial Data Infrastructure (NSDI) and OGC Simple Features Specification. However, it is this last standard that starts to give away the problem.

The current standards are too basic for many GIS applications. Therefore ESRI adds 'extras', including z values, annotation and support for survey and raster data. A Shapefile is just more useful than a standards-limited data format.

Tangled net of standards

Understanding the workings of standards really ought to be very easy. We have the International Standards Organization (ISO) that works things out on behalf of us all. It works very slowly but it gets there in the end. The speed of operation is a problem for businesses because, inevitably, they end up using draft standards because they can't wait for the final approval.

In the geographic space ISO has TC211 that has come up with a pretty good set of standards and is working on more. The most important standards as far as data sharing are concerned are ISO 19115 and ISO 19107. ISO 19115 is a metadata standard. It defines what should be in data catalogues and ensures that we all call things with the same names. ISO 19107 provides a schema for spatial data so that the way in which data is stored is consistent across compliant solutions.

We have already established that not everybody feels that TC211 has taken the standards to a really useful level. In these situations, the IT industry inevitably kicks off an alternative movement.

The OpenGIS Consortium was set up to create XML standards for data exchange. It was recognition that this was a technology that could be used to create interoperable infrastructures and, at that time, GIS solutions had not exploited it successfully. Unfortunately, it seems that OGC didn't feel the need to align itself with the activities of TC211. Instead, it repeated much of that work and came up with something different. The highest profile standard is the Geographic Markup Language (GML), an XML dialogue designed to enable applications to exchange geographic data. It is only recently that we have started to see a convergence of OGC standards with their ISO equivalents.

Even when OGC and ISO get their acts together there is still the problem of international politics. When it comes to governments, national standards bodies provide the driving force. Therefore, in the USA, if ANSI doesn't like an ISO standard it doesn't get adopted. The British Standards Institute (BSI) carries the same power in the UK.

The USA has an extra level of administration. Thanks to Bill Clinton, the Federal Geographic Data Committee (FGDC) was created to pull together the different formats being used throughout the US and to ensure that there was a proper national standard for spatial data. In itself, this has to be seen as federal recognition that the standards weren't working. The result of this has been the National Spatial Data Infrastructure (NSDI). However, there are still regional variations (RSDI) and there are still states that don't comply with any standard at all. NSDI works only for the USA but work is progressing on the development of the Global Spatial Data Infrastructure (GSDI) – surely just another repeat of the work already carried out by ISO and OGC.

Elsewhere work is being done to create metadata profiles for key regions, including Europe and Australia.

Self interest

It is clear that the development of standards for sharing and handling geographic data has to take into account much of the self-interest that comes from the companies that are involved and the government agencies that are tasked with finding the best solutions for their own locations. Vendor self-interest is a feature of all IT standards. Rather than starting from a blank sheet of paper, it makes sense to take a practical view of existing technology and then to bend it to suit wider requirements. Having your technology accepted as a foundation for a standard can be lucrative since IPR and patent rights are nearly always maintained.

Similarly, vendor self-interest is usually the cause of multiple standards for the same purpose. Failure to agree with standards or exclusion from the process often leads to an alternative development followed by a marketing war. Neither side will ever back down. The end result is great for competition but no fun for the user community. Eventually, the need to compete reduces the value of the standards. Added extras become the norm and a new market develops, as products appear to unify the different standards.

This is beginning to happen with geographic data. Some of the NSDI work can be seen in this light. In the UK, the GIGateway is the result of several years' work with both private and government funding. In Canada, we have seen the development of the JUMP unified mapping environment, originally an open source project that was designed to be able to connect to geographic data from a variety of sources. Unfortunately, so far, it seems to have been restricted to GML and Shapefile formats – thus taking us full circle back to the dominance of ESRI's data structures.

Finally...

The IT industry has never been good at managing the development of standards. There is too much self-interest and the process of development is too slow for users that need a rapid solution to their technology problems. The situation is made worse with geographic data because political interest is added to the commercial interests to be served.

The standards being developed by ISO, FGDC, OGC and others are creating confusion without actually serving up a practical solution. This is why ESRI has added extensions to its Shapefile format.

ESRI is a dominant force in the GIS market. This is why so many third parties adopt its format. ESRI continues to work with standards bodies but it cannot be blamed if others choose to use the Shapefile because of its practicality. Other major players in the market – MapInfo, Cadcorp or Intergraph – would be just as happy to have their formats used in the same way. None of them offer totally standards-based solutions.

In the end, the standard has to be defined by the products that the market buys. The best standards are those that evolve through day-to-day use of practical and useful products. Microsoft has proved the point with Windows and now, perhaps, we can look to dominant technology suppliers to set "de facto" definitions for geographical data.

Web sites:

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| American National Standards Institute | www.ansi.org |
| British Standards Institute | www.bsi.org.uk |
| International Organisation for Standardization | www.iso.org |
| OpenGIS Consortium | www.opengis.org |
| FGDC | www.fgdc.gov |
| ESRI | www.esri.com |
| ESRI and standards | www.esri.com/standards |
| Gigateway | www.gigateway.co.uk |

| | |
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| JUMP | http://www.vividsolutions.com/jump/ |
| MapInfo | www.mapinfo.com |
| Intergraph | www.intergraph.com |
| Cadcorp | www.cadcorp.com |

Appendix 3



OGC Comments on Inaccuracies of Barrie Article

By: [Carl Reed III](#)

(Jan 14, 2004)

EDITOR'S NOTE: *In a rebuttal to an article written by Steve Barrie, "[Standards that Control Standards](#)," Carl Reed, Executive Director, Specification Program for the Open GIS Consortium (OGC) provides a point-by-point account of where he disagrees with certain statements made in Mr. Barrie's treatise. Please see Mr. Reed's comments below:*

Given a number of inaccuracies in the recent "Standards That Control Standards" article, I once again I find myself putting "pen to paper". It is unfortunate that there are number of misrepresentations and factually incorrect statements in this article. I am therefore providing corrections to several of the erroneous statements made by Mr. Barrie and am also providing the readily available references to sources that support my positions.

Statement: "The OpenGIS Consortium was set up to create XML standards for data exchange"

This statement is totally inaccurate. While the OGC works heavily with the XML environment today, the author leads readers to believe that OGC was created primarily to leverage XML. In fact, the first sentence on our home page states that, "The Open GIS Consortium, Inc. (OGC) is a member-driven, non-profit international trade association that is leading the development of geoprocessing interoperability computing standards. OGC works with government, private industry, and academia to create open and extensible software application programming interfaces for geographic information systems (GIS) and other mainstream technologies." Nowhere in this statement is there mention of XML or data exchange. And, I must note that the OGC was founded in 1994 - many years before XML existed!

I also want to call to your attention the facts presented on our "History" web page (see: <http://www.opengis.org/about/?page=history>). He would have read "the need for open interfaces led to another organizational change, because OGF - a foundation - wasn't the right kind of organization to develop such specifications. What was needed was an industry consortium like OMG. This required forming a 501 (c) 6 not-for-profit trade association to replace the 501 (c)3 not-for-profit charitable foundation. The company was incorporated as "OGIS Ltd." on August 25, 1994. An October 22, 1994 Board resolution changed the name to "Open GIS Consortium, Inc." Again, there is no specific mention of "data exchange" as a reason for the founding of the OGC. The OGC is and always has been dedicated to defining, documenting, and approving specifications that enable interoperability of geospatial services, applications, and data.

Statement: "Unfortunately, it seems that OGC didn't feel the need to align itself with the activities of TC211."

This statement could not be further from the truth. It is unfortunate that Mr. Barrie did not spend any time determining what kind of relationship OGC has with ISO before writing his column. OGC has and exercises a Class A Liaison with ISO TC 211. This is close relationship designed to foster and facilitate not only coordination but also single-effort work on appropriate topics. OGC and ISO TC 211 have agreed to identify areas of common interest and work closely to insure harmonization of effort. The joint OGC and TC 211 collaboration is facilitated in a group called the Joint Advisory Group (JAG, formerly known as the TOCG).

The JAG provides a common forum for ISO and OGC members to meet on a regular basis and to discuss coordination and collaboration opportunities of common interest.

Over the years, several ISO Standards have been adopted in their entirety by the OGC membership and several more are in the process or being adopted. In addition, three OGC specifications, Simple Features, Web Map Service and Geography Markup Language have all been submitted to ISO. Two others, Web Feature Service and Filter Encoding are being submitted for ISO consideration this spring. In addition many active members of OGC also represent their countries on TC 211. To lament the fact that OGC has failed to align itself with TC 211 is to fail completely in learning about the depth of the alignment that is the core of how OGC does business.

Statement: "NSDI works only for the USA but work is progressing on the development of the Global Spatial Data Infrastructure (GSDI) – surely just another repeat of the work already carried out by ISO and OGC."

In terms of Mr. Barrie's comments on the GSDI - sorry, but that organization is not duplicating the work of FGDC, ISO, or the OGC. The GSDI organization is dedicated to promoting the consistent use of industry and international standards and other proven practices so that nations around the world have greater ability to share and apply geospatial data. In other words, GSDI does not develop the standards, rather promotes their consistent usage toward developing and deploying a Global Spatial Data Infrastructure. GSDI is helping to promote the advancement of compatible Spatial Data Infrastructures at the local, national and regional levels – essentially creating a Global SDI. GSDI has a Class-A Liaison status with the ISO TC 211. Furthermore GSDI and the OGC work closely together. Again, the facts are in plain sight. Check the GSDI vision and mission summary on their web page at <http://www.gsdi.org/press/2002/2002bro.pdf>

With regard to the FGDC, the FGDC has been an OGC member since 1994 and the OGC is a recognized stakeholder in the NSDI process. The FGDC has helped define and drive requirements for open, interoperable interface specifications. As a matter of fact, there would not be an OpenGIS Web Map Service interface specification without the vision and support of the FGDC. Yes, the FGDC has a major focus on content standards. That is a major part of their mission. And, the FGDC maintains an international SDI program to help grow consensus between nations. The ISO 19115 Metadata standard was developed in part based on the FGDC metadata standard, and from contributions from other nations. The FGDC today implements a profile of the ISO 19115 metadata standard, as do many other nations.

Your comments on vendor self interest.

Of course different vendors have various reasons for participating in a standards process. However, the OGC has a varied, international mix of membership. We have both technology providers and technology users. The members collaboratively define interoperability requirements and then work together to document and agree on an interface specification that solves a given interoperability problem. Interestingly enough, no single vendor as come into the OGC process and proposed - or even promoted - an interface or encoding based on their own work or self-interest. The OGC specification development process is an example of a general trend when it comes to standards -- industry players coming together, agreeing on the rules, then going back to their corners to compete. Once agreement on the underlying standards technology is in place, companies can begin to add their own value to the equation and start differentiating their offerings from the pack. The standards are necessary to create, grow and sustain the market for the future.

In summary, it is growing increasingly difficult for me to respond to the number of continuing inaccuracies without appearing defensive. But with the plethora of misstatements and poor research, I feel compelled to set

the record straight. As much as OGC has an obligation to advancing the standards goals of our members, I am hopeful that Directions will place more attention on publishing the facts – it is a matter of public record.