

ISO/TC 211 GEOGRAPHIC INFORMATION STANDARDS

Levelling the GI Playing Field

For the past ten years, the International Organization for Standardization (ISO) Technical Committee 211, Geographic information/Geomatics has been working on standards development. It is now completing an initial set of twenty integrated standards and has already begun work on a second set, to include standards for imagery and location-based services.

Unlike previous ISO technical committees, ISO/TC 211 has the unique distinction of beginning and continuing a programme of work focused on the concurrent development of integrated sets of standards for geographic information. The ISO/TC 211 website provides listings of approved standards, an overview of each, and current work items. While the development of a singular or stand-alone ISO standard occurs faster, the carefully developed ISO/TC 211 sets of integrated standards ensure interoperability. The ISO standardisation process may be slower because it requires formal consensus and approval of standards by many nations. However, the widespread international acceptance of ISO standards by legal statute and regulatory mandate is recognised by many countries as being far preferable to any national, regional, commercial or de facto standards.

Defining Consensus

Standards are generally perceived as technical solutions accepted by consensus. Within ISO, "consensus"™ does not, however, necessarily imply unanimity or approval by majority. The notion of consensus within this context refers rather to the absence of sustained objection. Closer scrutiny reveals that standards are more likely to be political compromises that may have significant roles and implications in the management, policy and financial considerations of governments, industry and user communities. In this regard the approved standard is less than likely to be a superior technical solution.

Technology Transfer

Standards frequently serve as forms of technology transfer between advanced and emerging countries. The traditional technology lag between developed and emergent countries is disappearing as these latter join technical committees within standardisation organisations, either as participating members or as observers. Standards also serve as democratic mechanisms to level the playing field for all players, large or small, in a competitive technological/ GIS environment. Smaller companies usually lack the resources enjoyed by larger ones to address significant technical issues. Resolving such issues by a standard shifts the focus of competition between companies to other products and services. This democratic principle also applies to the standardisation process; the International Organization for Standardization intentionally uses 'ISO' as acronym rather than 'IOS', to signify and to strive for equality of nations within the standardisation process and voluntary adoption of ISO standards: one country, one vote.

Adopting Standards

Geographic information standards generally refer to geographic data standards and/or software interface specifications for geographic information. Geographic data standards are developed for defining, describing and processing geographic data. The ISO Metadata Standard is an example of a geographic data standard, and one that is primarily content-oriented. Software interface specifications allow different software to interact and be interoperable whilst maintaining its proprietary nature. Such specifications may also result from the adoption or adaptation of an existing information technology standard for geographic information applications. The use of the Extensible Markup Language (XML) is an example of such; modification of the XML with a geographic information extension, Geography Markup Language (GML) is a good example of adaptation.

Keeping Ahead

A common practice in standards development is to first consider the adoption or adaptation of an existing standard. Developing a standard is usually a last resort, since the time for developing and approving standards is long. Standards should be available when needed, so standards development needs to be anticipatory rather than reactive. Integrating other standards during the development process facilitates the interoperability of standards, while conformance testing provides confidence in their implementation. ISO/TC 211 is comprised of over fifty national bodies, liaisons with 23 major international professional organisations and seventeen other standards committees and organisations, and its work is concentrated on developing geographic data standards. In general, ISO/TC 211 meets twice a year, about 120 technical experts attending each meeting. Between these two major meetings there are also technical working-group meetings, and considerable work is also achieved through online and email interaction.

Organisational Links

ISO/TC 211 has internal and external links to other standardisation organisations. Internal links comprise liaisons with other ISO technical committees doing related work that may be relevant; external links are with standardisation organisations outside of ISO. The relationships between ISO technical committees are defined by ISO directives and may impact technical work programmes, perhaps involving the scope of the technical committee and new work item proposals. ISO/TC 211 also maintains very important external liaisons with various standards organisations outside of the realm of ISO standardisation efforts.

Working Together

The Open Geospatial Consortium (OGC) has a Class A Liaison as well as a Cooperative Agreement with ISO/TC 211. Their work is complementary, the focus of ISO/TC 211 being on geographic data standards, while OGC concentrates on software interface specifications. Both organisations share the same vision for the interoperability of geographic information, applications and technology within the geospatial community in particular, and within the information technology community at large. The two organisations work closely together, as evidenced by their OGC-ISO/TC 211 Joint Advisory Group (JAG) that co-ordinates and harmonises the technical development of standards and specifications.

Web Mapping

Some members of this JAG are concurrent technical members of both ISO/TC 211 and OGC; the latter has submitted its Web Mapping Services Interface specification, recently approved as an ISO standard. There is continuing joint technical co-operation in the development and finalisation of the OGC originated Geography Markup Language (GML) as an ISO standard. OGC membership consists of over 250 organisations spanning the spectrum of the geospatial community; however, its hallmark in the vendor/commercial community has always remained a principal component of both its membership and leadership.

European Links

Other important ISO/TC 211 relationships are with the European Committee for Standardization (CEN) Technical Committee 287 (Geographic Information) and with the European Commission Joint Research Centre. The mandate of CEN/TC 287 is to produce a structured framework of standards and guidelines specifying a methodology to define, describe and transfer geographic data and services, work to be carried out in close co-operation with ISO/TC 211. The standards will support the consistent use of geographic information throughout EU member states in a manner compatible with international usage; it will also support a spatial data infrastructure at all levels within Europe. To date, nine standards developed by ISO/TC 211 have been adopted as European standards.

Operational implementation and deployment of standards and specifications may be advanced by an EC proposal for legislation on the establishment of an infrastructure for spatial information within Europe. Within the context of this initiative the JRC serves as Technical Co-ordinator, responsible for developing rules for technical implementation and any associated standards. The JRC has Class A Liaison to ISO/TC 211, co-hosted the recent ISO/TC 211 Plenary meeting in Pallanza, Italy, and serves as co-chair of the OGC-ISO/TC 211 JAG (see GIM International January 2005, pp. 48-49). The JRC is also a member of the newly established ISO/TC 211 Focus Group on Data providers, the charter of which is to raise the awareness and promote data producer use of international standards in the area of geographic information. It also aims to collect requirements for development of additional standards in this area.

Links to the User

The membership of ISO/TC 211 comprises technical experts from national-body delegations, including representation from the national mapping organisations. This membership profile is augmented by its membership of Class A Liaisons. The Class A Liaison member can include any organisation that has interests in the development, deployment and use of these standards. Class A Liaison members hold all the same rights as national-body delegates participating in standards development, except for one: Class A Liaisons cannot vote within ISO/TC 211. Most Class A Liaisons are large, international professional, academic or non-governmental organisations that generally do not want to vote, their international basis requiring the maintaining of a neutral and transparent position. Accordingly, members constitute the user community for ISO/TC 211 geographic information data standards.

ISO/TC 211 has established an Advisory Group on Outreach to promote the awareness, adoption and advocacy of ISO/TC 211 standards within user communities. It actively seeks to enter into joint outreach efforts with international organisations interested in applying ISO geographic information standards, facilitating their adoption and implementation and the capture of user requirements and feedback to provide a basis for research and contribution to the ISO/TC 211 standardisation process. The intent is to institutionalise ISO/TC 211 standards within large international initiatives and programmes. Thus ISO/TC 211 will be participating in and sponsoring standards workshops at the forthcoming FIG-GSDI-8 and ICA conferences in Egypt and Spain to be held, respectively, in April and July 2005.

The Way Forward

The global user community for geographic information standards also consists of nations, non-governmental organisations, multilateral banks, vendor community, international initiatives and programmes. The viability of standards are increasingly judged on their capacity to support criterion established by these communities at national, regional and global level to achieve the integration and interoperability of geographic information and systems within existing and emerging information technology environments. This overall interoperability using generic information technology provides the ability to extend the benefits of geographic information/technology and its incorporation within other technologies and applications, and from specific user domains to those of mass-market consumers. These are, in large measure, the major and common objectives for the international geospatial community. That is why standards deserve their institutional advocacy and strategic support.