Title: Summary of voting ISO/TC 211 N 509 Resolution on Conceptual schema language for specifying ISO 15046

Source: ISO/TC 211 Secretariat

Status: Resolution 68 has been approved by a majority of the P-members of ISO/TC 211

Required Action: The working groups are requested to implement the decision from this resolution in the ISO/TC 211 work items

Reference: N 509

File name(s): 211n525.doc, 211n525.html, 211n525.PDF

Distribution: P, O and L members
Chairman
WG Convenors
Mr. Keith Brannon, ISO CS
Mr. François Salgé, CEN/TC 287
## Summary of voting

**ISO/TC 211 N 509**

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<tr>
<th>P-member</th>
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Approval: 16 members  
Disapproval: 2 member  
Abstention: 2 members  
No vote: 7 members
Comments on ISO/TC 211 N 509

The Netherlands

As sufficient documentation on UML has not been made available, NNI cannot foresee the consequences of this decision, e.g. for existing applications using EXPRESS. We strongly request that more information be provided before we can support this decision.

Sweden

Sweden rejects ISO TC211’s Resolution 68 in ISO/TC 211 N 509. The rational, which lead to this decision is described below.

Sweden would appreciate, if the resolution below could be adopted. It takes into account all the issues leading to the rejection of Resolution 68.

New proposed Resolution:

ISO/TC211 shall use EXPRESS (ISO 10303-11: 1994) as conceptual schema language for the normative information models of ISO 15046. Additional informative representations based on the Unified Modelling Language (UML) static structure diagram with ISO Interface Definition Language (IDL) basic type definitions and the UML Object Constraint Language (OCL) may voluntarily be used. This requirement shall be implemented prior to submission of the parts for their next formal ballot (CD or DIS).

New proposed Justification:

The mission of ISO TC211 is the development of a framework enabling interoperability among different and potentially dissimilar GIS applications, from data exchange over data sharing to data integration and consolidation. For this purpose it is necessary to agree on a single, lexical CSL for application schemas and their integratable or referencable standardised components.

EXPRESS is an international standard, which has already been used, tested, supported, and approved for many application domains including GIS. There is no evidence, that EXPRESS cannot fulfil the requirements of the lexical CSL for static information models in the context of ISO 15046. With regard to model of behaviour, a new edition of EXPRESS is sufficiently developed to state, that it will be available for DIS ballots of parts of ISO 15046 with minimal support from ISO TC211.

As an alternative, a standardised mapping between UML and any CSL to be used in application schemas must be developed. This will be clearly more effort on the side of ISO TC211 than to support ISO TC184/SC4/WG11 in the finalisation of the new edition of EXPRESS and the necessary adaptations of its implementation forms (IDL Binding, Java Binding) to the new capabilities of this language.
Issues against Resolution 68

1. **Graphical vs. Lexical Language**
   An application schema developed in conformance with ISO 15046-9 is the complete definition of contents and structure of a geographic dataset. Resolution 68 selects a number of component languages (UML for the static structures, IDL for the basic type definitions and OCL for the constraint specification) for the definition of application schemas. These languages, it is assumed, will be linked together through the use of UML, a diagramming technique (graphical language). Such languages are always less precise and more subject to human interpretation. If the standard is intended to support the sharing of information even across the boundaries of dissimilar application domains, we need more precise specifications than a diagramming technique can provide. To enable consistent implementations of complex schemas using different tools, we need a computer-sensible, non-ambiguous data description, a single standardised lexical language, such as EXPRESS-2 to represent the schema including its constraints. From the text of Resolution 68 we don't see, that this requirement is fulfilled.

2. **System design vs. Information Sharing**
   UML has been developed on the background of system design, especially object-oriented system design. This is however only one of the problems to be solved by ISO 15046. Others are exchange, sharing, integration and consolidation of GIS information from different and dissimilar sources. EXPRESS-2 supports the latter requirements better and scores equally well for system design. It enables precision not only in the description of system interfaces, but also of system internals. However it does not require the latter, as long as we don't want to generate systems from the EXPRESS-2 specification.

3. **Single Domain vs. Integration of Multiple Domains**
   UML, with it's background of systems design, has been developed to support a single domain of discourse within a model. An application schema in the other side integrates many constructs from other parts of ISO 15046, such as spatial schema, quality schema, geodetic reference schema, geographic identifier schema, etc. Therefore the means by which syntactic and semantic interoperability would be maintained would be via techniques such as cut and paste between the models from the different parts of the standard. This is known to be a major problem in large complex standards. ISO TC184/SC4 realised this would be a problem and the EXPRESS language has been specifically designed to deal with the specification and reuse of models in a number of related problem areas. This reference capability allows the parts of the standard to be developed and used independently.

4. **OMG and Internet**
   It is clearly the intention of Resolution 68 to enable the utilisation of the OMG technology within the GIS domain. There was most probably a concern, that following the EXPRESS route would cut off the GIS users from main stream technology developments. This is however not true. In TC184/SC4/WG11, ISO 10303-26 (IDL Binding for SDAI) and ISO 10303-27 (Java Binding for SDAI) are under development. An additional file format based on XML is under discussion. So EXPRESS will have implementation forms supporting OMG CORBA and the Internet pretty soon. Admittedly, these current activities are all based on EXPRESS-1 (ISO 10303-11 : 1994) and EXPRESS-2 has not yet reached CD level - the CD ballot for EXPRESS-2 will be initiated before 1998-06-01. Nevertheless, the extension of these parts to cover the additional capabilities of EXPRESS-2 will be less effort than to fix the lack of formal precision in the UML approach. In addition there is significant interest in these extensions within TC184/SC4/WG11. TC211 would therefore most probably not be alone, should it decide to become active in this area. This is much
less likely, if the decision is to fix the shortcomings of UML. For the implementers who wish to use UML directly, there are tools available for converting EXPRESS specifications into the Rational repository for viewing and manipulation as UML.

5. **Support of Users in Industry**
Many industry segments, including civil engineering, building and construction, process industry, and infrastructure providers (roads, railroads, pipelines, telecommunications, power lines, etc.) as well as armed forces all over the world require interoperability between product and GIS data. The product data domain has developed and is using EXPRESS. UML didn't even exist when the development of ISO 10303 started. As UML on the other side has no real technical advantages over EXPRESS-2, there is no reason to believe that TC184/SC4 will change its direction. Resolution 68 will therefore disconnect standard GIS data and interfaces from the industrial users of this information, from the eventual customers who have an economic interest to pay the price for collecting and maintaining these data.

**Existing EXPRESS Models**
During the last couple of years, there have been several developments in the GIS domain, with which we should try to be at least technically compatible. This would enable at least a certain degree of upward compatibility between these developments and ISO 15046 on the level of data as well as specifications. An important representative of these developments are the ENVs prepared by CEN.