Response to "A Close Look at the IFO Data Model"

To the Editor:

Paper [1] that appeared in the March, 1995, issue of the SIGMOD RECORD is a critique of the IFO data model, as described in [2]. While paper [1] does make some valid observations about the IFO model, the paper makes a number of statements that we feel to be incorrect. Furthermore, [1] demonstrates a fundamental misunderstanding of the goals of [2] that we would like to point out.

Several statements in [1] concerning the IFO data model (specifically Section 3.1, item 3, and Section 3.2, items 1, 2, and 3) are false because in IFO, the Cartesian product construct (represented using the cross-vertex) is used to represent a *subset* of a Cartesian product. Thus, it can explicitly represent binary and n-ary relationships, very similar to the "relationship" construct of the Entity-Relationship model. Further, as with the Entity-Relationship model, Cartesian product classes in IFO can have attributes.

The paper [1] dwells on the fact that the IFO model does not include constraints. (This is the focus of seven of the items in Sections 3.1 and 3.2.) As stated near the top of page 526 in [2], "The primary focus in the development of IFO has been on the structural component of the model", as opposed to the data manipulation and integrity-specification components. In connection with SDM, [2] carefully qualifies near the bottom of page 526 that IFO subsumes "... virtually all of the *structured* aspects of the Semantic Data model ..." [emphasis added]. Some other "missing" features of IFO (according to [1]) are pertaining to conceptual modeling. One can easily identify many other features not covered by [2] such as language issues, implementation issues, and issues around the migration of relational data to this new model.

To conclude, we wish to stress (since this was apparently overlooked by the author of [1]) that IFO was not meant to be a *comprehensive* semantic data model. The main focus was to provide a formal presentation of the main data structuring features found in previous semantic data models, and to provide a formal analysis of update propagation. If IFO has influenced later works on semantic data models or object-oriented DBMSs, we believe this is due to the formal basis provided by IFO, and not because of an alleged claim of comprehensiveness, a claim that is not made in [2].

References

[1] M. S. Hanna, "A Close Look at the IFO Data Model", *SIGMOD RECORD* 24:1, March 1995, pp. 21-26.

[2] S. Abiteboul and R. Hull, "IFO: A Formal Semantic Database Model", *ACM Transactions on Database Systems* 12:4, December 1987, pp. 525-565.

Respectfully,

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