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Report on the PhD Thesis by Martin Nečaský

This thesis concerns not too much developed part of XML technology – conceptual modeling for XML data. In particular, the author proposes a new model XSEM, provides its formal description, and discusses its usability in practice.

In background, the reader is acquainted with basic facts about well-known modeling techniques such as ER model and UML. The candidate shows also how modeling of XML is related to so-called model-driven architecture. Chapter 3 mentions related works and their mutual comparison. The main contribution of the thesis lies in chapters 4-6. Chapters 4 and 5 introduce XSEM-ER and XSEM-H parts of the XSEM model, respectively. A variant of ER model is extended is extended with a new modeling construct called cluster type. The resulted model remains platform-independent. Chapter 4 also contains a basic formalism for specification of hierarchical projections required in other parts the modeling process. In Chapter 5 the platform-dependent part of the model, called XSEM-H, is presented. Schemes in the XSEM-H model are based on views, modeling a type of XML documents. Chapter 6 introduces an algorithm enabling to translate XSEM-H views into a XML schema in the XML Schema language. A lot of possibilities for other research are mentioned in the final Chapter 7.

The thesis uses a formal approach accompanied by non-trivial examples highlighting rather complex results of the modelling process. It is also typical for the candidate that he made several attempts to put his model into practice. It needs, obviously, a software tool based on the XSEM model. Such a tool is currently under development.

The results presented in the thesis have been published in proceeding papers of representative international conferences, supported mostly by ACM and IEEE. The paper about conceptual modelling for XML from DATESO workshop (available in CEUR-WP server) has 4 citations. Consequently, I recommend that the candidate be awarded the Doctor degree.