Accepted Manuscript

A scalable model based approach for data model evolution: Application to space missions data models

Lynda Ait Oubelli, Yamine Aït Ameur, Judicael Bedouet, Romain Kervarc, Benoit Chausserie-Laprée, Béatrice Larzul

PII: S1477-8424(18)30044-7
DOI: https://doi.org/10.1016/j.cl.2018.08.001
Reference: COMLAN 308

To appear in: *Computer Languages, Systems & Structures*

Received date: 27 March 2018
Revised date: 3 July 2018
Accepted date: 3 August 2018

Please cite this article as: Lynda Ait Oubelli, Yamine Aït Ameur, Judicael Bedouet, Romain Kervarc, Benoit Chausserie-Laprée, Béatrice Larzul, A scalable model based approach for data model evolution: Application to space missions data models, *Computer Languages, Systems & Structures* (2018), doi: https://doi.org/10.1016/j.cl.2018.08.001

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Available online at www.sciencedirect.com
ScienceDirect
Computer Languages, Systems and Structures 00 (2018) 1–32
C Science Procedia

A scalable model based approach for data model evolution: Application to space missions data models

Lynda Ait Oubelli[1,2], Yamine Aït Ameur[1], Judicaël Bedouet[2] , Romain Kervarc [2]
Benoît Chausserie-Laprée[3], and Béatrice Larzul[3]

1. IRIT/INP-ENSEEIHT, University of Toulouse
2 Rue Charles Camichel, Toulouse, France
{Lynda.aitoubelli, yamine}@enseeiht.fr

2. ONERA/DTIS, University of Toulouse
Toulouse, France
{Lynda.Ait-Oubelli, Judicael.Bedouet, Romain.Kervarc}@onera.fr

3.CNES-The French Space Agency,
18 Avenue Edouard Belin, Toulouse, France
{Benoit.Chausserie-Lapree, Beatrice.Larzul}@cnes.fr

Abstract

During the development of a complex system, data models are the key to a successful engineering process, as they contain and organize all the information manipulated by the different functions involved in the design of the system. Moreover, these data models evolve throughout the design, as the development raises issues that have to be solved through a restructuration of data organization. But any such data model evolution has a deep impact on the functions that have already being defined.
Recent research tries to deal with this issue by studying how complex industrial data models evolve from one version to another and how their data instances co-evolve. Complexity and scalability issues make this problem a major scientific challenge, leading to huge gains in development efficiency. This problem is of particular interest in the field of aeronautics and space systems. Indeed, the development of these systems produces many complex data models associated to the designed systems and/or to the systems under design, hence on the one hand data models are available. On the other hand, it is well known that these systems are developed in the context of collaborative projects that may last for decades. In such projects, specifications together with the associated data models are bound to evolve and engineering processes shall take into account this evolution.
Our work addresses the problem of data model evolution in a model-driven engineering setting. We focus on minimizing the impact of model evolution on the system development processes in the specific context on the space engineering area, where data models may involve thousands of concepts and relationships, and we investigate the performance of the model-based development (MBD) approach we propose for data model evolution over two space missions, namely PHARAO and MICROSCOPE.

© 2018 Published by Elsevier Ltd.

Keywords: Data Model Comparison, Data Model Evolution, Data Migration, Data Conservation, Model Driven Engineering (MDE), Composite Evolution Operators.

Download English Version:

https://daneshyari.com/en/article/11002388

Download Persian Version:

https://daneshyari.com/article/11002388

Daneshyari.com