

Interactive comment on “Web services for distributed and interoperable hydro-information systems” by J. Horak et al.

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We are thankful to the anonymous referee for his/her valuable comments and questions, which have helped us to discover parts, which are difficult to understand, weakly explained or not documented. The topic is multidisciplinary and it aggravates how to find a balance between the length of paper and comprehensive explanation of all relevant aspects. The answers to comments and questions are provided below; original comments are in italic. The corresponding changes and improvements are incorporated in the final version of the paper.

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However, as described hereafter, some points need to be developed in more details before the paper can be finally accepted: as this topic is a multidisciplinary one, between the fields of computer architecture, application development and hydrological modelling, basic concepts and/or corresponding references need to be more clearly stated for the reader.

The more extended description is provided in the final version of the paper, especially for the architecture of distributed information system and numerical hydrological and hydrogeological modelling.

In addition, even if T-DSS is a prototype, presentation of a hydrological case-study is required as it would help the reader to have a better overview of the system capability.

We agree, that the case studies will provide better understanding of the system capability. Presentation of 2 case studies, one for the hydrogeological modelling and the second for the hydrological modelling, is added to the final version. Case studies are presented as step-by-step procedures, which hopefully help to understand the concept and advantages of web based distributed systems.

Specific comments

- a key-point of the work is the choice of Web Services concept for building T-DSS. Part 2 "Architecture of distributed information system" and Part 3 "T-DSS" are dedicated to this point, but overall overview of the topic "local system versus global system" is not provided. More detailed references would give us a state-of-the-art in this domain. Moreover, whereas local system structures are well described with examples, global system concepts are not defined, but only presented in terms of T-DSS module description.

This part was revised and modified, providing improved characterisation of both systems and review of the advantages and disadvantages.

- according to the authors, one of the main benefits of the Web-services technology is its ability to integrate transnational constraints. We assume that this functionality has been implemented, but we would like to know if it has been really tested by end-users from another country.

Main benefits of web services are ability to integrate application and data and ease of integration. Different applications running on all kinds of machines, from the desktop to the mainframe, located within one enterprise or throughout the Internet, can be easily integrated. A client can combine data from multiple Web services to one unified interface - even if the systems themselves are incompatible. One service might be utilized by several clients and it leads to better code re-use as another positive side-effect of Web services' interoperability and flexibility.

The advantages of web services are more pronounced in the situation where the heterogeneous data and services has to be integrated and at the same time they should preserve their original features and functions. Also due to the character of a distribution, the communication through Internet has to be applied. These aspects can be expected during integration of national/local services and data.

Thus, application of web services for distributed information systems are not constrained to transnational systems. But the web-services based system provides important benefits in such applications due to its ability to preserve features of existing national applications and services.

Multilingual features of the system were tested in the predecessor of the system in the frame of TRANSCAT project (e.g. Nestos-Mesta river, Bela-Biala river catchments). The current version was not tested by end-users from another country yet. A new

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paragraph documenting experiences with multilingual features is added to the final version of the paper.

- integration of hydrological and hydrogeological models is clearly described as well as system services. Nevertheless, it would be interesting to know more about selecting such models. End users indicated they prefer free softwares, but why these two? For some technical reason (easy to implement in the overall system)? For their reliability? For their ability to assess various hydrological case studies?

HEC-HMS and Modflow were selected as representatives of hydrological and resp. hydrogeological modelling system. Reasons are both technical and economical. Selected systems provide a quite wide range of possible hydrological applications, direct linkage to GIS, they are frequently used, and provided free of charge. These aspects are more explained in the final version.

- with regards to the last part of the paper, it would be clearer for the reader to make a distinction between what has been fully implemented in T-DSS and what is in prospect for the future. In §4.3 "interface to additional utilities", for example, we understand that GIS GRASS wrapper has been developed and integrated in T-DSS, but we suppose it is not the case for mDSS interpolation services. Moreover, the relationship between TDSS and mDSS interpolation services is not clear: have these services been imported from mDSS or have they been designed to be implemented in mDSS?

An interpolation service is designed and implemented using GRASS GIS wrapper. The idea of providing such a service for mDSS became during TRANSCAT project with the purpose to enable mDSS (or other DSS system) a support of specific functions through TDSS. The interface (wrapper for GRASS GIS) is prepared, tested

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and ready to use, but the implementation on mDSS side was not completed. This is the reason, why we talk only about the design of interpolation service for mDSS; the implementation is ready only on 1 side.

In the final version of the paper, the description is extended to provide more detail information about utilisation of such a service.

- Figure 3 and 4 show examples of web client outputs. However, we do not know whether these results come from a real case-study (even if the study has been performed previously in another context) or if they are fictitious. It would also be interesting to know if the system has been tested in a real transnational context as it was a key-factor in selecting web-services technology. More generally, it is important to know if T-DSS system (even if it is a prototype) has been tested according to the different steps of a real hydrological project. Related additional information would be welcome for the reader as it allows to get a more precise idea of the system confidence level: it is very important in terms of decision making environment.

T-DSS has been evolved from the previous system, which has been developed and tested in the frame of TRANSCAT project. Because the implementation of the new system is not finished, we could not provide more information about the system testing in the real hydrological project.

The links for figure 3 and 4 are more described in the final version.

- finally, we would like to get more information on the overall project. As T-DSS is supposed to evolve towards an operational system, it is important to know more about the development framework, specially concerning end-users (researchers, engineers or decision makers), future implementation and maintenance facilities.

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In our paper we have intended to draw reader's attention to the possibility and advantages of utilisation of web services for development of hydro-information systems. T-DSS is a prototype demonstrating these capabilities. The system has been developed on the base of analysis of system and end-user requirements, but the conclusions of analysis are difficult to reproduce in the paper.

The review of main end-users and stakeholders as well as critical notices to future implementations is added to the conclusion of the final version.

Technical corrections

- Line 1880-9: meteorological in place of eteorological;

The correction is made.

- Figure 2 is difficult to read;

The figure is changed.

- Line 1882-14: we suppose Fig.1 should be in place of Fig. 3;

The correction is made.

- Acronyms: some of them are very well known (like GIS), some others are defined (for example, WS-API for Web Services Application Interface), but some of them which are undefined (SW, WMS, JAMS) need to be specified.

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WMS (Web Map Service) is explained in chapter 3, "SW" is eliminated from the final version and JAMS is explained.

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