# A methodology to improve WEB database system continuously

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Today, various databases including scientific one offer WEB interface. For improvement of WEB database system, it is important to hear voice from an expert of the field. We have examined a construction method of the WEB database system which is suitable for continuous evolution. In this presentation, we show the result with examples.

In continuous development of system, the most important point is to have clear design and implementation. Also important is to record the design in 'document'. Modification of the system should be reflected and maintained in the 'document'. Maintenance of the 'document' not always requires heavy human effort. We have pursued a way to keep the design 'document' of WEB database system as simple as possible.

The most important point for reduce burden of system construction is to reduce copy of design information with human hands. For example, it is not recommended to copy contents of table in design document into source codes. Moreover you should not copy design information between design documents. It is highly recommended to write design information in the normalized single point in design 'document' tree.

There are many technologies to construct an equivalent WEB system. Each technology has losses and gains. At start of development of individual systems, a technology is chosen by some reason. In course of improvement, assumption for selection of technology may break. In such cases, considerable re-design work is required for addition of new feature to the database system. We have studied normalized way for design with less ambiguity in implementation which may not covers all of the WEB database system but the most of WEB database system.

We are compiling the result into a guideline. The guideline covers how to write 'design document' as well as method of implementation. In the beginning, the guideline suggests to write 'design document' in a standard structure. This is our coarsest modeling of WEB database system. It is not recommended to write figures and tables with word processor. Instead, UML and XML are recommended. In our scheme, purpose of writing UML and XML is not consideration but record of detail design.
Our guideline shows a necessary and sufficient way for usage of UML and XML to model a WEB database system. For example, state charts describe design of transition between WEB pages and sequence charts describe interface information of procedures and internal variables of the WEB application.

Our design method does not conceal layers of WEB applications. For example, the guideline requires preparing template files of XHTML file, and burying information for mapping with internal variables into the file. This is the all of the designing of view portion of web application. WEB screen is one of the most important parts which should be reviewed by the expert of the field of the database. Exchange of the HTML template in the improvement of database highly accelerates communication between expert and engineer.

We are also preparing a framework with the guideline. This framework can process the XML files to configure WEB database and eliminate hand work by programmer. Our framework also provides tools to check consistency between XML files in order to detect errors in implementation in smaller loop.

With this method, we are now developing WEB database system for the Solar-B satellite and Astro-F satellite which will be launched in 2006 by Japan Aerospace Exploration Agency. We will complete development of prototype at the end of February 2006. We are also planning to provide the guideline and the framework to public soon.