# Development of Global Product Data Management System with Recent Internet Technology

Hirotaka Katoh*

## Abstract

Calsonic Kansei's Global Product Data management System was deployed for the purpose to accelerate global and digital development. In May 2015, as the first use case in the world using latest internet technology for deploying PDM system, it was unveiled widely at one of popular annual PLM users' conference.

**Key Words** : Global and Digital Operation, Product Data Management, 2D/3D CAD, Internet

## 1. Background of GPDM development and introduction

Product Data Management System is very effective solution for man-hour loss in the data transfer at the fields of the current automobile development where a digital development is prevailing. While many automobile manufacturers introduce the system, parts suppliers are trailing behind due to the high development and maintenance cost and difficult system operation. Following the rapid expansion of overseas production, Calsonickansei has been preparing the design information management system (GBOM and GPDM) in a phased manner to assist the production preparation and parts procurement at the local sites. (Fig. 1)

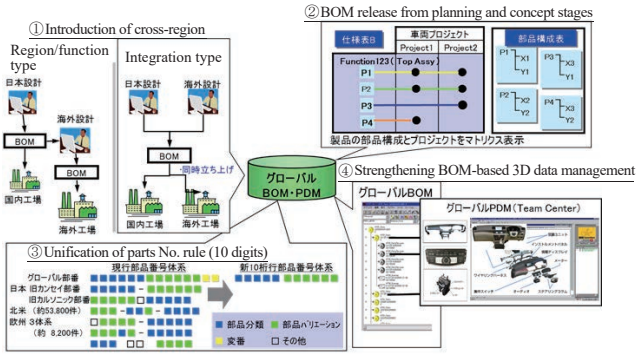


Fig. 1 GBOM/GPDM system for global operation

Firstly, we introduced Design BOM (Bill Of Materials) and Production BOM system linked to Design BOM on a global basis. (Prior to the introduction, the rule for the parts number over 10 digits was also standardized.) Then, we developed GPDM system that transfers and stores the latest drawings and 3D data. In Japan, there are a considerable number of CAD users in the design teams. We introduced this system simultaneously with new CAD system, which had already been planned to be introduced, so that we could minimize the users' inefficiency (time for operation training and for learning a new system) caused by the system change.

As for the overseas bases, we first introduced the system to North American bases (North America and Mexico) along with the design transfer timing of the vehicle project designed by a new CAD system. The introduction to the bases in Europe and China (Shanghai and Guangzhou) has also been completed.

In the global introduction of GPDM, two issues were raised: ① Establishment of the network connecting each overseas base to GPDM and ② Preparation of 24-hour system operation organization. The following section describes how we solved these issues.

## 2. Issue of global development

### 2.1 Establishment of system with use of Internet

To establish an effective system configuration in developing PDM on a global basis (Management by providing an individual server for storing CAD data to each base is more designer-friendly than the centralized data management.), it is necessary to connect the data servers spotted among the bases by a network with a considerable capacity. However, large expenses are required for this network configuration. (A typical Web system has a screen data capacity of several 10 KB, but CAD data require about 10,000 times of the capacity.)

* Global Technology Division Development Process Innovation Group

Note 1 : PLM Connection is a conference for user companies held by Siemens, a giant vendor in PLM/PDM products. The conference is one of the nation's most popular events where major OEM, parts makers, aircraft makers, consumer-electronics makers, and electronic parts makers participate.

In the GPDM, by using an Internet commercial solution of Akamai Technologies, Inc.[Note 2] (the world-first application case in PDM), we could increase the data volume. In addition, we also could save the initial and running costs up to about one-tenth in comparison with our in-house network. The feature of this solution is that its servers on the Web also function as data cache, and thereby, actual system speed increases to more than the specified value of the network volume. Major advantages of the Akamai Internet relative to the exclusive line are described below.

- ✓ Making a lead time before a system introduction shorter because of unneeded exclusive network. (Introducing the system to the future bases in a timely manner. See Fig. 2.)
- ✓ Reducing drastically equipment investment and maintenance cost of the network.
- ✓ Gaining stable network performance even with the Internet environment.
- ✓ Expecting a competitive edge by introducing PDM on a global basis ahead of competitors.

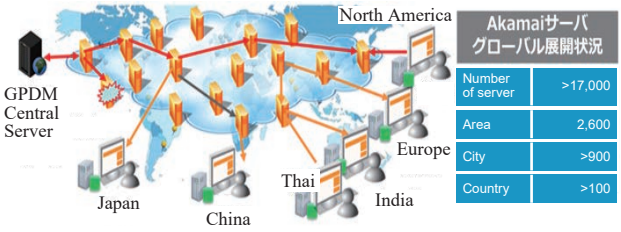


Fig. 2 Image of GPDM system structure with Akamai

### 2.2. Launch of 24-hour system operation organization

Prior to GPDM introduction to the overseas bases, system operation centers with English-speaking operators were opened offshore to immediately troubleshoot a possible system malfunction during operation hours in each base. To establish this support system, first, the system failures caused in Japan were listed and the troubleshooting manual was created for each failure that might occur overseas. Next, responsible engineers were sent to the bases in order to train local engineers, while an operation trial was started. Finally, more practical requests were incorporated in the program (e.g. creating of pre-training programs for personnel change in consideration of much turnover employment situation in local sites). As a result, the official operation was launched by the local engineers only.

## 3. Introduction effect

As a quantitative effect, the introduction of GPDM in Japan improved CAD user operational efficiency to more than 6%. (See Table 1 for details.)

Table 1 Improvement of Operational Efficiency

| | Introduction effect (Introduction in Japan) | Measurement | User efficiency percent |
|---|---|---|---|
| ① | Reduction in the man-hour of data maintenance | Automatic update percent | 3.5% |
| ② | One-stop design release system | No. of design notice, and No. of data issue notice for release | >2.0% |
| ③ | Reduction of data transfer | No. of data issue notice for production engineering | >1.0% |
| | | Total | >6.5% |

The effect of GPDM introduction is mainly divided into two items: reduction of CAD data creation man-hour (① in the above table) and shortening of data transfer time (② and ③). The former effect is remarkable for the case when the product composition level is deep and many components are commonly used in the composition, as is common in the automobile parts. In fact, in the case of a change in common parts, CAD data updating efficiency can be dramatically enhanced because CAD assembly structures can be saved in the data base not in an individual CAD data file but in the GPDM. The latter effect is that it is not necessary to transfer physical data by sharing the data base between CAD data creator and the users. When studying performance and productivity by using CAD data, an engineer can select the latest data from PDM, using the parts number as a search key. It can prevent the engineer from requesting the data creator to send the latest data every time. Therefore, waiting time for CAD data transfer and man-hour for deskwork procedures can be significantly reduced. (Data transfer to and from overseas bases takes at least one day. The introduction of GPDM can shorten the time to several minutes or some 10 minutes, although it depends on data size and network distance to and from the base.)

Note 2 : Akamai Technologies, Inc. (Massachusetts, US), a giant of contents delivery network, Its products are used in many government offices including the Pentagon and private firms.

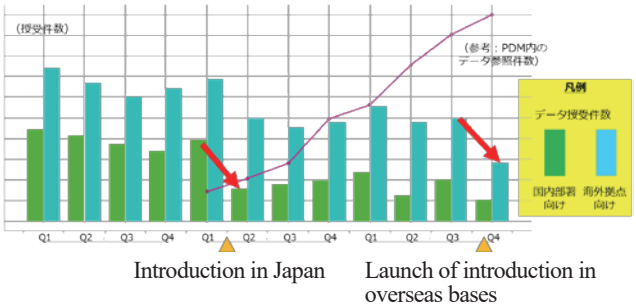


Fig. 3 Trends in number of data exchange

The above graph (Fig. 3) shows trends of the number of data issue notice before and after the introduction of GPDM as an evidence of the effect ② and ③. The before-after analysis shows the number of manual data transfers is decreasing, while the number of direct communications between CAD data creators and its user is increasing (by use of communication tools in the system). It can be presumed from this analysis that we can shorten the lead time for the production preparation and for the overseas bases' data use.

## 4. Conclusion

With the completion of the GPDM introduction to major bases, Calsonic Kansei can disuse the copy data separately prepared in the overseas bases and achieve Monotsukuri (design study and production preparation) based on the physically unique latest design data to parts number shared by any global base. Currently, GPDM covers design data only but we are studying an expansion to manufacturing-related data (drawings for plant equipment and tooling). (The production division has many overseas bases and thus can take advantage of accessibility to the system through the Internet, or "Product data is available immediately via the Internet.") With a view to expanding the application of GPDM, we will make efforts for further stable operation of the system, aiming for an improvement of its operation ratio (ratio of actual normal system operation time to users'browsing time, an index of an influence of system malfunction that user cannot avoid.)

## Reference

(1) Calsonic Kansei Technical Review vol.10 2013 : Development of Global Product Data Management System Shogo Kitamura

(2) Leaflet showing a Siemens PLM case : Global development of PDM with Internet technology (A case of Calsonic Kansei Corp.) Establishment of Global Product Data Management System via Internet

Hirotaka Katoh