



Global simultaneous mass production launch of servers/storage products across 3 global sites Enabled by MES in Hitachi's IT platform business

How to deliver products to market faster?

- Many manufacturers have set up global production operations to target this goal. In this article, Hitachi, Ltd., Information & Telecommunication Systems Company introduces the latest success story of Manufacturing Execution system (MES) implementation that enabled global simultaneous product launch.

Global simultaneous mass production launch of servers/storage products across 3 global sites Enabled by MES in Hitachi's IT platform business

How to deliver products to market faster? - Many manufacturers have set up global production operations to target this goal and Hitachi, Ltd., Information & Telecommunication Systems Company is no exception. Hitachi has set up production operations of its server and storage products across Japan, U.S. and France. In order to maximize the benefits of this 3-site global production strategy, Hitachi has succeeded to simultaneously launch new products in these global locations by standardizing on a global MES (Manufacturing Execution Systems). In this article, we will introduce the presentation from Kuniyuki Matsuo, General Manager of the IT Platform Division Group, Global Supply Chain at Dassault Systèmes France "3D Experience Forum Japan 2015" event.



Kuniyuki Matsuo, General Manager of the IT Platform Division Group, Global Supply Chain, Hitachi, Ltd., Information & Telecommunication Systems Company

Hitachi, Ltd., Information & Telecommunication Systems Company is a division of Hitachi, Ltd., focused on IT related products and services. They account for 19% of Hitachi's total sales volume, and are the largest scale operations by business segment. General Manager Kuniyuki Matsuo is affiliated with the IT platform division group that handles the business of servers (Hitachi Unified Compute Platform, BladeSymphony, HA8000 etc.), storage (Hitachi Unified Storage, Hitachi Virtual Storage Platform etc.) and software (JP1, Cosminexus etc.).

Among these product groups, servers and storage are manufactured across 3 global sites in Japan, U.S. and France after product development is completed in Japan. By standardizing on a

global MES (Manufacturing Execution Systems), Hitachi is now able to launch mass production simultaneously across all locations right after completion of the design stage.

MES is primarily used at the factories to access information from different parts of the manufacturing process and hence enabling control and management based on overall status of the operations. It covers the functional scope from work instruction to shipping, receiving, quality, maintenance, scheduling and traceability, and is utilized to complement ERP (Enterprise Resource Planning). Hence, it is also known as the link to connect between shop floor (frontline management) and top floor (business management).

The use of MES in Japan had been limited because the ample availability of highly-experienced technicians to manage delivery and quality of manufacturing. However, the retirement wave of experienced veteran technicians around the end of the 2007 economic down turn has made systematization of management an urgent task and hence greatly accelerated the introduction of MES. The increased difficulty of harmonizing operations management as a result of international expansion is yet another reason to implement MES, of which Hitachi is such a case.

The MES solution that Hitachi adopted is "DELMA Apriso" from Dassault Systèmes. In addition to the 11 standard functions established by MESA (Manufacturing Enterprise Solutions Association), DELMA Apriso has expanded functionalities such as inventory management and label printing (Figure 1).

The 11 features established by MESA are process management, product tracking and genealogy, resource allocation & status, data collection & acquisition, quality management, maintenance management, Operations / Detailed scheduling, dispatching production units, document control, labor management, and performance analysis.

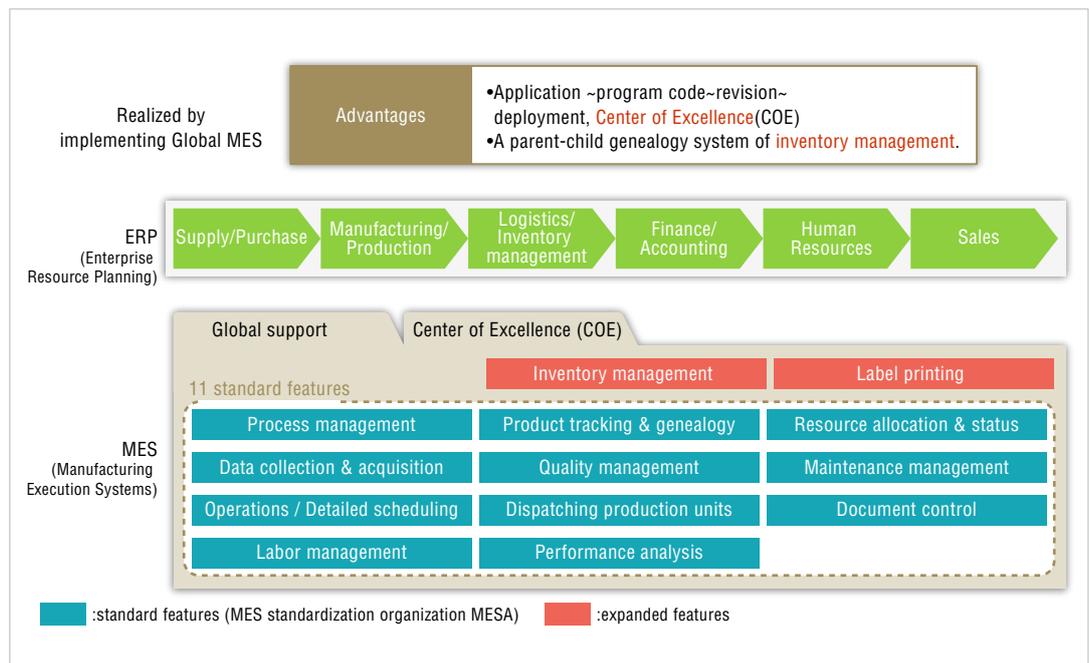


Figure 1 Functionalities of a global MES (source: Hitachi, Ltd.,)

Launching Global Production Processes of Server Product in 6 Months

Hitachi achieved 4 major benefits from implementation of a global common MES. Firstly, the ability to simultaneous mass production and shipment of new products in all 3 global sites. Before the start of production, the teams from 3 locations discussed the process and then start production. "Only 1 month from GA (General Availability), we are able to ship new products from all 3 global sites simultaneously," said Kuniyuki Matsuo, General Manager, IT Platform Division Group, Global Supply Chain, Hitachi, Ltd., Information & Telecommunication Systems Company.

In the past, Japan would start mass production in 1 month and shipment in Japanese and overseas markets would start 2 months after the release of the evaluation version. Mass production in U.S. and Europe could only start afterwards so it required a total of 4 months before mass production can start in all 3 sites.

Secondly, the rapid roll-out of the above mentioned global product launch process to server manufacturing. Although storage products have adopted the global 3-site manufacturing strategy, server products were manufactured exclusively in Japan's Hadano factory. In order to reduce TTM (Time to Market) and TTV (Time to Volume) for server manufacture, they have also applied the 3-site strategy to servers since 2014 by implementing a simultaneous mass production systems based on the global MES in just 6 short months.

Thirdly, "we achieved a 50% reduction in operations time between assembly and shipment by applying a parent-child genealogy system for inventory management" said General Manager Matsuo. By managing materials for the frame of the rack server as the "parent" and parts like controllers and hard disks as "children", Hitachi is able to conduct simulation of system configurations at its CTO (Configure to Order) process, hence achieved such reduction in operation time.

More specifically, Hitachi has stopped disassembly products by MTS (Make to Stock) and instead started storing them with information of their product configuration. With CTO, the system configuration that is simulated closest customer configuration is selected for shipment.

Lastly, "the utilization of modularity concept during the implementation of MES" said General Manager Matsuo. The implementation at 3 global sites is conducted by utilizing the local team at each country. During such, leveraging Dassault Systèmes' "Screen Framework" that controls the configurations of screens and business logics, they are able to easily make modifications and reviews on configurations made at different local sites. In order to further improve development and production efficiency, they have made an internal tool "Application Configuration" to handle master data that control calls between screens and subroutines.

Higher efficiency of material supply was achieved by multi-site expansion, manufacturing process was left out

Hitachi set up the 3 site system for storage products of Japan, U.S. and Europe in 1992 (Figure 2). Production for Japan, China, and the rest of Asia has been taking place at Odawara factory in Odawara city, Kanagawa prefecture of Japan. Production for North and South America market has been at the Oklahoma factory in the U.S. and production for Europe and Africa market has been located at the Orléans factory in France. On the other hand, servers were produced in a one site system exclusively in Hadano city, Kanagawa prefecture of Japan.

With production moving to 3 sites and the LP (Local Procurement) of materials enabled, they achieved substantial improvements of material supply efficiency. On the other hand, the autonomy in each site was strong and each site had competed with the others for productivity. Since each production site gradually moved forward with their own continuous improvement activities “while each individual site had its strength, lack of total unity across sites had also become a weakness” (General Manager Matsuo).

In 2010, hardware commodification accelerated, and price competition intensified, leading to concentration of parts supply from Asia. Therefore, costly core module production was moved to Japan. As customers continued to demand shortening delivery schedule, the final assembly and testing processes were carried out as before at each local site.

Furthermore, competitiveness grew stronger from 2012 and Hitachi decided to move forward with standardization of production processes and equipment, which had subtle differences even they were for the same product. However, local market differences in product demand and hence the corresponding production volumes have driven each local site’s desire to “display individualities”.

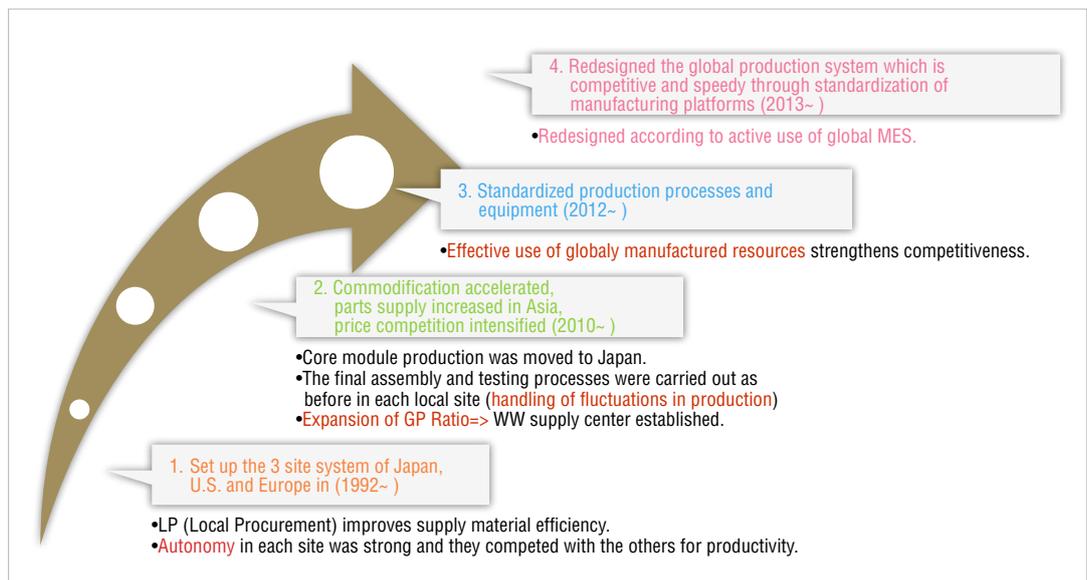


Figure 2 The history of the global supply chain growth (source: Hitachi, Ltd.,)

Accordingly, different MES systems were also introduced at each local site, each of which has its own challenges such as lack of functionalities and scalability, inability to cope with globalization, and disparity of information. Japan was using a commercial out-of-the-self package in combination with an in-house developed MES whereas Oklahoma installed Apriso products (later acquired by Dassault Systèmes France) and Orléans used another in-house developed MES.

4 Step Approach to Implementing a Common Global MES Hitachi had 4 main criteria for selecting a global common MES solution.

1. Implementation for a short time
2. Seamless integration with different ERPs implemented at each site
3. Detail process granularity that supports manufacturing operational KPI analysis
4. Global implementation services support with local adaptability to site specific requirements

Dassault Systèmes' "DELMIA Apriso" was selected. "Apriso Center of Excellence (COE)" functionality to enable global centralized management and the success in U.S. site of switching to DELMIA Apriso from another solution were among the reasons of this choice.

DELMIA Apriso was acquired by Dassault Systèmes in 2013 and was added to the company's global production process product series "DELMIA" as a MES solution. It supports the establishment of global manufacturing governance; improvement of manufacturing efficiency; increasing the return on business systems, inventory management and quality, compliance with reduction of IT costs resulting in greater return on asset (ROA).

The global implementation of MES has taken 4 steps (Figure 3). The first step is listing up all the business processes and their variations. In order to carry out standardization, a close look was taken at processes that differed in subtle ways despite they are targeted to produce the same results. Terminologies and jargons at each site were defined and shared.

The second step is establishing a project portfolio. Each production site has to choose the best examples of its production processes and management practices. General Manager Matsuo said

NO	Project Steps	Detail
1	Listing up all the business processes and their variations	<ul style="list-style-type: none"> •Examining business processes •Standardizing Terminologies and jargons
2	Establishing a project portfolio	<ul style="list-style-type: none"> •Developing road map •Defining business scope •Calculating the effects of the proposed changes •Reaching agreements with leaders •Creating core team / establishing communication channels
3	Applying to actual business execution	<ul style="list-style-type: none"> •Making changes to focus on the process thinking •Building consensus •Disclosing process information •Standardizing management code and rules
4	Optimizing business processes	<ul style="list-style-type: none"> •Reviewing management strategy •Redesigning business process

Figure 3 Implementation approach of a global MES (source: Hitachi, Ltd.,)

that leaders at each site firmly believed that their own operations was the best, therefore it took an awfully long time to reach agreement.

The third step is to applying to actual business execution. Best-practices were designed for the production site processes. There were quite a bit of challenges in reaching an agreement here because each production site thought that its processes were the best.

During the kick-off of the project, General Manager Matsuo and the presidents of the 3 production companies at each global location created "GMES (Global MES)" symbol endorsed by top management to boost teamwork spirit. General Manager Matsuo determined that, "It was of paramount importance for the three sites to work collaboratively toward a common goal." The final step is optimization. A strong leader was chosen to manage the progress of the project, during which business processes and practices were thoroughly reviewed, challenged and redesigned.

In the near future, Hitachi plans to consolidate its local operations at Hadano and Odawara factories to one location. They are exploring with the ideas of installing sensors in every location at the new factory in order to take advantage of applying IoT (Internet of things) in a manufacturing environment. This new factory is planned to become an IoT showroom for Hitachi.



