It is also expected to have a powerful influence in increasing the functionality and sophistication of products.

"With the approach of the IoT age, and also for next-generation (5G) networks, I expect to see an increase in the fusion of technologies and an increase in opportunities for designers with know-how in various technical fields to pool their knowledge in the development of products that combine technologies. With this system, technical assets held by different entities are used effectively and personnel with various skills are deployed smoothly to development sites that need them. This is expected to result in the speedy creation of competitive new products for the global marketplace," emphasizes Omagari.

Great achievements are also anticipated from a cost perspective. Systems integration will minimize the operations management of systems that was formerly dispersed within the company. This is expected to result in annual cost savings of half a billion yen in operating costs alone. Further taking into consideration labor costs, future development costs etc., these cost savings will be a massive business impact.

NEC plans to extend this "One NEC PDM" system to its other business entities in phases, and complete deployment to the entire group within about two years. Furthermore, it is intended that it be used in downstream processes such as upkeep and maintenance as well as in upstream processes such as product development.

Also, know-how that has been increased through this initiative will be incorporated into "Obbligato III," the PLM solution developed and sold by NEC, and provided to customers. NEC intends to robustly support the global business expansion of its customers in the manufacturing industry.

About

Using the power of ICT, we are focused on creating "Solutions for Society" that support social values such as "Safety", "Security", "Equality" and "Efficiency" with the aim of helping people live rich lives. We aim to realize an "information society that is friendly to humans and the earth". At the same time, NEC adapts itself to diverse regions of the world and provides products and services to win the love of our customers. We will continue to contribute to the creation of these social values in every country and region around the world.

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Case Study

\Orchestrating a brighter world

NEC

NEC Global Business Process and IT Innovation Project «Stage 3»

What will be the form of NEC's new development platform for turning out revolutionary products that triumph in the global marketplace?

Challenges

- The development system was divided vertically by business entity and it was difficult to make effective horizontal use of technical assets throughout the company, particularly when it came to design and development information, with PDM (product data management) systems operating separately.
- Plants were previously linked to business entities, so it was not easily possible to move production between bases or transfer production resources.
- Processes and rules for development operations were not unified among business entities, and it was not possible to flexibly deploy human resources as required.

Solution

- Ten or more PDM systems were unified into a single system for the whole company that incorporated best practice within and outside of the company. A design and development platform has been integrated from the perspective of overall optimization.
- Rules for development operations, including coding schemes, BOM structures, the engineering change process, and terms that were not unified among business entities have been standardized by type.
- To enable production of the same product at any plant worldwide, an interface system has been constructed to act as a hub between unified PDM and plant production management systems.

Results

- The "One NEC PDM" for company-wide design and development information has been put in place. This has enabled the sharing of technical assets throughout the company and the development of products that flexibly combine asset strengths.
- "Ubiquitous manufacturing" (a system that enables the production of the same product at any plant) has been achieved on the basis of a mechanism that allows the sharing of production BOMs between bases. A production system able to respond to fluctuations in demand and requirements for business continuity planning (BCP) measures has been put in place.
- The standardization of processes and rules has put in place a platform for the proper deployment of engineer resources familiar with the technical fields required for new products and for the speedy development of competitive new products.

Introduction

How could revolutionary products that would be successful in the global market be created by making optimal use of technical assets and human resources available within a company? To achieve this, NEC has embarked on the company-wide unification of ten or more PDM (product data management) systems operating separately in individual business entities. As a result of this work, a development platform is now in place that enables the resolution of problems that generated issues from a global management perspective. This platform enables effective use of technical assets such as design and development information and human resources, "ubiquitous manufacturing" (a system that enables the production of the same product at any plant), and the strengthening of BCP measures. This has strongly promoted the realization of new products fusing the strengths of multiple projects.

Challenges

At present, domestic markets are reaching maturity and there is no prospect of major future growth in the business. NEC has therefore rolled out policies focused on strengthening its global capabilities.

"To create new products and services capable of opening up foreign markets, business entities such as business units and divisions must change situations in which each entity works on product development and production in its own way. Accordingly, following on from stage 1 of Global Business Process and IT Innovation Project "Accounts, purchases, and sales" and stage 2 "Global SCM reform," NEC intends to construct a design and development platform that is unified and integrated from the perspective of overall optimization," says Eiken Nishimura of the NEC MONOZUKURI Innovation Division.

Previously, effective horizontal use of technical assets throughout the company, particularly design and development information, was not possible. NEC engages in the development of a wide range of products ranging from mass market computer terminals to satellites. Each of its business entities applied its own PDM, so design data was managed separately, coding schemes, BOM structures etc. were not unified among business entities, and it was not easily possible to share data between business entities.

What will be the form of NEC's new development platform for turning out revolutionary products that triumph in the global marketplace?

Standardization of development work rules

- Simple operation processes that can be used globally
- Design flexibility by unifying processes/tools
- TCO reduction by PDM unification
- Sharing of design assets

"Regarding coding schemes, as an example, entity A and entity B would use the same format for part codes, but entity A would have two final digits showing differences in printed wiring boards or customers, whereas entity B would use the same two digits to express compatibility" (Nishimura).

Next, since rules and processes for development operations were not unified among business entities, problems such as the flexible deployment of engineers were also an issue.

"Abbreviations for remodeling orders and permanent measures in design changes also were not unified among business entities. For example, an abbreviation such as "ECO" would indicate a remodeling order at one entity but a permanent change at another. As a result, this caused confusion when an engineer familiar with the processes of one particular business entity was deployed to another," explains Shinichi Omagari of the NEC Telecom Carrier Business Unit.

Another major issue was that production plants were basically linked to business entities. For example, if one business entity experienced an unexpected surge in demand for one of its products, it was not possible to respond flexibly by having that product manufactured at a plant managed by another business entity. The same situation arose when plants were damaged by natural disasters such as earthquakes and floods, and there were also problems from the perspective of BCP measures. "During the Thai floods of 2011, our production bases were inundated and we had no choice but to halt production for several months. We would have liked to switch production to our domestic plants, but we would have had to devote huge numbers of staff to making adjustments manually from the bill of materials level," reflects

Hideaki Matsushita of the NEC Platforms Network Products Development Division.

In addition, these systems also had associated financial and operational costs. NEC had determined to unify its legacy PDM systems together with organizational consolidation, but there were nevertheless ten or more systems operating within the company. Operations management was divided among more than thirty personnel, and operational costs were swelling considerably.

Solution

NEC has put the construction of a mechanism to unify these ten or more PDM systems as a main solution of these issues (Fig. 1).

It is however necessary to have a large-scale, wide-ranging grasp of the current situation and clear the issues one by one from the perspective of overall optimization.

"First, we worked to standardize by type the rules for development operations, including coding schemes, BOM structures, the engineering change process, and terms that varied from one business entity to another," explains Nishimura.

Specifically, products have been placed into four categories, Type I through Type IV, according to their characteristics. Mass produced products such as mobile phones are classified as Type I, BTO (built to order) products such as servers, storage devices and financial terminals are classified as Type II, semi-customized products such as mainframe computers and broadcasting equipment are classified as Type III, and fully customized, built to order products for fields related
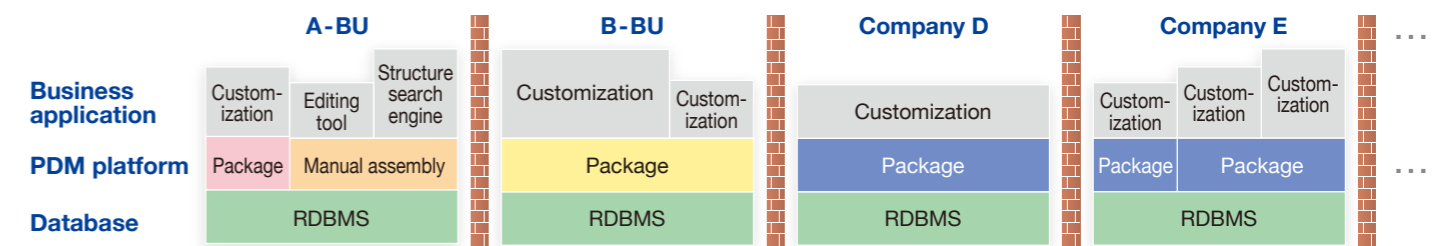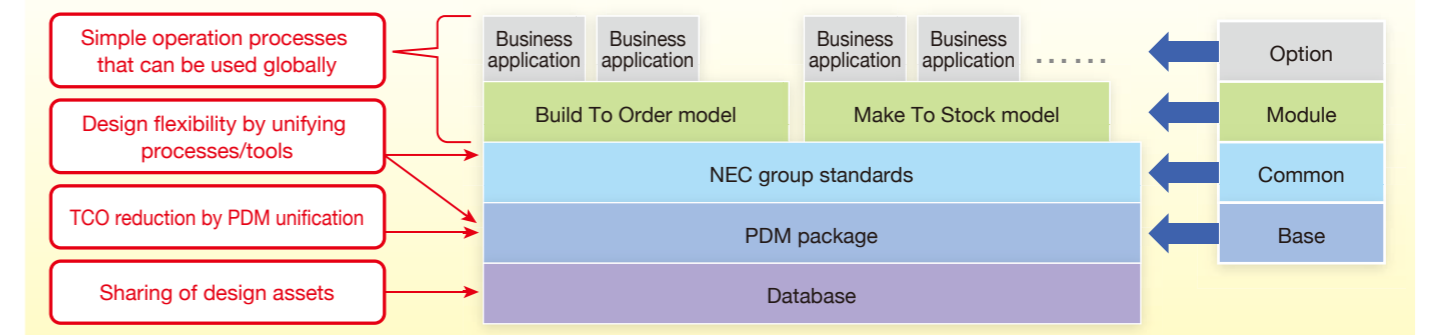
to defense or space are classified as Type IV. Standards for optimum development processes and rules have been established for each type. For functional standardization of PDM systems, meanwhile, a "company-wide working group" was launched made up of key personnel from each business entity and affiliate, and functional requirements incorporating best practice within and outside of the company were defined. A standardization plan was put together outlining the functions that need to be provided for PDM from three perspectives: the "company-wide viewpoint," the "development site viewpoint," and the "product characteristics viewpoint." Fit/gap analysis was requested from each business entity and a "brush up" approach has been taken via such efforts as the creation of prototypes. In addition, a design-production interface system called "DM-HUB (Design and Manufacture-HUB)" has been constructed to go along with PDM unification. This has been introduced to act as a hub between unified PDM and plant production management systems, enabling production of the same product at any plant worldwide and realizing so-called "ubiquitous manufacturing."

Furthermore, the "Partners' Portal" for secure sharing of design information with external vendors such as an EMS (Electronics Manufacturing Service or ODM (Original Design Manufacturer) has also been established. A mechanism to promote horizontal specialization of labor has also been constructed.

As a unified PDM platform, NEC has adopted its own PLM solution, "Obbligato III." It is now possible to carry out essential operations for product development such as BOM management, engineering change management, document management, drawing management, cost management, and project management using this unified PDM, and by the time it went into operation, huge amounts of data had been recorded: 24 million items, 120 million items of relational information between items, and 18 million documents. At the time it went into

operation, there were about 6000 users. In two years, it is planned to be used by the entire group, 17,000 people.

Results

The system that NEC has constructed with unified PDM at its core is now in use at business entities including the Telecom Carrier Business Unit, which develops network products aimed at telecommunications carriers such as mobile base stations, micro miniature microwave communications equipment (PASOLINK), optical communications equipment, and submarine cables, and NEC Platforms, which develops, produces, and sells NEC Group ICT equipment. It is also in use in development operations in Japan, India, and the United States, at production bases in Thailand and Hong Kong, and also at sales bases in various countries, including the Netherlands and Australia.

Its greatest achievement has been what it aimed to do from the start; it has put in place a platform that satisfied the following conditions: effective use of technical assets and human resources, ubiquitous manufacturing, BCP compatibility, etc. Standardization of the product development process should be of particularly great value, with this platform supporting the development of new products able to triumph in the global marketplace.

"Today, for instance, there are an increasing number of cases of new products developed by combining a number of products from different business entities and fusing their strengths. To do this previously, engineers developing new products had to understand and use the processes and rules implemented in systems at multiple business entities. In future, however, there will be no such trouble and it will be sufficient to understand just the standardized process, so the platform will allow faster development operations and further the formation of a common platform," says Matsushita.

NEC product development in the past

"Development process innovation with IT" in NEC group
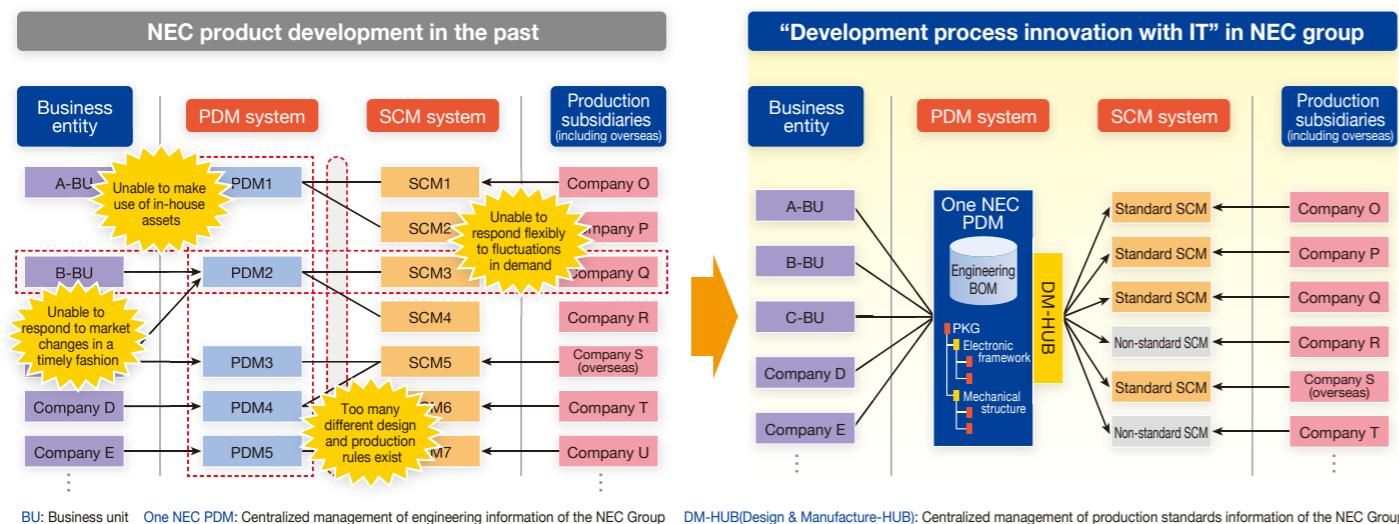
BU: Business unit   One NEC PDM: Centralized management of engineering information of the NEC Group   DM-HUB(Design & Manufacture-HUB): Centralized management of production standards information of the NEC Group