

## “Dynamic Collaboration”: the model of a new business that quickly responds to changes in the market through “The integrated IT/Network solutions” provided by NEC

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**INTRODUCTION** Companies are searching for a new business model in the midst of unclear, chaotic and fast-changing economic circumstances, as exemplified by increasing globalization and rapid changes in the market environment. The focus of these companies is on “creating new corporate value through quicker and more dynamic response to accelerating changes in the market.” NEC believes that the model of the next-generation business will be one in which each company enhances its own competencies and strengths, and uses these core competencies to collaborate with other companies. On June 10, 2003, NEC introduced this concept of “Dynamic Collaboration — making your business grow —.” This message is a promise that NEC will support its customers’ business innovation and creation of new value. In order to fulfill this promise, we at NEC are determined to resolve our customers’ management issues by offering business solutions that converge our advanced IT/network technologies, and thereby serve as a business partner that evolves along side our customers.

### 1. WHAT IS “DYNAMIC COLLABORATION?”

The globalization and speed of business is accelerating, with companies entering an era of mega-competition. Accordingly, many companies have endeavored to reform their supply chain management (SCM) and customer relations management (CRM) business processes in order to be successful in the midst of severe competition and respond to a suddenly and dramatically changing market environment. However, these companies are faced with the issue of finding a flexible response that will cope with further accelerating market change.

Thus, in recent years, many top managers have been searching for a business model that effectively combines and utilizes their own company’s managerial resources with external resources to “create innovative products and increase competitive strength.” In other words, evolution toward a type of business based on “collaboration” that promotes cooperation and coordination with a global viewpoint has begun. Thanks to the broadband environment brought about by the e-Japan strategy of the Japanese Government, these collaborative businesses are developing not just between companies, but also in areas beyond countries and organizations.

Even up until now, the form of business has been created to meet changes in the business environment.

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In the period of high economic growth, the “integrated” type of business, which expanded the scale of activity based on a company’s own resources, was the main form of business. In the recession, companies changed the business form to one of “selection and concentration,” in which non-core businesses were aggressively subcontracted and/or transferred to outside companies in order to refine core competencies, and outsourcing, by which less specific business processes were subcontracted to outside companies, was put to use. Typical examples included the subcontracting of business processes such as “manufacturing” and “distribution” to electronics manufacturing services (EMS) and third party logistics (3PL), and the spinning off or selling of non-core businesses.

Amid these unclear, chaotic, and rapidly changing economic circumstances, companies are increasingly moving forward with “selection and concentration.” By strategically combining their own companies’ strengths with the strengths of other companies, they have realized a new business process, and thus, are beginning to create a new model through collaboration. This collaboration in turn brings about the creation of new business value such as the development of innovative new products.

One example of this is the trend in strategic business collaboration among companies in the electromechanical industry and the steel industry, as observed from about the year 2000.

In recent years, however, the market has become increasingly complex, and the rate of change has accelerated. With fixed collaboration, it is difficult to

find values that meet the demands of a constantly changing market. In order to act in step with changes, and to create and provide the optimal corporate value for a given time, a real-time collaboration is required (Fig. 1).

Therefore, the future business model will have to achieve a flexible collaboration with other companies that can accomplish the creation of new corporate value to meet the needs of the market by using advanced IT/network integrated technologies. This model will make it possible for companies to evolve into a “customer-oriented business that can constantly provide better and less expensive goods (merchandise) to the market more quickly.” “Dynamic Collaboration” is the next-generation business form proposed by NEC (Fig. 2).

## 2. WHAT BUSINESS EFFECTS CAN “DYNAMIC COLLABORATION” ACHIEVE?

Dynamic Collaboration aims to achieve the following flexible management environment:

- 1) Reduced cost
- 2) Improvement in the speed of decision-making and operations
- 3) Securing business opportunities through the collaborative power of companies
- 4) Creating new businesses to keep up with a ubiquitous society

With Dynamic Collaboration, companies can always create a corporate value that is appropriate to the types of changes in the market and thus achieve an ideal business process. In other words, a company can acquire the strength to plan and develop innovative products by using its own core competencies together with those of its partners, and, thereby, achieve a global value chain by which it can quickly provide products to customers. Moreover, the company can dynamically organize collaboration with the optimal partners in order to satisfy the demands of the market, making it possible to quickly rebuild the entire value chain.

For example, one manufacturer, through collaboration with its retail partner company, built an integrated supply chain that incorporated not only production, distribution, and sales, but also product development and design. That manufacturer shared the data on “how many of what products are sold when” with each of the partner company’s stores in real-time, achieving a company collaboration that feeds back sales planning, inventory, and distribution management, and product development. In this way, a real-time business model that is able to provide customers with products any time has been realized, satisfying customer demands. Moreover, without being limited to the supply chain, R&D departments have also started collaborating in the search for new value to acquire the strength to develop new global products. For example, a food producer that was

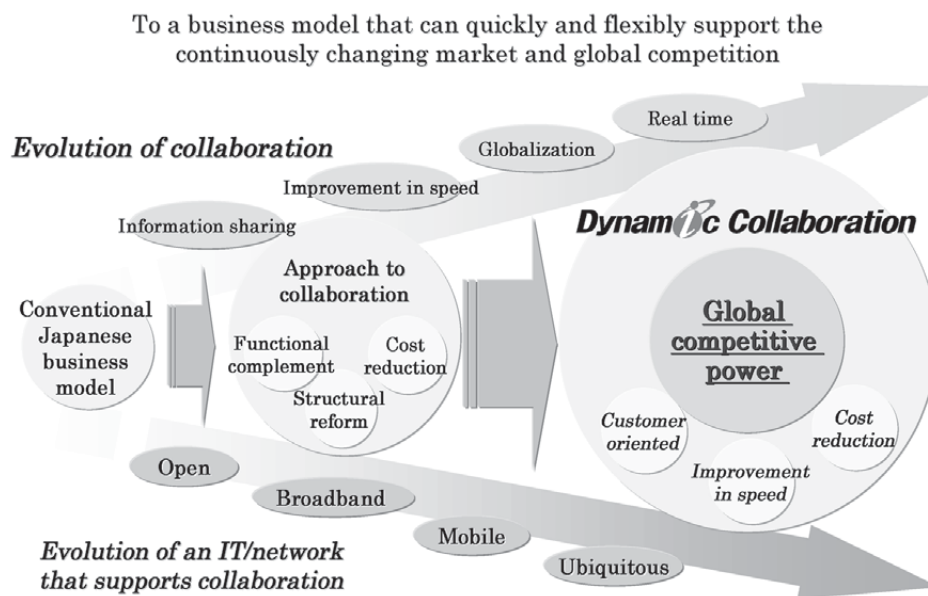


Fig. 1 New business model through collaboration.

criticized as not being capable of merchandizing because it could not adequately preserve freshness, has succeeded in merchandizing technology through collaboration with a retail company that had advanced know-how in the area of freshness control. This product became a hit, even though it was marketed in a high price range. Additionally, previously unthinkable R&D collaboration is taking place among companies in the same trade. One Japanese pharmaceutical company collaborated in research with an overseas company specializing in the creation of drug target exploration and research, reducing the period and cost for creating drugs in the areas of cancer, immunological diseases, and allergies, strong points of both companies.

NEC tackled SCM reform and product competitiveness to increase the profit of our personal computer business. By collaborating with specialty companies such as EMS and 3PL in China for our production function, NEC built a global value chain going beyond affiliated companies and national boundaries (Fig. 3).

Accordingly, NEC's personal computer business realized a profit increase through high-speed and low-cost operations, including a one-week reduction in delivery time, cost cuts, inventory reduction, and improvement in the speed of new product development, which allows the quick release of competitive new products, such as personal computers equipped with fuel cells, to the market (Fig. 4).

### 3. THE IT ENVIRONMENT FOR REALIZING "DYNAMIC COLLABORATION"

In Dynamic Collaboration, it is necessary to transform a business process into an IT environment in which collaboration moves seamlessly from development to customer delivery. In advanced (complex) and expanded business collaboration, large capacity information such as animations and voices must be exchanged in real-time, on a global basis. In the conventional IT environment, technologies have become unable to support such collaboration in terms of performance and expandability. To cope with this problem, a new IT environment that presumes collaboration is now necessary. This IT environment will enable real-time processing, so that companies can speed up decision making and operations, and become able to prevent the loss of business opportunities, and even to create new business.

NEC considers the following three points to be essential in order for an IT environment to realize "Dynamic Collaboration."

#### (1) Open Configuration

Dynamic Collaboration assumes flexible partnering transcending the boundaries between countries, companies, and organizations. This collaboration requires an open and standard IT environment configuration.

For example, this configuration may include the

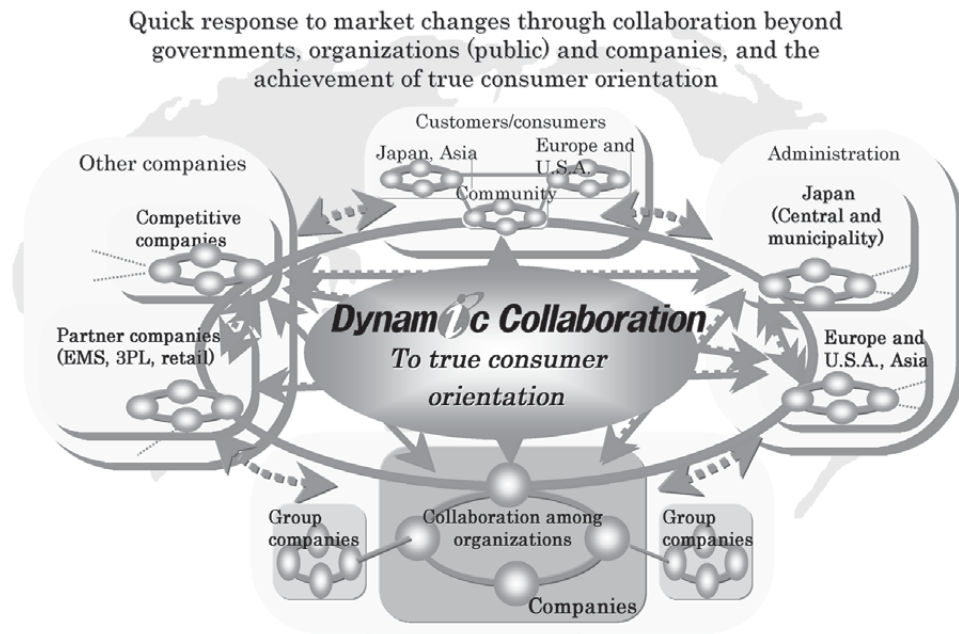


Fig. 2 Diagram of Dynamic Collaboration.

selection of de facto standard products with high worldwide market shares and the adoption of an industry standard protocol using XML.

(2) Stress-Free Network Connection

Dynamic Collaboration requires a network environment in which collaboration with partners can be carried out free of stress, as if people are in the same company and location and, therefore, without the need to consider the network connection.

In a collaboration among companies, examples include the usability of business application functions

from connected companies without the need to consider the network connection, as well as the seamless accessibility of the in-house network from outside the company and use of its business applications.

(3) Secure System

Dynamic Collaboration requires the robustness to avoid lost business opportunities due to unexpected system failures or natural disasters, as well as a flexible and secure information system infrastructure that can quickly respond to the market in real-time, 24-7.

For example, this system may include a redundant system to maintain uninterrupted operation when the system's load is very high or when system problems occur, and the use of a remote backup that allows business to continue even if system problems occur due to regional disasters, by dispersing systems over various remote locations.

The most important requirement in achieving such an IT environment is to build a network infrastructure and an information system infrastructure. In Dynamic Collaboration, the operating cost is reduced through the implementation of a network infrastructure that uses up-to-date standard technology such as VoIP and IPv6. This network infrastructure assists in the real-time and global exchange of vast amounts of information generated in a developing broadband environment, while improving communication

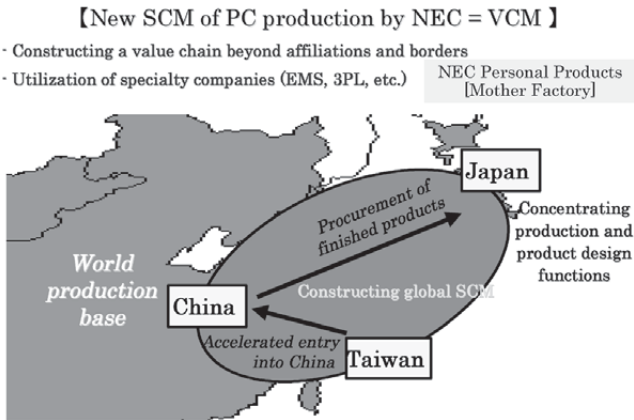


Fig. 3 Reconstructing a global value chain.

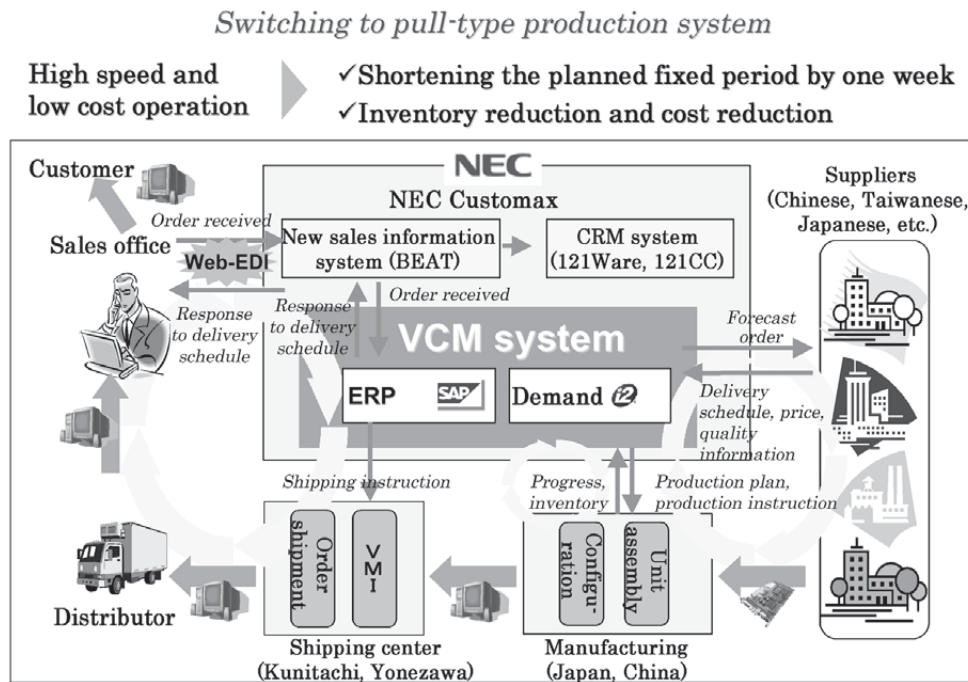


Fig. 4 Reconstructing a value chain through collaboration.



capabilities and achieving innovative work styles.

Furthermore, it is essential for the information system infrastructure to be open and standard. With the flexibility of an open system, the collaborative strength among companies can be improved and global business opportunities can be increased. Of course, this information system infrastructure must be robust in order to avoid the loss of business opportunities due to unexpected system failures and natural disasters.

The next requirement is the integration of new solutions that can quickly respond to the future market environment. NEC believes that environmental changes in the ubiquitous network society will be increasingly severe. In such an environment, the cre-

ation of new business through the implementation of solutions that utilize advanced mobile technologies and IC tags is indispensable (Fig. 5).

#### 4. ACHIEVING "DYNAMIC COLLABORATION": SOLUTIONS PROPOSED BY NEC

The IT environment that can realize Dynamic Collaboration is becoming increasingly advanced and complex. NEC is a leading worldwide IT vendor that can build and operate this advanced, highly complex IT environment with credibility. With expertise and a track record in providing numerous solutions for an IT environment that enables Dynamic Collaboration, NEC also has the industry's top-class products and services.

To date, NEC has built the corporate network infrastructures and information system infrastructures of a vast number of customers through solutions based on the solution system known as "iBestSolutions" (Fig. 6). In constructing these corporate network infrastructures, NEC has realized communication bases that have superior cost performance and real-time features by employing advanced technology, such as VoIP, together with proprietary communication technologies.

For example, for a trading company customer, we built a corporate network utilizing VoIP in order to improve productivity through innovating the work style. In this way, the company achieved improved operation speed and a reduction in total cost. In

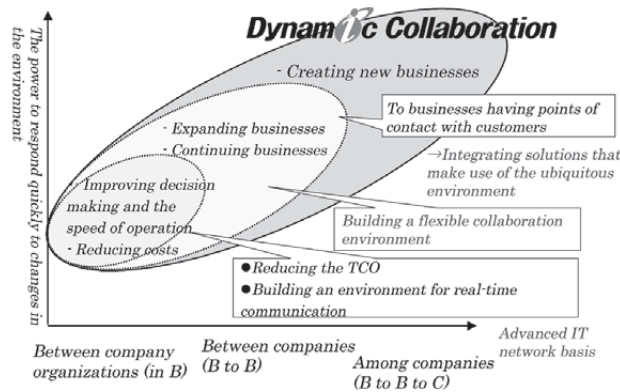


Fig. 5 IT requirements to achieve Dynamic Collaboration.

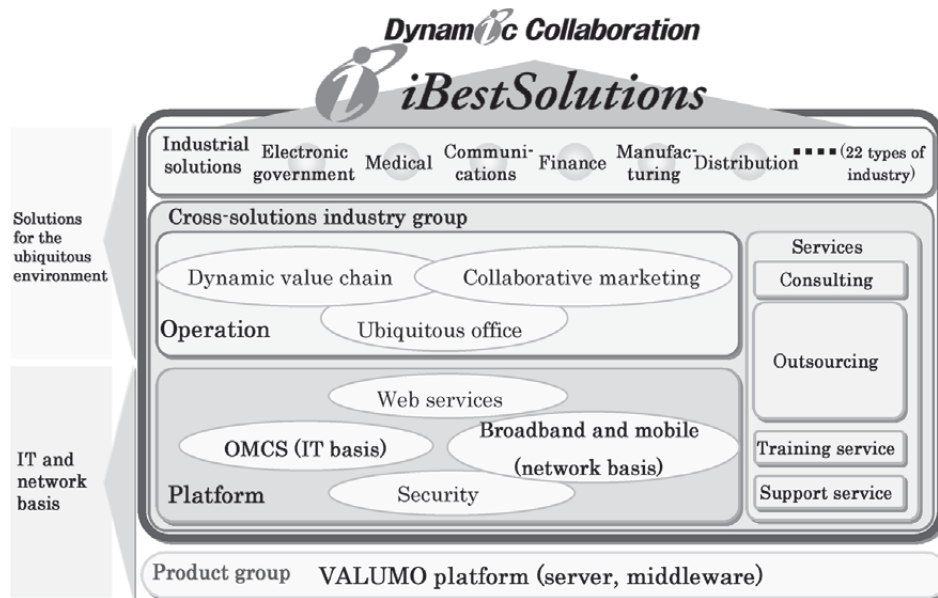


Fig. 6 Integrated IT/network solution structure combined with business solutions.

addition, for an airline company customer, we realized an environment in which the network bandwidth was increased by several dozens through outsourcing the network environment while maintaining the same cost. This resulted in more efficient operations with improved real-time communication.

As for the information system infrastructure, NEC has proposed and implemented the construction of a backbone system based on an open system, that is, OMCS (Open Mission Critical System), from mid 1990, at the forefront of other IT vendors.

For example, for a major telecommunications company customer, we constructed a super large-scale backbone system based on an open system. Through this, a flexible system expandability was achieved with the ability to support unpredictable increases in transaction volume, which could not be supported by the conventional mainframe system. For a customer in the banking business, we built an accounting system based on an open system, which was previously believed to be difficult. Thanks to the expandability of this new system, we realized an infrastructure that enables the rapid installation and operation of a system for providing new future financial products.

Furthermore, our customers in the manufacturing and distribution industries needed a speedy and expandable system infrastructure in order to handle the diversification of customer needs (for example, increased numbers of products) and the globalization of supply chains (for example, collaboration with overseas operating bases and EMS vendors), among others. NEC has been providing a great number of OMCSs to meet these needs.

An OMCS is realized through the integration of (1) NEC's hardware and middleware products based on our platform technology "VALUMO" and (2) top-of-their-field products through strategic partnerships with Hewlett-Packard, Oracle, BEA Systems, EMC, CISCO Systems and other companies. NEC can achieve an extremely high-quality platform that is best suited to the needs of our customers through the proper integration of best-of-breed products (Fig. 7).

Particularly, VALUMO can construct an information system environment that reduces the total cost of ownership (TCO), and at the same time realizes dynamic collaboration among companies and the robustness of an open system. As for the technology for realizing collaboration among companies, NEC has implemented Hub systems that facilitate connections among information systems within and outside of companies, and the "Hub & Net" system model that connects these hub systems with a network (Net). Using this system model, companies can dynamically

build the most suitable value chain system according to the needs of the market (Fig. 8).

For example, for one newspaper publishing company we used a Hub & Net type of system model that employed a Web service technology protocol. In a short period of time we then constructed the operation flow, from article editing to newspaper production. For new operation flows among companies in the future, by adding a Hub system, this system model realizes an IT environment that can construct a new operation flow in a much shorter time than the typical system connection (Fig. 9). This technology for constructing a flexible environment by means of Hub & Net is evolving into grid computing.

Concerning robustness, this is realized by a system construction technique that prevents operations from being discontinued. The flexibility of an open system is used so that in the event of system failure, the affected computer is dynamically detached and a new computer is connected. As for security, NEC provides total security technology to respond to all types of attacks. Currently, NEC is carrying out R&D intended to create a more advanced security technology. For instance, we are researching the combination of real-time security and data mining technologies for the early detection of intrusion and damage by an unknown new virus.

## 5. TOWARD PROVIDING NEW SOLUTIONS FOCUSED ON THE UBIQUITOUS SOCIETY

Looking ahead to the arrival of the ubiquitous network society, NEC will continue to provide solutions that realize advanced real-time communication capability together with leading computer and network

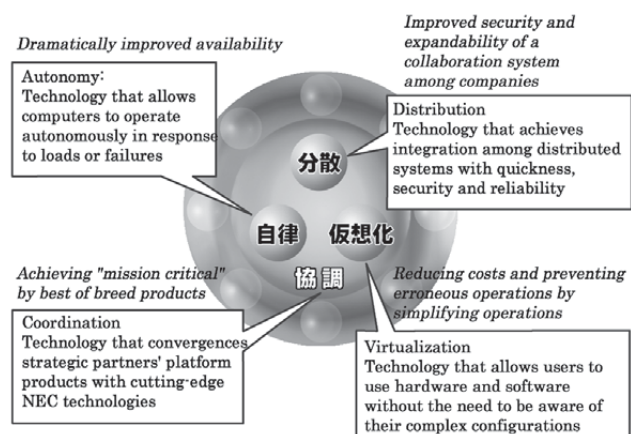
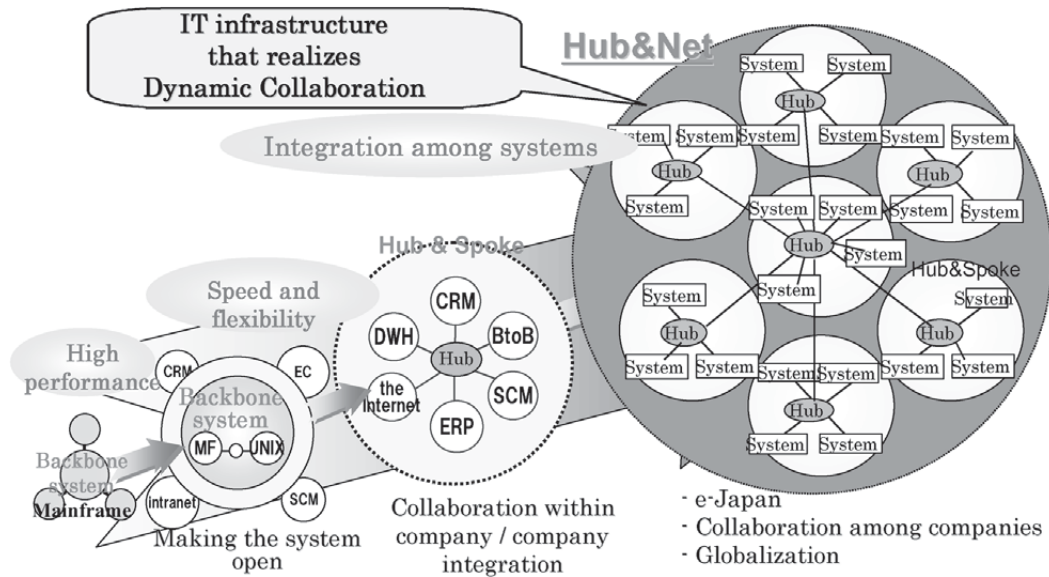


Fig. 7 Platform technology "VALUMO," which supports the IT infrastructure.

technologies. For example, increasing attention is now being given to a technology called "radio frequency identification" (RFID), whereby data is exchanged by wireless link between a tag, created by combining a super miniature antenna and an IC chip

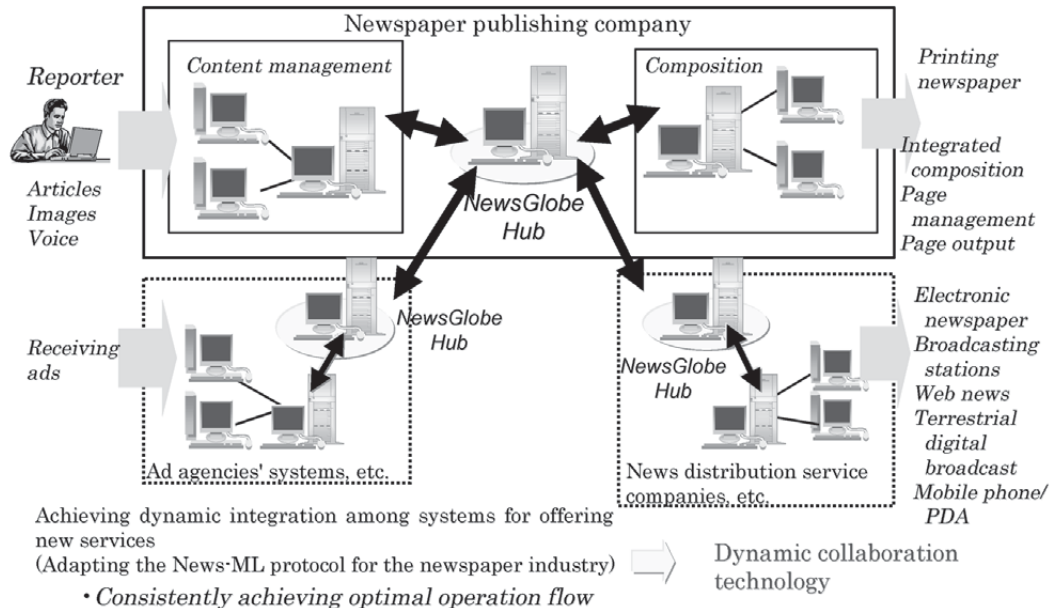
into one unit, and a computer device. By combining this technology with IT solutions, it is possible to achieve more advanced SCM, improve traceability, and achieve advanced CRM and authentication. A case in point is NEC's support of collaboration that

*Creating a distributed computing technology based on the proven record of OMCS as a system model*



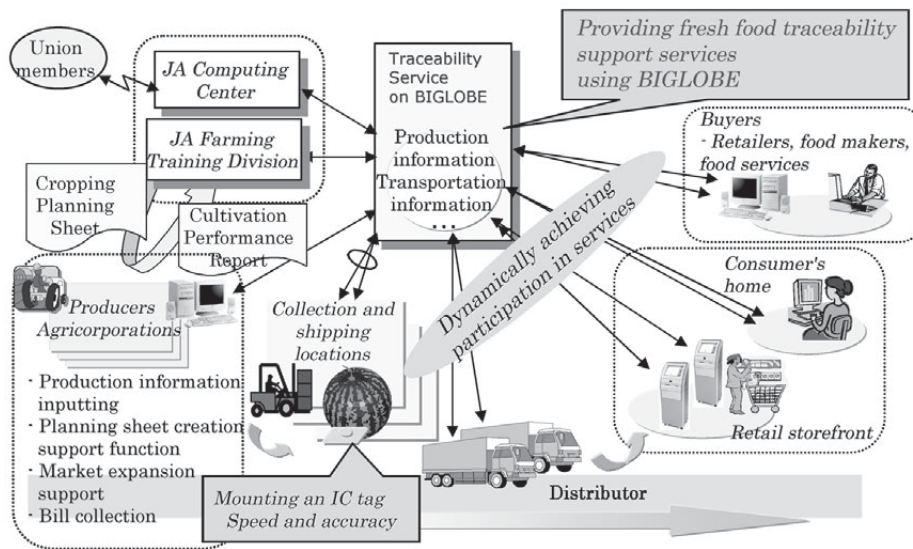
**Fig. 8 Collaboration type system model created by OMCS.**

*(Example) For newspaper publishing companies: Rebuilding a flexible flow of operation for information distribution*



**Fig. 9 Achieving flexible collaboration using Web services.**

Achieving "Business Process Innovation in Food Supply Chain"



**Fig. 10 Fresh produce traceability system.**

contributes to the business reform and process innovation of customers engaged in food supply chains by using RFID in a "traceability support system" (Fig. 10).

NEC will develop and provide new solutions that use a broadband network by converging the achievements and technologies it has cultivated in its network solutions business and system solutions business. NEC will achieve even greater evolution of Dynamic Collaboration in the ubiquitous network society through the further development of our customers' businesses.

In fact, NEC is actively implementing Dynamic Collaboration. While incorporating these results, we provide the ideal IT environment for customers who seek to achieve Dynamic Collaboration. Moreover, as our customers' best business partner, together we will create new value.

In this special issue on 'Advanced Technologies Driving "Dynamic Collaboration" Featuring System Technologies,' we will introduce papers dealing with five core technologies following next paper "Dynamic Collaboration" from Scientists' Eyes.'

The technologies refer, respectively, to VALUMO (pp.27-35), Web Services (pp.36-42), Different-Type Network Connection for Dynamic Collaboration (pp.43-49), Security (pp.50-55), and Grid Computing (pp.56-62). Each paper gives an overview of the technology and products, and describes future trends.

I hope these papers will help you understand our work in striving to realize "Dynamic Collaboration" through the integrated IT/network solutions.

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