

Quick-Delivery, Low-Cost Web Development Architecture born from Field SE

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Abstract

Web-based systems are required to track the extremely high speed of innovative web technologies and to handle a large variety of business systems.

The key to meeting these requirements does not lie in combining several pieces of software, but it is the "agility" of quick building and execution of solutions with a "light" configuration that can deal flexibly with change. This paper introduces the functions and expected effects of the web development framework "NeoSarf/F" and of the infrastructure supporting it "NeoSarf/J," both of which are the fruits of our endeavors in the SE field.

Keywords



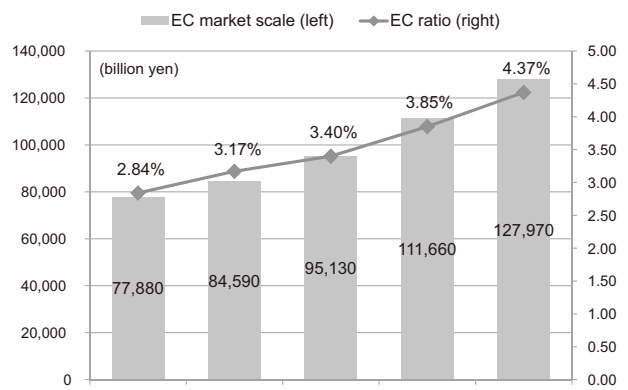
Web development, framework, EC, cost reduction, productivity improvement, SI, without owning it, SOA, agile development, omni-channel, NeoSarf/F, NeoSarf/J

1. Introduction

The dissemination of smart devices such as smartphones and tablet terminals and the expansion in the use of cloud platforms by enterprises has been increasing year-on-year the need to develop applications for web-based systems and smart devices for business systems. The EC (electronic commerce) market leading the expansion of web-based systems is growing at a higher rate than that of the department store and convenience store markets; reaching a scale of about 12.8 trillion yen in 2014 (**Fig. 1**).

At NEC, too, we developed a solution called "NeoSarf/EC" in 2010 and proceeded to sales talks, but we were then in need of hard experience. This was because we took the traditional approach and fixed the functions with too heavy a configuration. Actually, the majority of causes of rejection by the market were "too high prices" or "lack of product appeal."

So we decided to go back to basics and we have finally succeeded in developing a completely new tool. This is the "NeoSarf/DM" EC/direct marketing integrated solution, which is composed of a group of EC/direct marketing job templates. We then commercialized the engine parts of NeoSarf/DM as independent solutions by using "NeoSarf/F" and "NeoSarf/J" as introduced below.



* Compiled based on the Report entitled "Preparation of Infrastructures for Computerization and Implementation of Services for the Japanese Economic Society in FY2014 (Market Survey on E-Commerce)" by the Japanese Ministry of Economy, Trade and Industry.

Fig. 1 Changes in the Japan's BtoC-EC market scale.

2. NeoSarf/F and NeoSarf/J

NeoSarf/F has been developed aiming at becoming a tool that focuses exclusively on job design/building by minimizing the influence of web technology and the client environment

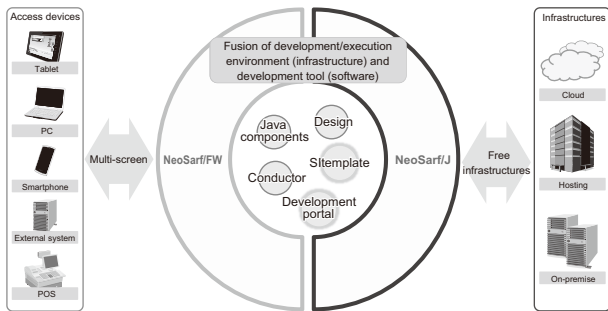


Fig. 2 Total environment.

(browser). We have also enabled reductions in the term of delivery and of the cost of the entire productivity improvements. This was achieved by providing a loose coupling procedure for improving the component reuse rate and by the enhancement of the coding efficiency.

For the infrastructural configuration, we have shifted the concept of “building” to “combining” and achieved a loose coupling that presupposes changes. NeoSarf/F and NeoSarf/J achieve the integration of nonfunctional domains such as SI (System Installation), configuration change and configuration management (Fig. 2).

NeoSarf/F and NeoSarf/J must be capable of running for 24 hours/day and 365 days/year and the present solution is also applicable to the mission-critical systems that are becoming web-based. This is because it incorporates the features required in the scenarios of development and operation that are based on our expertise as obtained via development of EC/direct marketing systems for the distribution industry.

3. Building Efficiency Improvement by NeoSarf/F

There are three major effects expected from the use of NeoSarf/F, which are “speeding up the development period,” “reduction of the development cost” and “improvement of the development quality.” Similar effects may be obtained in function modifications and additions in the operation & maintenance phase as well as in the development phase.

NeoSarf/F adopts a service-oriented architecture (SOA) in order to solve the difficulties caused by the use of component design, such as the standardization of inter-component interfaces, the prevention of component complication and the elimination of complex issues from the released work.

With regard to the design phase, errors in the specifications can be reduced by using screen design and screen authoring tools to facilitate the generation of a “working model” without need of special skills. The working model is provided with job processing operations after the development stage has started so that elimination of waste and improvement of development flow efficiency can contribute to cost reduction. This technique

is not only effective in the EC/direct marketing domain but also in universal web-based systems.

4. Features of NeoSarf/F

4.1 Structure of NeoSarf/F

With NeoSarf/F, a single core application drives the system dynamically using parameters called “conductors.” The integrated management of the conductors and the standard definition of an interface required for loose coupling, called the “cushion,” contributes to a minimization of the range affected by development and customization as well as to the release with the compileless.

For the building technique, the design information is registered as source data using the Repository Management System (RMS). At the time of execution, the core application receives the request and performs the behavior registered in the repository data to achieve the job processing and screen display generation (Fig. 3).

A single screen page can accommodate multiple components (function group), each of which is composed of a design form (design) and conductor (processing function) (Fig. 4).

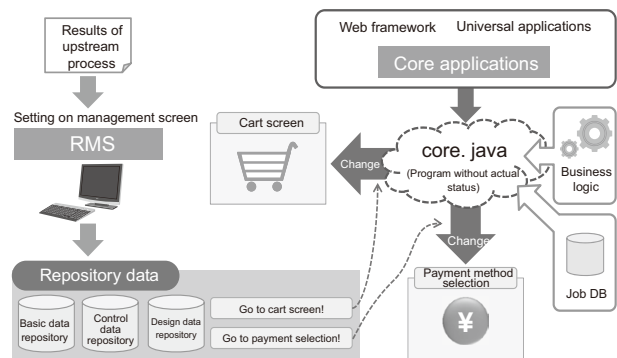


Fig. 3 Structure of NeoSarf/F.

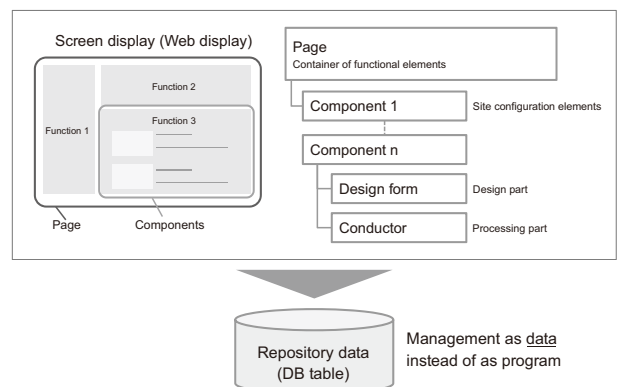


Fig. 4 Features of NeoSarf/F.

4.2 Interpreter Type Language "Conductor"

The Conductor was initially born as a control type unique language executed by combining Java components. It adopts an interpreter type drive method to enable dynamic additions and/or modifications of the operational components. The Conductor can be developed independently from any language. Since it is a high-class language, a single line written in it is equivalent to tens of lines of Java language from the viewpoint of coding. Consequently, it is possible to develop operational components using both the Conductor and Java according to



Fig. 5 Integrated development editor and Conductor (development language).

the characteristics of the project.

The Conductor is coded using a dedicated development editor to improve the coding and debugging development efficiencies. It integrates the functions that have previously been implemented by combining several products, such as the method description (structured programming), copy & paste, search, context check, code checking using CDI dictionary (maintainable dictionary), step execution and variable checking (Fig. 5).

4.3 Standard Interface Implementing and Maintaining Loose Coupling

The cushion is a standard interfacing function that works as the mechanism for implementing and maintaining loose coupling. It can link all of the components, screens, processing operations and DBs logically so components and designs can be replaced dynamically (Fig. 6).

The cushions are not only used in coupling between components but their flexibility against changes in the scenarios of component usages also enables reuse of data (Fig. 7).

5. Features of NeoSarf/J

5.1 Structure of NeoSarf/J

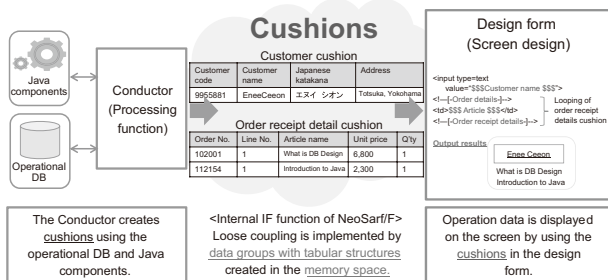


Fig. 6 Standard interface "Cushion."

NeoSarf/J applies the joint design orientation (all-common interface rule) to the interfaces (IFs) among a large variety of access devices, external ASPs and middlewares. This makes it possible to adopt the same system configuration regardless of the system scale, thereby ensuring extensibility and freedom of selection (Fig. 8).

In the following the three "freedoms" available via the functions of NeoSarf/J are described.

(1) Infrastructure-free

The infrastructure to be used can be selected freely from on-premise, housing/hosting and the cloud. Regardless of the selected infrastructure, the same level of security measures is available via the standard configuration.

(2) Formation-free

Development is possible with a single server, and the number and configuration of the servers can be changed dynamically according to the needs of the project phase, the development regime and the details of each test. After the start of the actual operation, the servers can be added or removed without interrupting the site.

The linkage with the cloud service enables auto-scaling suitable for NeoSarf/F without influence from cloud service characteristics from the various providers.

(3) Position-free

Even when the number of servers is fixed, the roles of the servers running in a system built with NeoSarf/F can be modified dynamically for effective use of servers with

The cushions are not only used for the linkage between the conductors and design form, but they can also be used within a single Conductor or across multiple Conductors in a single page.

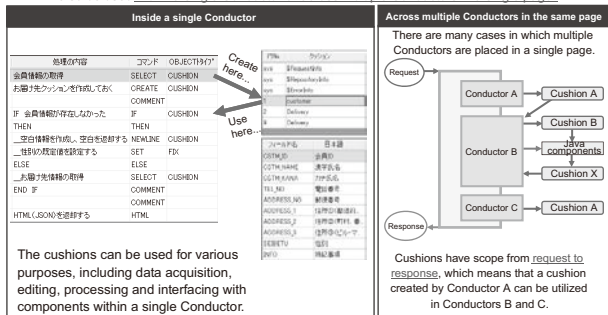


Fig. 7 Image of SOA structure.

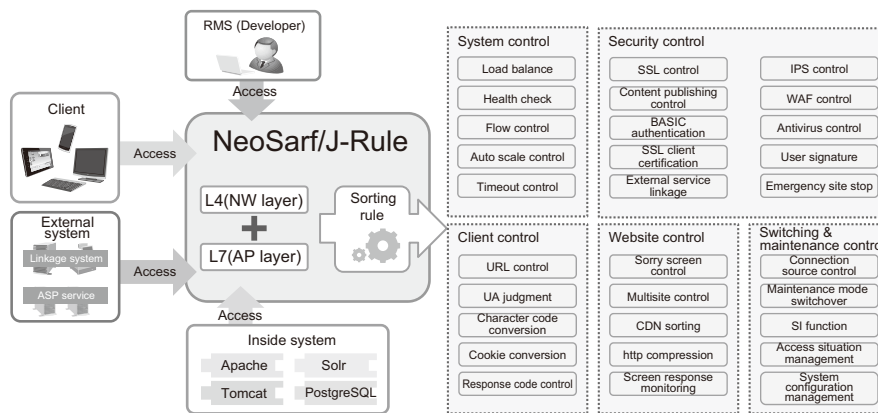


Fig. 8 Basic functions and examples of applications of NeoSarf/J.

low operation rates. If the specification of the NeoSarf/J is changed, the changed server roles become effective from the next access.

6. Conclusion

It is expected that the IoT (Internet of Things) will continue to advance and that all things including unexpected ones will be connected to the Internet. Recently, the expansion in the use of mobile terminals such as smartphones has triggered changes in the behaviors and needs of consumers. This trend has promoted integration of all marketing and distribution channels, including that of actual shops and online stores. This is known as omni-channel retailing.

Many of the users of NEC products are profit making organizations such as enterprises, and our ongoing mission is to develop system integration (SI) services for the users. We believe that provision of the convenience of omni-channel retailing is the form of SI that should be pursued at the present time. We intend therefore to bring advancements to NeoSarf/F and NeoSarf/J, which are the web-based system building technologies designed to support the systems described above while creating strong infrastructures for the omni-channel systems.

* Java is a trademark and a registered trademark of Oracle Corporation and/or its affiliates in the U.S. and other countries.

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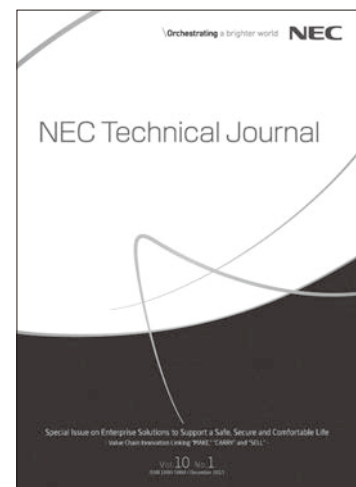
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