

Practical Case of Applying ComponentAA Development Method

● Yuzo Yonemura

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Fujitsu's ComponentAA Development Method is a development standard for Web applications that is designed to provide short-term delivery and high-quality system integration. It gives specifications for the technological elements of documents and techniques and guidelines for designing and testing. In the industry & distribution business, to verify the effect of ComponentAA Development Method, we adapted it to a model project and achieved a quality improvement and person-hour reduction. These benefits were achieved by facilitating customization activities such as the integration of documents and the creation of sample descriptions and charts showing the relationships among documents. In this paper, we introduce the challenges of adapting ComponentAA Development Method in the industry & distribution business, some effective customization methods, and the effects of applying ComponentAA.

1. Introduction

More and more Web applications are being developed in industrial/distribution fields, and many of these are being developed using Fujitsu's ComponentAA Development Method (hereafter called ComponentAA), which was released in 2003. In addition to traditional development methods, ComponentAA reflects Fujitsu's practical development technologies and rich experience in system development, making it a development standard for the Web application age. In order to provide customers with quality Web applications with short delivery times, ComponentAA standardizes technologies and guidelines for documents, development methods, design, and tests. This makes ComponentAA a suitable development standard for SDAS Web applications.

At development sites, applications are developed effectively by customizing part of ComponentAA while considering all the relevant

factors, for example, the target business, software type, required skills, and development periods.

However, due to a lack of effect analysis in projects, accumulation of customization know-how, and post-application feedback, ComponentAA has only brought benefits to a small number of particular projects, and it has hardly contributed to efficiency improvement on an organizational scale.

To solve this problem, we set up a model project; designed, developed, and tested an application based on ComponentAA; and clarified the application's effects and problems and the customization know-how that could be applied to other projects.

This paper describes the customization problem of previous ComponentAA applications and the benefits observed in the model project. Then, it looks at future applications of ComponentAA.

2. Customization problem of ComponentAA applications

Unless otherwise specified by customers, Fujitsu uses ComponentAA as a standard tool when developing Web applications for industry/distribution solutions. However, the scope and method of adaptation must be customized for each project by modifying part of ComponentAA according to factors such as the target business, software type, required skills, and development periods.

Customization is required because:

- 1) There are many documents to prepare.

ComponentAA requires many documents to be prepared in order for design work to be performed completely, especially when it is applied to very large-scale developments. While these documents enable complex business processes to be described, for comparatively simple business processes, it takes an excessive amount of time to prepare them because many descriptions are duplicated in two or more of the documents.

- 2) Information for sample documents is insufficient, and the relationships among documents are not clear.

Although sample documents are based on real development projects, they do not provide sufficient information. This is because they are created from design documents of multiple projects, and all project-specific information has been deleted. In addition, because each sample document deals with a particular process, the relationships among documents may not be clear.

- 3) Design work tends to be shifted to an earlier phase.

Figure 1 shows the development standard phase of ComponentAA.

It seems to engineers that design work tends to be shifted to an earlier phase. For example, they are required to perform a certain kind of design work in the system structure design (SS) phase instead of the program structure design (PS) phase in which it was formerly performed, or in the user interface design (UI) phase instead of the SS phase. On the other hand, depending on the

customer's needs or their business area, some design work, for example, updating logic for tables, may be shifted without any significant problems to a phase after the phase specified by ComponentAA.

- 4) It may be necessary to modify ComponentAA to match the tools used.

ComponentAA is basically a general-purpose standard that does not require specific tools or a specific method of application development. Therefore, the document format must sometimes be customized to match the tools used in each development project.

Although ComponentAA is customized to be applied to particular projects, it has been an important issue that we do not have a system for accumulating customization know-how and reusing it for other projects.

3. Application of ComponentAA to model project

In the model project, we customized ComponentAA and used it to model an about 200 person-month project to be handled by Fujitsu Industrial/Distribution Solution Business Group.

When we applied ComponentAA to the model project, we measured its effects and looked for a method of passing the know-how to succeeding projects to address the above-mentioned problems. In addition to the model project team, we organized a special team and assigned them to the ComponentAA customization work in order to clarify ComponentAA's effects and clarify which know-how can be applied to other projects. This enabled us to find satisfactory answers to problems without being confined by the limitation of the phase or the person-hours of a particular project.

We took the following measures for the problems mentioned in the previous section:

- 1) Integration or deletion of documents containing the same definition

We created document formats that allow additional descriptions to be added to documents

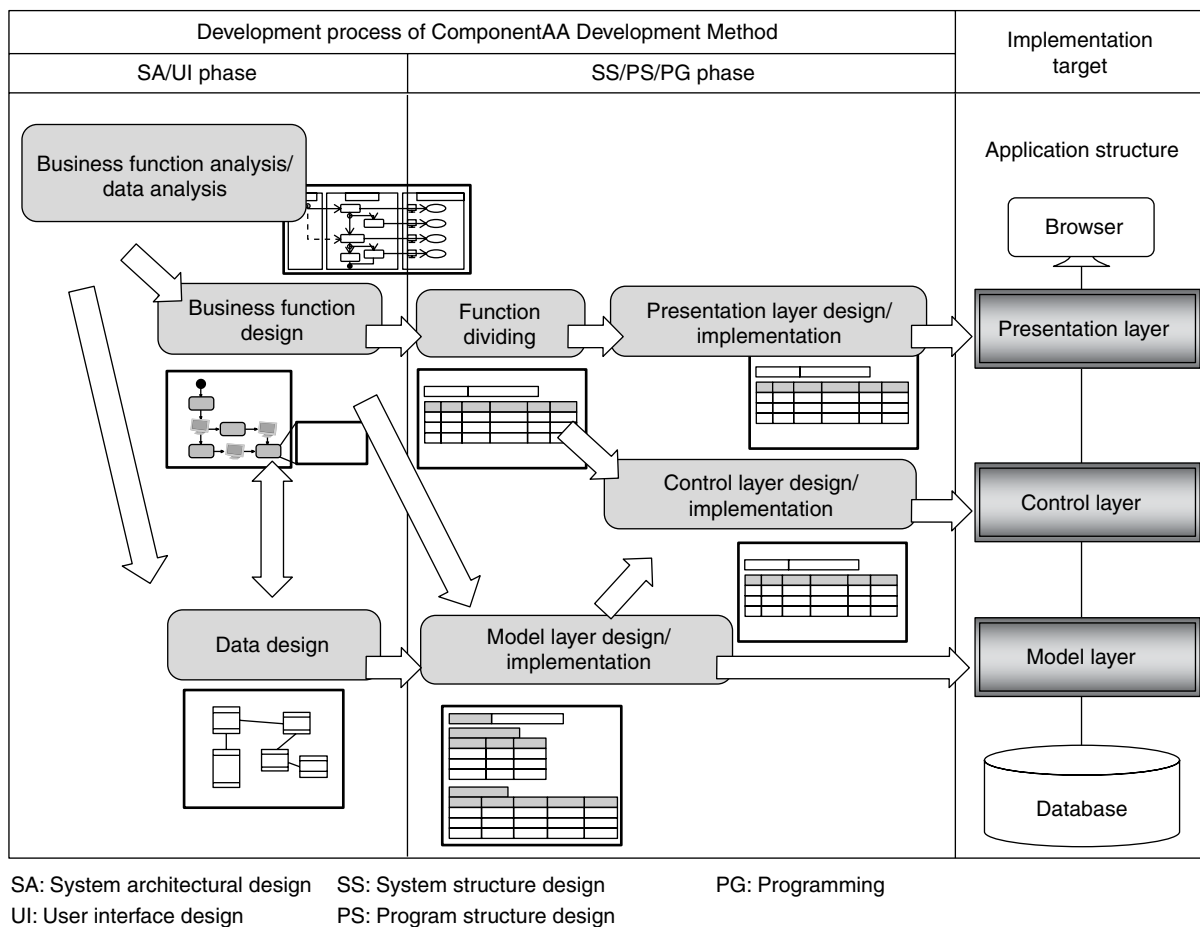


Figure 1
Development standard phase of ComponentAA.

created in earlier phases and consolidated the documents by customizing their formats. In this way, we minimized duplicate definitions and reduced the number of documents. Consequently, we reduced the total volume of descriptions needed for the model project while maintaining the description level required by ComponentAA (**Figure 2**).

2) Recreation of sample documents

We created new sample documents that have consistent contents in order to clarify the relationships among the documents. We provided detailed and abundant description examples for the sample documents in order to cover as many description patterns as possible. This helped design engineers understand the documents and enabled standardization of the description level

(Figure 3).

3) Evenly distributing the workload among the phases by reconsidering documents for customer review

We tried to evenly distribute the workload for creating design documents among the phases by limiting the documents needed in the UI phase to those required for customer review and those required for the main document.

4) Creation of macros that automatically convert documents into the formats of tools

We created macros that automatically converted the design documents into the input formats of the tools that were used. These macros also checked data integrity to improve the input accuracy and quality.

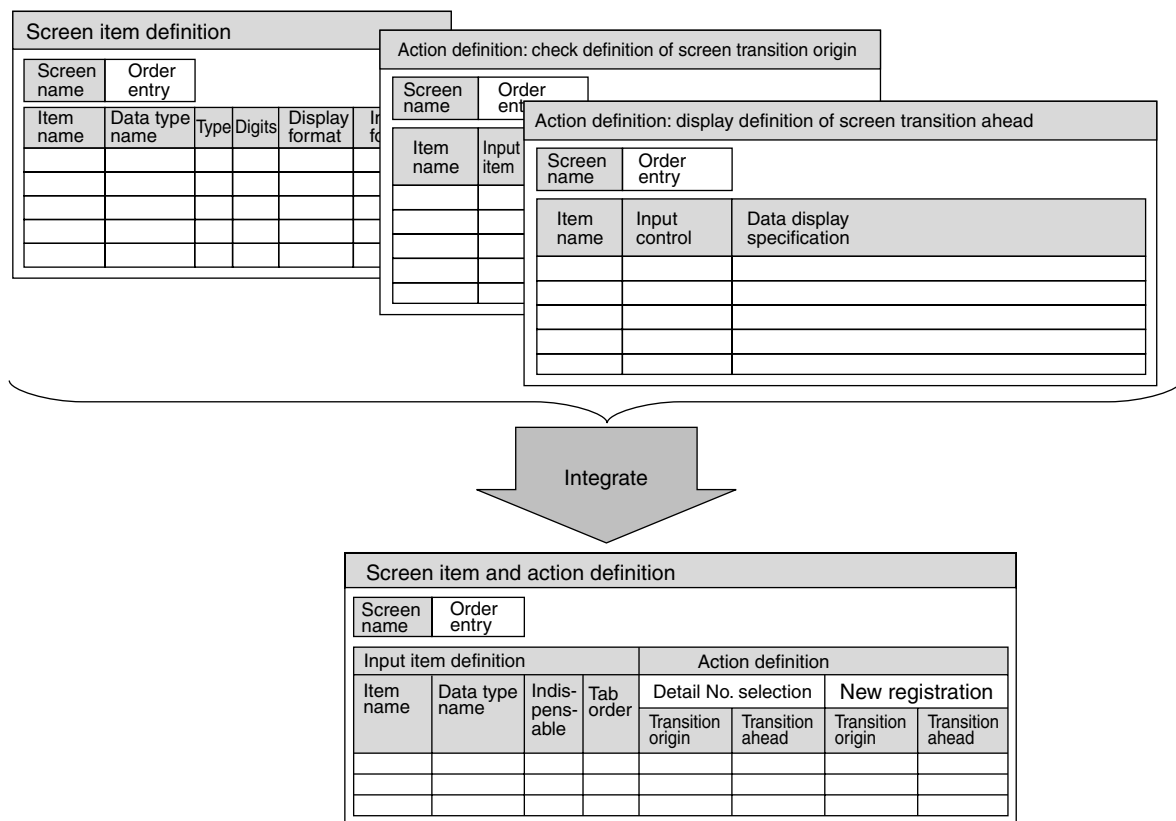


Figure 2
Example of document integration.

4. Benefits observed in model project

As mentioned above, applying the customized ComponentAA to the model project provided benefits mainly in two work areas. One of these is the standardization work performed by a standardization team or a common technical team responsible for specifying the document formats used in development projects. The other is design work performed by a business development team using this document standard.

1) Benefits to standardization work

Development projects require standardization work to 1) determine the types and contents of the design documents and test specifications created for each phase and 2) unify document formats and description levels. This standardization work is not necessary for ComponentAA because it provides formats, samples, and instruc-

tions for documents, including phase-specific documents. It also eliminates the need for customization work and the creation of sample documents that are usually done on a project-by-project basis by providing a general-purpose customization model and the consistent description examples mentioned above.

Our research showed that ComponentAA made a dramatic reduction of about 200 hours in the time needed for this standardization work.

2) Benefits to design work

Applying ComponentAA to the model project unified the document formats and description levels, resulting in a consistently high design quality. In particular, the relationships among documents were made clear by providing description examples with consistent contents as mentioned above. This helped the design engineers understand how to prepare the documents and effectively improved

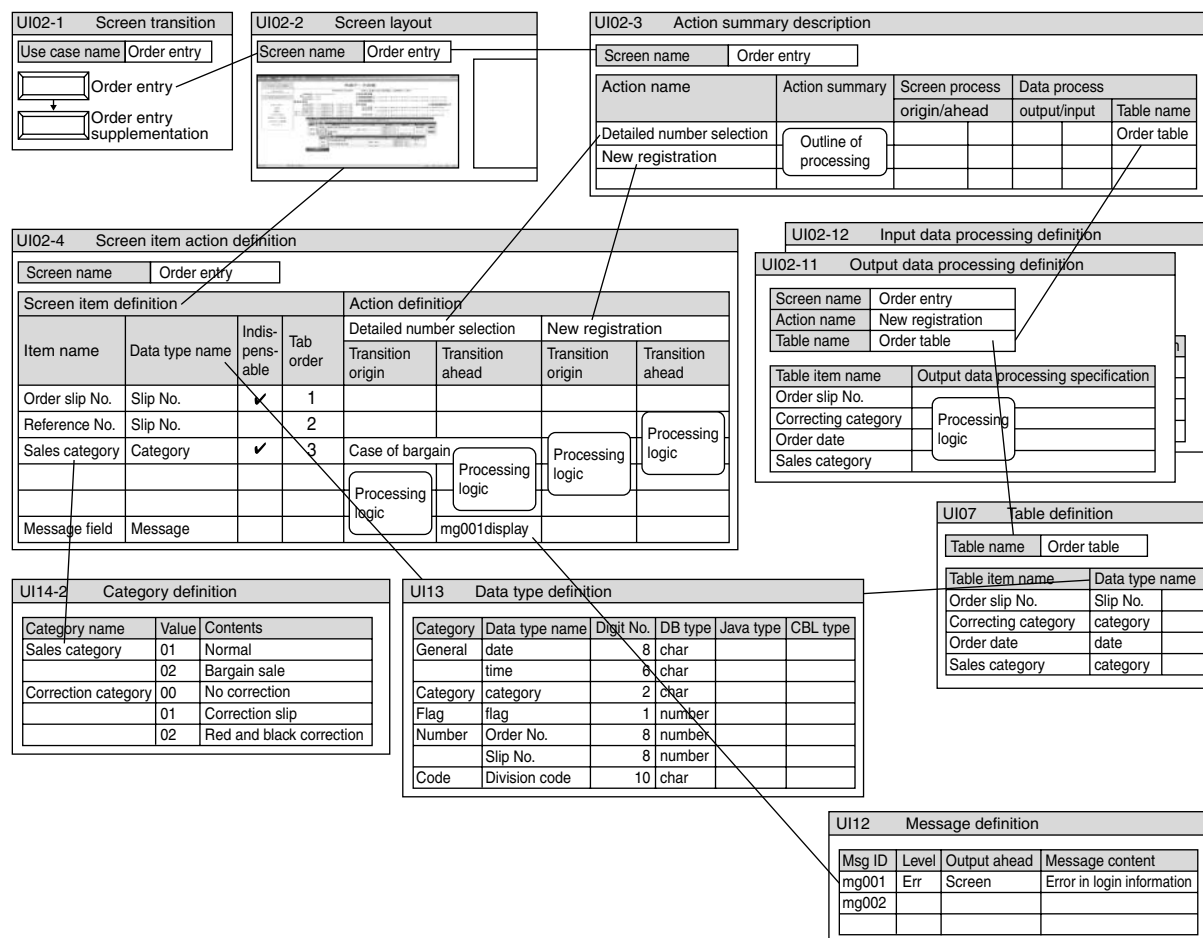


Figure 3
Outline of document relationships.

the description level.

Customizing the documents by deletion and integration reduced the total volume of description, resulting in fewer design person-hours. It also helped improve the maintainability of the documents. The macros for automatically converting documents into the formats of tools not only reduced transcription work, but also improved quality, for example, by improving data integrity checking.

5. Future applications

Fujitsu's industrial/distribution solution business will further promote ComponentAA application to development projects while considering the results obtained in this model project.

We will have to solve two problems. The first

concerns the numerical assessment of the effects on design work performed by business development teams. So far, we have not found an appropriate method of numerically assessing the effects of document standardization on design work. We will continue to work on this problem.

The other problem is how to enhance the test specifications used in the testing phase. To solve it, we need to integrate our ideas about test cases and test items, clarify the description level of specifications, and create consistent samples for various testing phases. This will further improve quality and reduce person-hours.

6. Conclusion

This paper described an effective application of ComponentAA Development Method, in which

it was customized and used to model an about 200 person-month project to be handled by Fujitsu Industrial/Distribution Solution Business Group.

The document standard of Fujitsu's ComponentAA Development Method is publicly available,¹⁾ which is very rare for standards in this industry. Although the standard is also available to customers and system integrators, they mostly think it is very difficult to use many documents because it can handle very large-scale developments.

We expect we can further improve quality and reduce person-hours by narrowing our target down to a specific business operation or business area and by unifying application development methods. Currently, we are promoting the application of ComponentAA as a standard development pattern for development projects by providing a set of standards that include — in addition to this document standard — a method design, development guides, and rules.

We recommend that, when you consider introducing a Web application development standard, you select a model project to which ComponentAA has been applied and then customize it into your own standard as you apply it.

Reference

- 1) Fujitsu: ComponentAA Development Method. (in Japanese).
http://segroup.fujitsu.com/sdas/technology/develop_guide/1_caa.html



Yuzo Yonemura, Fujitsu Ltd.

Mr. Yonemura received the LL.B. degree in Public Law from the University of Tokyo, Tokyo, Japan in 1986 and the MBA degree in Business Strategy from Keio Business School, Yokohama, Japan in 1996. He joined Fujitsu Ltd., Tokyo, Japan in 1986, where he has been engaged in research and technology support of application software development.