TransMigration Services

● Shigeki Kimura ● Shoichi Senda ● Manami Uda

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Information technology (IT) systems are now directly linked to business strategy and are a critical factor in determining whether a business succeeds. Therefore, businesses must optimize their IT systems enterprise-wide to ensure long-term business expansion. Fujitsu offers TransMigration Services to customers who face challenges in optimizing their IT systems. TransMigration Services enables customers to transform their systems safely, surely, and swiftly into optimized systems by effectively using existing software assets to address a broad range of business challenges and requirements. This paper describes the key considerations when using TransMigration Services to optimize a system. Then, it describes the two phases of TransMigration Services and its supporting technologies. Lastly, this paper presents a case study of a TransMigration Services application.

1. Introduction

Current IT systems stand at a major turning point in the face of a host of challenges, for example:

- The rising cost of maintaining and managing application assets,
- an anticipated shortage in 2007 of technicians familiar with the working concepts of existing systems,
- the need to develop various technical innovations and respond to evolving demands for industrial restructuring,
- corporate consolidation and merging of municipalities, and
- the need to respond to rapidly changing business climates, including the growing globalization and escalating business competition.

Migration is attracting attention as a promising solution to overcoming these challenges. Generally, the term “legacy migration” can be closely associated with the concept of migrating from a mainframe to an open system such as one based on UNIX, Linux, or Windows. Working under a total scheme of systems development called SDAS, Fujitsu’s TransMigration Services[note 1)] provides a package of services for migrating to an optimal platform, including mainframes, by optimizing a system across its lifespan, from planning to maintenance.

At Fujitsu, the term “legacy” is not used because Fujitsu believes its customers’ systems are not legacies but systems that continue to evolve while keeping the workflow simple.

This paper describes the key considerations when using TransMigration Services to optimize a system. Then, it describes the two phases of TransMigration Services and the technologies Fujitsu provides to support its operation. Lastly, this paper presents a case study of a TransMigration Services application.

note 1) A term coined from the English word “transmigration.” It signifies Fujitsu’s commitment to using customer assets to achieve total optimization.

2. Key considerations for system optimization

This section summarizes the key points that must be considered when optimizing a system by using TransMigration Services.

2.1 Openness not the only solution

In the migration review stage, system analyses are directed from various perspectives to work out guidelines for organizing assets and migrating, abolishing, and merging systems.

Valuing its customers' future business plans, Fujitsu has made a plan to rebuild customers' existing systems into optimized systems, while inheriting and making effective use of existing application assets. TransMigration Services[1)] is a service portfolio that comes with extensive options and tools for performing this task.

These services can be used to review any mainframe, office computer, or system operating on an open basis, regardless of its manufacturer, and support its migration and rebuilding to a platform optimized for the customer's system.

A broad choice of target platforms is available, including the continually evolving global servers, PRIMEQUEST, PRIMERGY, and UNIX servers, pursuant to Fujitsu's concept of the TRIOLE IT infrastructure.[2)] In addition, the middleware "Migration Suite" facilitates migration to an open system by allowing the application assets of a mainframe to run with the minimum amount of patches.

2.2 Selection of platform

Platforms are selected based on two standards: the lifespan of business changes and the business scope of users (**Figure 1**). Although open systems come with a large repertoire of software products they can run and require a minimum amount of time to build using the package, the OS or middleware is updated so frequently that the systems require enhancements every three to five years. This characteristic suggests the use of open systems for applications that must be quickly implemented and/or can be reviewed periodically.

Mainframe and office computers, in contrast, are characterized by their long-standing traditions of high reliability and high availability and comfortably fit into applications that have been used across an organization for a long time or require high reliability and availability.

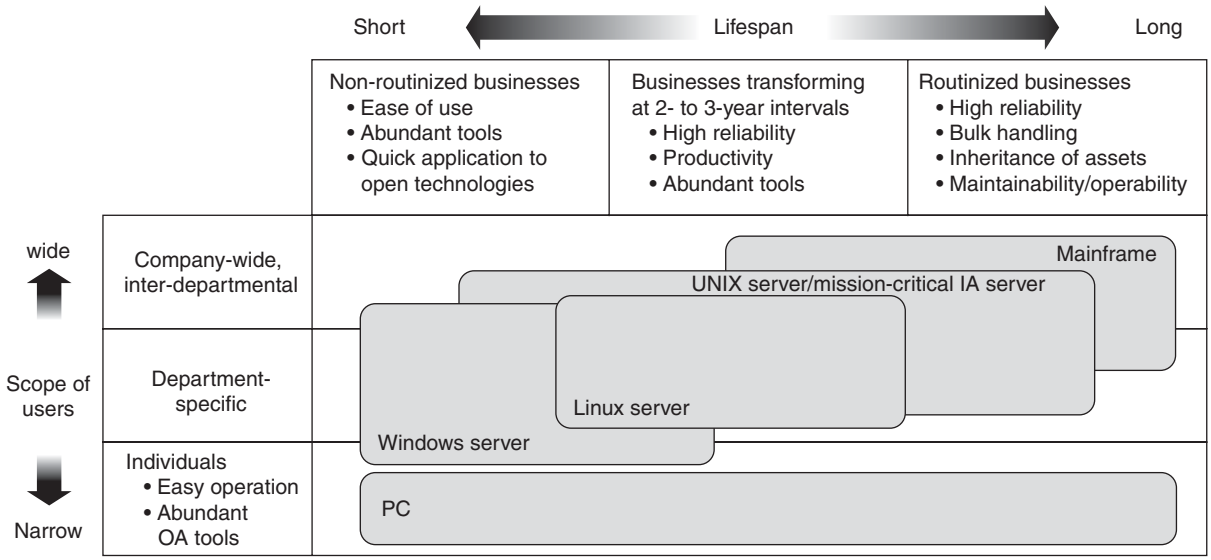
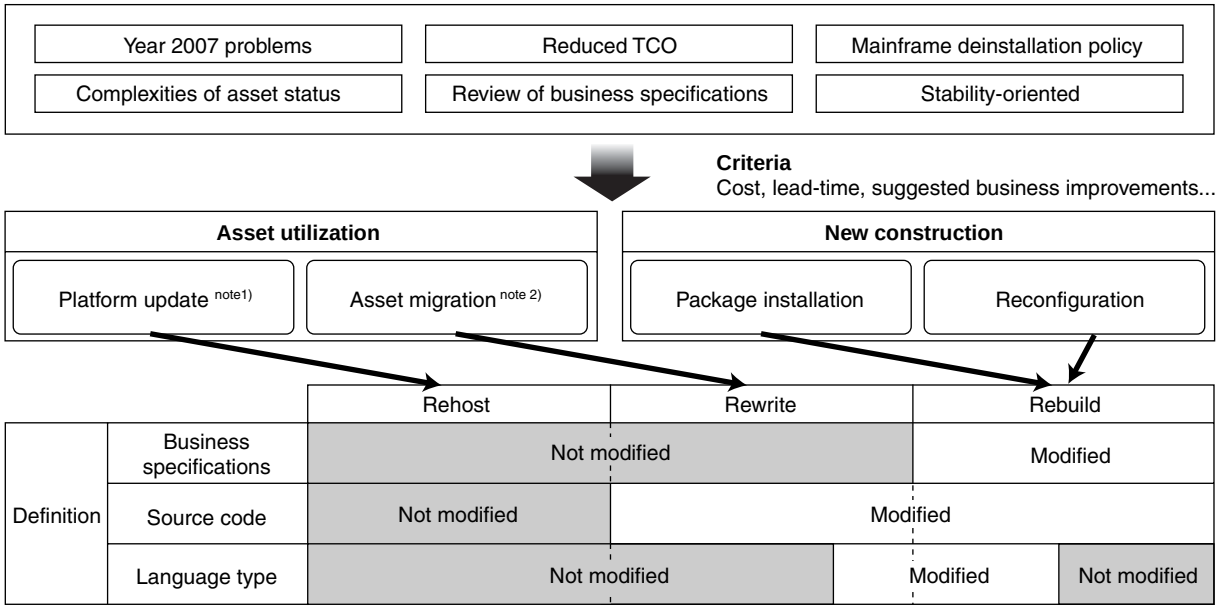


Figure 1
Target platform range.



note 1) Simple migration, for example, an upgrade that takes over the existing OS and middleware.
note 2) Migration of software assets from one kind of OS or middleware to another.

Figure 2
Migration method pattern.

2.3 Choosing whether to use existing assets or build a new system

1) Types and features of different migration methods

Migration methods can be classified into two categories: use of existing assets (platform update and asset migration) or new construction (package installation and reconfiguration) (**Figure 2**).

Platform update involves simple migration (rehosting) by upgrading the hardware, OS, and middleware. Asset migration converts (rewrites) application assets from one type of OS or middleware to another. Asset migration inherits the business specifications as is but rewrites the non-compatible sections of the source code so they are compatible with a new environment. Reconfiguration (rebuilding) constructs a system on a new platform by reviewing the business specifications.

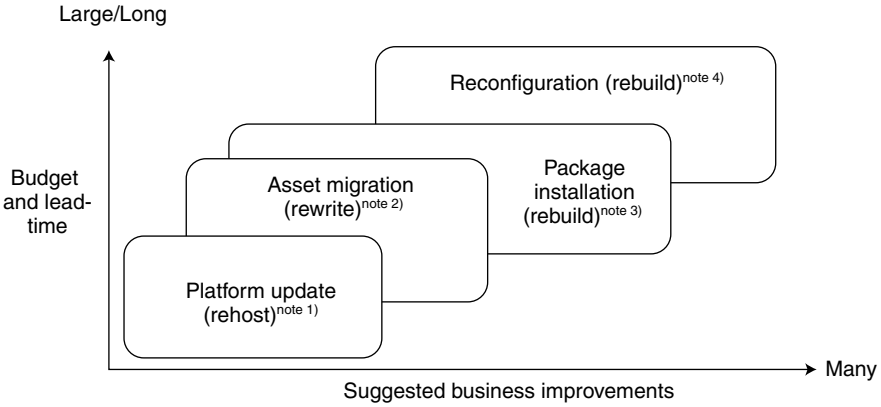
2) Selecting a migration method from the viewpoints of budget and suggested business improvement (**Figure 3**)

The platform update method is used when there are few suggested business improvements and a quick, low-budget system implementation is desired. This method includes the option of updating an existing mainframe. The asset migration method, on the other hand, is used when there are few suggested system improvements and the platform needs to be modified. Reconfiguration should be chosen when there are many suggested business improvements; however, compared to platform update, reconfiguration requires a longer implementation period and a higher budget. Package installation may also be considered as part of the reconfiguration method.

3) Comparison of temporary cost of migration

Among the migration methods, platform update offers the largest saving in temporary costs.[note 2)] Asset migration is expensive, accounting for roughly 1/5 to 1/10 of the cost of new

note 2) Costs of migrating application assets by rewriting or rebuilding (excluding costs of hardware and middleware purchases, infrastructure environment building, and migration of operational system design and environments and post-migration maintenance costs).



note 1) Few suggested business improvements, and stability is of prime concern.
note 2) Few suggested business improvements, and the budget and lead-time are limited.
note 3) Businesses are adaptable to standard specifications, and the budget and lead-time are limited.
note 4) Many suggested business improvements, and a long-term project can be put into action.

Figure 3
Selectivity guideline from budget and requirements viewpoints.

development for a reconfiguration.

4) Concept of total costing in migration

The temporary cost of migration is the cost of migrating from a mainframe to an open system, but subsequent spending on the platform can be kept relatively low. The period before returns are received from migration investments, including the cost of migration and the costs of hardware and software products, is a major consideration when making an investment decision and is generally thought to be about three to five years. When assessing the economic feasibility of a cutback, the total cost of ownership (TCO) should be considered, including the cost of building infrastructures and other operational facilities and the operational cost. More servers installed after completion of the initial migration plan could result in rising operational costs.

From the perspectives of the TCO (including the operational cost) and long-term corporate strategy, continued use of an existing system may prove more efficient than migration. Migration decisions should be made in a project-specific manner because the system mode is a major parameter in the decision.

5) Phased migration (**Figure 4**)

Given a limited lead-time and budget, the phased migration method, whereby modifications are made to the existing platform to create an ideal system implementation, may be a possible choice. Compared with rebuilding a system from scratch, this method alleviates migration risks such as soaring development costs and delayed completion and then allows investment to be leveled off after the migration.

TransMigration Services is a total support package that addresses all these factors to realize an efficient, high-quality migration in a manner best suited for the customer.

3. Two phases of TransMigration Services

TransMigration Services is organized into two phases: diagnosis and construction (**Figure 5**).

In the diagnosis phase, surveys and analyses are conducted, including an analysis of the performance assets (assets analysis service) and a validation of the migration method (Proof Of Concept [POC] service). In the construction phase, based on the conclusion in the diagnosis phase, a next-generation system is implemented using migration methods such as asset migration, package installation, and reconfiguration. The infrastructure construction service constructs an

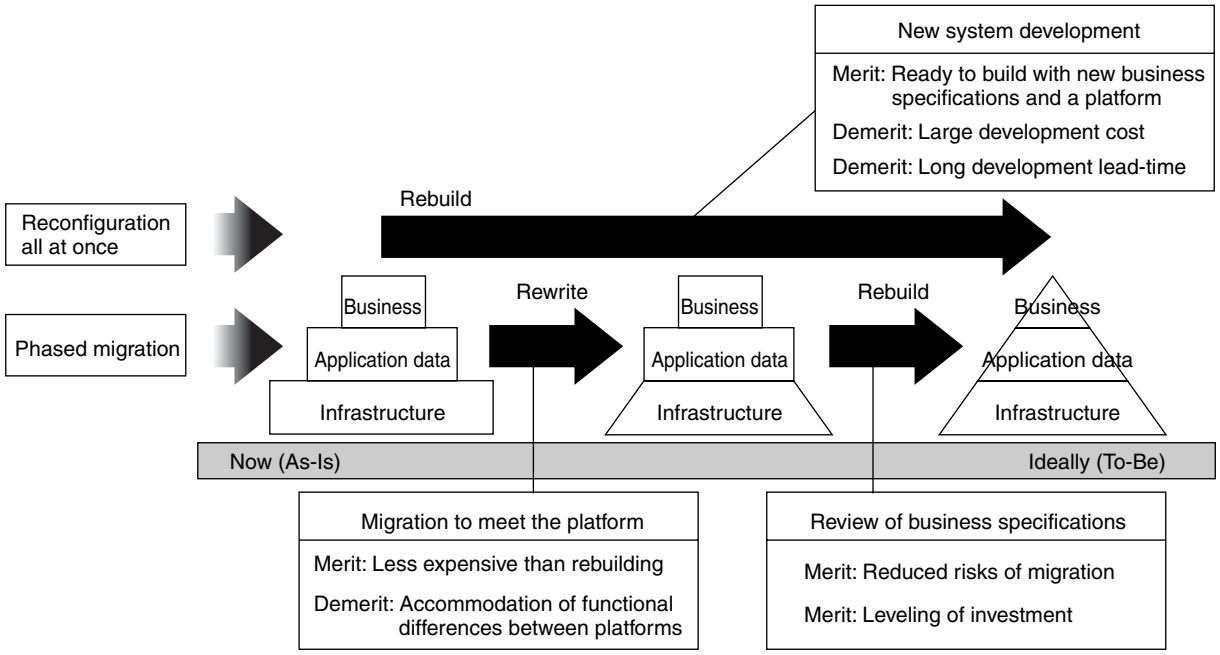
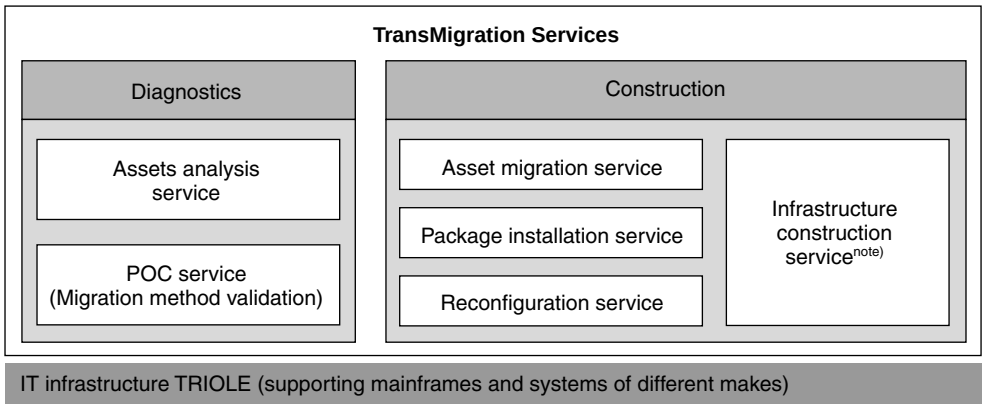


Figure 4
Phased migration.



note) Including updates to the platform.

Figure 5
TransMigration Services lineup.

operational environment. Among the migration methods, platform update is included as part of the infrastructure construction service.

4. Migration support technologies

This section focuses on the migration technologies that support the operation of TransMigration Services.

4.1 Migration Suite

In a migration from a mainframe to an open system, simply migrating business applications will not get the job done. Major differences used to exist between mainframes and open-system middleware, and it was costly and time-consuming to resolve these differences manually.

Migration Suite is a middleware package that accommodates such middleware differences to

minimize the need for manual work, assuring maximum mainframe asset utilization (**Figure 6**). The middleware can be coupled with tools for migrating, for example, screens, applications, Job Control Language (JCL), and other components (**Figure 7**) and can reduce manual work for these migrations by up to 50% (based on in-house figures). The middleware, therefore, promises cost savings, dramatic reductions in lead-time, and enhanced product quality.

For example, Migration Suite enables inheritance of form and screen functions and continued use of Virtual Storage Access Method (VSAM) indexed files. It also enables transaction application session management, error exit routines, USE FOR DEADLOCK procedures, and appending to the intermediate files created during job execution that are to be migrated to an open platform. Before the release of Migration Suite, when migrating from a mainframe to an open system, the functions provided by this package had to be built into applications.

4.2 Migration from COBOL to Java

Fujitsu plans to develop services that automatically transform business logic from COBOL to Java (**Figure 8**). These services will be made available in sequence, beginning with banking system solutions. Fujitsu intends to pursue its proactive policy of studying and developing technologies to meet diverse migration needs.

4.3 Migrating to a reliable, stable platform

Troubleshooting open systems was once a laborious task because their hardware, OS, and middleware often came from different vendors. Fujitsu's TRIOLE system models commonly used combinations of software into validated templates to support migration to a high-quality, high-reliability platform.

5. Case study of applying TransMigration Services

SANYO Electric Co., Ltd. conducted a system integration project in which the sales system

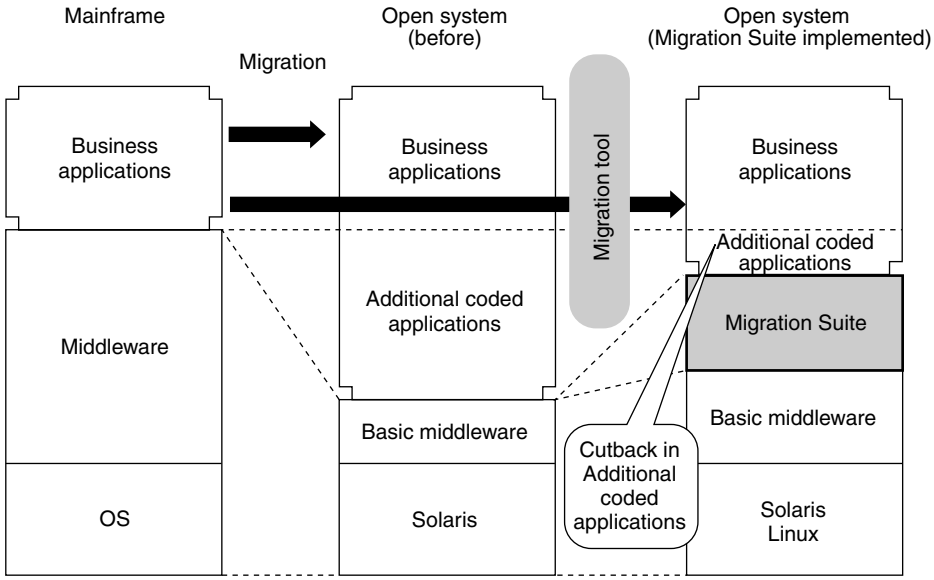
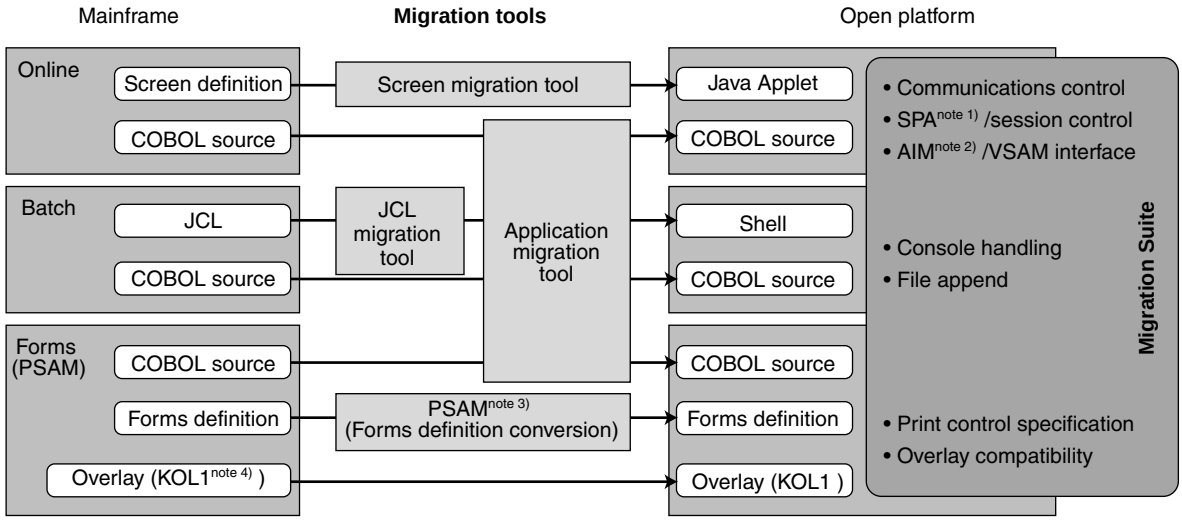


Figure 6
Aim of Migration Suite.



note 1) Scratch Pad Area (SPA) is a mechanism for online succession of information.
note 2) Advanced Information Manager (AIM) is middleware with a function for making an online database system.
note 3) Presentation Service Access Method (PSAM) is a middleware.
note 4) KOL1 is a form of the slip spool of mainframes.

Figure 7
Migration Suite lineup.

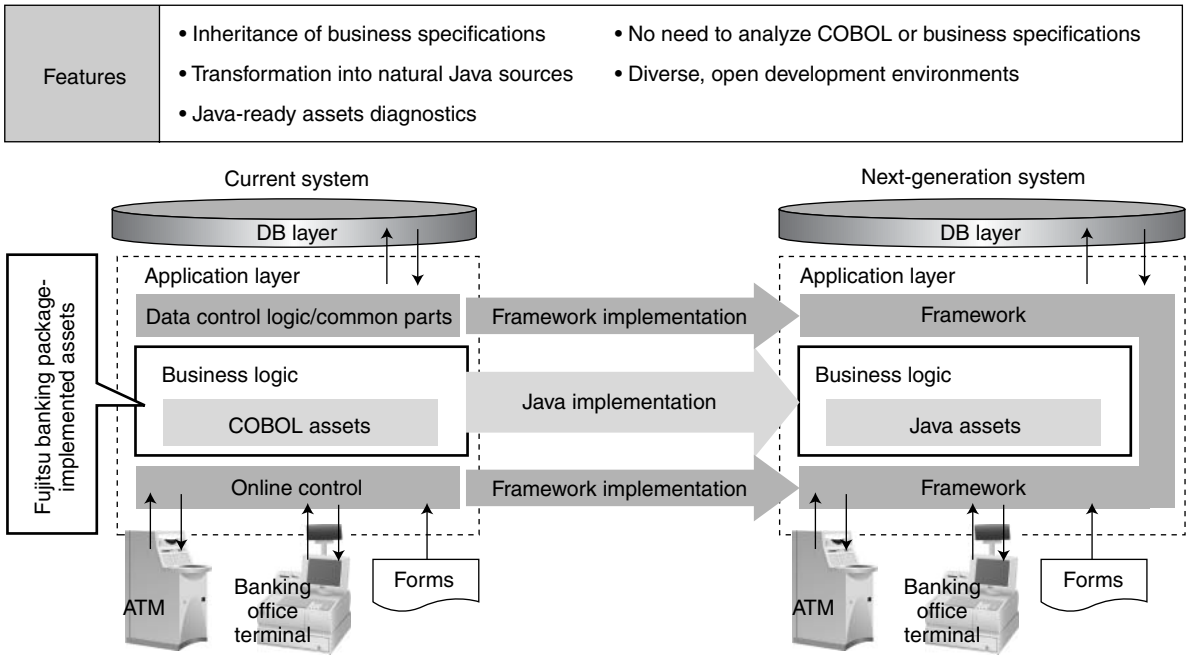


Figure 8
Web-enabled source code automatically transformed into Java.

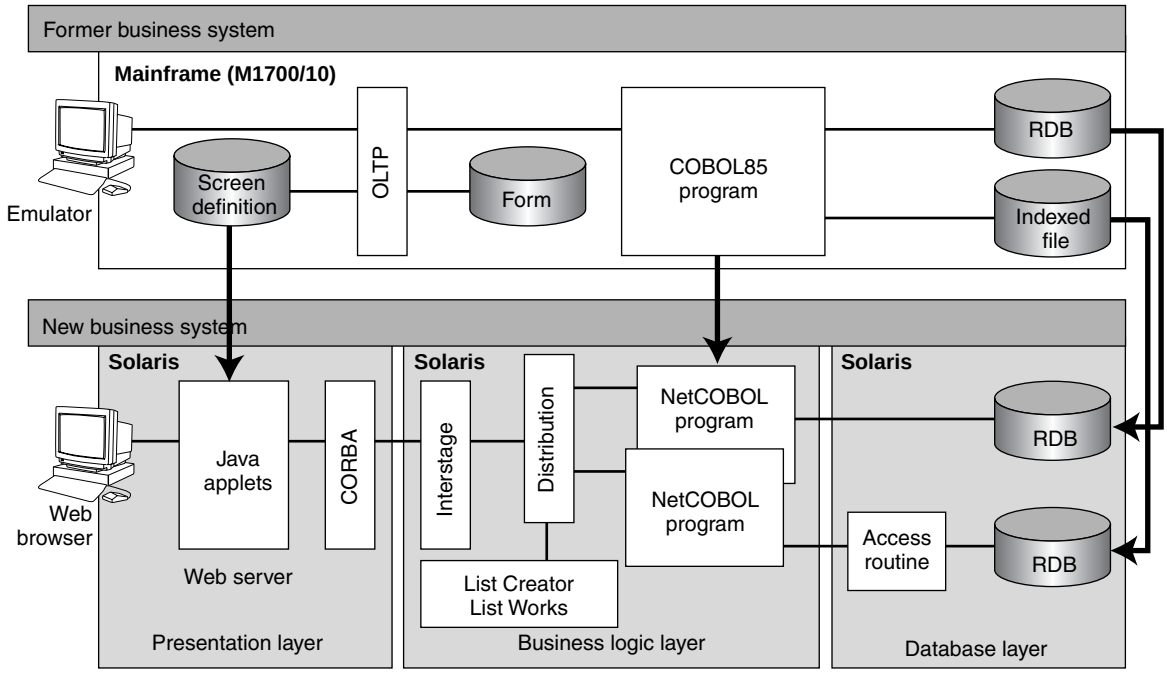


Figure 9
Topology of asset migration at SANYO Electric Co., Ltd.

portion of its mission-critical system, which runs on a mainframe, was isolated and changed to a Web implementation by using the asset migration service of TransMigration Services. The project reduced the TCO and paved the way for openness. One of the system requirements was to gradually migrate the platform to an open system without modifying the business specifications (**Figure 9**).

The migration was accomplished in four steps:

1) Migrating screen definitions in the presentation layer to Java applets for Web representation.
2) Migrating COBOL85 programs in the business logic layer to Fujitsu NetCOBOL without modification.
3) Unifying accesses to VSAM indexed files in the database layer into RDB accesses by way of subroutines.
4) Migrating forms to output based on Systemwalker ListWORKS (now called Interstage List Works).

In addition to reducing the hardware and software costs, the company keeps the operational cost below its previous level by using a built-in-place Systemwalker Operation Manager monitoring system.

The new system duplicates the easy screen handling of the previous host terminal, which brought Fujitsu high evaluations from SANYO Electric Co., Ltd.

About 2000 programs in total were migrated. The project started in October 2003, and the system started commercial operation in May 2004. The lead-time, initially estimated to be 10 months, turned out to be only 7 months — a drastic cut made possible by Fujitsu's extensive repertoire of tools and the customer's own testing skill. Two major factors behind the success of this project were 1) the availability of migration procedures established at the customer's site and within Fujitsu through the application of POC and 2) the efficient identification and elimination of all the important problems.

5. Conclusion

In a system migration, it is important to first narrow down the range of software assets that will be migrated. The next step is to implement POC to work out migration guidelines and methods and identify the migration's scale, schedule, and budget.

The customer's own testing skill is also a decisive factor for successful migration of a mission-critical system.

The migration project at SANYO Electric Co., Ltd. was completed in seven months, three months of which were dedicated to customer testing. Because customers familiar with the operational requirements of their present systems are in the best position to perform last-minute testing on systems prior to final migration, successful migration depends on customers having the testing skill, time, and other resources needed to make a comprehensive test.

We are now expanding TransMigration Services so it can handle migrations of mission-critical systems to Linux. Fujitsu will be offering customer-focused total service packages with reinforced platforms and services to help customers perform their management tasks and achieve continuous growth.

References

1) Fujitsu: TransMigration Services. (in Japanese). *http://segroup.fujitsu.com/sdas/migration/*
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Shigeki Kimura, *Fujitsu Ltd.*
Mr. Kimura received the B.Ec. degree in Economics from Nihon University, Tokyo, Japan in 1992. He joined Fujitsu Ltd., Tokyo, Japan in 1992, where he has been engaged in business support of TransMigration and MigrationSuite.

Shoichi Senda, *Fujitsu Ltd.*
Mr. Senda received the B.E. degree in Precision Mechanical Engineering from Nihon University, Tokyo, Japan in 1977. He joined Fujitsu Ltd., Tokyo, Japan in 1977, where he has been engaged in promotion of SDAS and support of TransMigration and related migration business.

Manami Uda, *Fujitsu Ltd.*
Ms. Uda received the B.E. and M.E. degrees in Mechanical Engineering from Tokyo University of Science in 2002 and 2004, respectively. She joined Fujitsu Ltd., Tokyo, Japan in 2004, where she has been engaged in TransMigration service promotion.