

Using TRIOLE to Enable Delivery of Large-Scale Industrialized IT Services

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Development and production methodologies in Japan have long been the envy of the rest of the industrialized world. With TRIOLE, Fujitsu Ltd. harnessed the essence of these practices to create a world-class process for the industrialization of product-based IT solutions within their regional markets. In 2003 a joint UK and Japanese team was formed to bring the effectiveness of TRIOLE to bear in the radically different and services-dominated UK IT environment. The goals were to understand if such an obviously effective set of principles could provide insights that would improve customers' long-term service experiences in the UK, demonstrate close and effective collaboration between the UK and Japan, and explore how the organizational and cultural environment might be impacted if it were to support the emergence of a re-engineered service-delivery mindset. This paper tells the story.

1. Introduction

In 2003, the CEO of Fujitsu Services was addressing the perennial challenge of all senior IT executives: how to improve service quality while keeping costs under control. During one of his regular business trips to Japan, he saw TRIOLE and was extremely impressed by its simple promise to create robust solutions from pre-tested standard building blocks. He recognized that the principles of TRIOLE aligned closely with the Japanese culture and its product-oriented business cycles, but also that they offered insights that might apply back home in the services-dominated UK IT marketplace.

In Japan, TRIOLE was capably delivering solutions that were straightforward to integrate using Fujitsu middleware, robust to deploy, and extremely cost-effective, and if the same ideas could be shaped and applied in the UK's service delivery environments, it would signal a win-win for Fujitsu and its customers alike. No longer would customers have to endure the extended

service outages and interruptions that typically accompany bespoke projects, and no longer would Fujitsu have to repeatedly resource and marshal the large development teams needed to create and implement new designs. TRIOLE, it was hoped, would illuminate a path towards reuse, standardization, and commonality across all dimensions of service delivery.

In what was to become one of the first large collaborations between Fujitsu's Japanese and UK organizations, the Touchdown program was launched. Formed on November 9, 2003, the joint team would spend the next few months together trying to understand what made TRIOLE work and how it might be reinterpreted to add value within the UK's service-delivery culture.

2. Touchdown

In Japan, TRIOLE helped Fujitsu to identify commonly occurring configurations of product-based infrastructure — allowing them to construct reusable assets such as templates of

prefabricated and verified clusters of components. The Touchdown program would focus on understanding how to acquire such templated TRIOLE work products from Japan and shape them to create robust, elemental, and predesigned service components for deployment in the UK. The goal was to create a capability to recombine these new service templates as multiple service solutions across Fujitsu Services' UK customer base.

From the outset, the team was multicultural and multi-disciplinary. As the program unfolded, group members worked hard to appreciate the viewpoints and perspectives of people from different geographies and cultures. The UK people collaborated to understand the attitudes and motivations coming from Japan, while their Japanese colleagues persevered to come to terms with an unfamiliar language and business culture. As a result, through a good mixture of patience, process, and compromise, they achieved harmony.

To maximize their chances of being able to analyze a complete slice of the TRIOLE universe and uncover the numerous technical and organizational challenges that lurked in the details, the team initially focused on products and infrastructure up to and including the middleware layer. The transition from a product focus to a service focus soon acted as a stimulus for the team to face up to some of the big questions that would later come to dominate the program; namely:

- What events in the customer and technology worlds determine the need for templates?
- What are the real differentiators in the Japanese approach that make TRIOLE work?
- How could the challenge of ongoing maintenance and lifecycle management of TRIOLE solutions be addressed?
- What cultural changes would be needed to introduce TRIOLE to the West, and how could they be best achieved?
- How should the team explain the benefits of TRIOLE to customers?

- How could the team address the sheer volume of documents available for translation and select the best for reuse within a managed-services model?

The intellectual roots of all the team members lay in an understanding of and compatibility with the needs of large IT organizations born from an institutional familiarity with a mainframe systems culture. The UK members came to recognize that they could rely on and leverage their Japanese colleagues' techniques for describing solutions and use them to create predictable outcomes for their own UK service customers.

By the end of the 11-week program, the team was united under a single vision: that there was a great deal of potential for TRIOLE to contribute to Fujitsu's UK and international services business. Japan's product templates and technology would be complemented by UK service know-how to form a library of TRIOLE service templates. Supported by the considerable evidence unearthed during the Touchdown program, the idea had a broad instinctive appeal across the global Fujitsu organization.

On January 30, 2004 the group presented their findings to the Fujitsu Services CEO. Later, they presented them to the Chairman of the Fujitsu Services board. The team had learned together and developed the beginnings of a new discipline — one that had the potential to begin the industrialization of IT service delivery across all of Fujitsu's markets. TRIOLE-based services were about to be given the green light.

In the aftermath of a completed program, it was recognized that Touchdown was one of a very small number of projects to deliver such a major level of success from close collaboration between Europe and Japan.

3. First year

When a customer accepts delivery of a product-based solution, the responsibility for its management, first-line support, and lifecycle

ownership usually passes to the customer. Expectations change significantly for customers in the managed-service context, in which both supplier and customer view the relationship as a strategic one that will, ideally, last indefinitely, or at least long enough to outlive several generations of technology.

Meeting to discuss the design for their TRIOLE service templates, the UK team therefore knew that they had to architect them for the very long term. Concentrating initially on the development of infrastructure service templates, they understood that template lifecycle management would have a colossal impact on the shape of TRIOLE for service-delivery in the UK. It would be simply unacceptable for, say, a component of a production service to become suddenly obsolete during the course of a managed-services contract. This forced everyone involved in template production to think about a template's value over a matter of years, not just the short period of time leading up to and including the start of a new service. For example, a template defining a managed-desktop service might be recognized to have a lifecycle of, say, two years, which means the template must also specify how the service should be managed gracefully into its next incarnation. An unexpected benefit of this approach is that it takes both the service-provider and the customer into an understood and collaborative realm of predictive change, rather than a status quo in which a service-provider is perceived as resistant to change.

The simplest way in which to construct service templates would have followed a predictable pattern. First, an expert systems architect would produce the technology design and then pass it on to a service architect who would wrap it with whatever it took to turn a technology solution into a lasting service template. However, it was suspected that the very loosely coupled technology and service elements of this model would inevitably separate over time. Eventually, some incremental service requirement would be

beyond the capabilities of the incumbent technology, compromising the integrity of the whole service solution.

To avoid this situation, the team decided to incorporate the elements of the service architecture into the description of the templates themselves. A template would not be called a template if it lacked the facilities needed to describe the detailed nature of the services it offered — by definition, every template must include its own service wrapper.

The team also realized that nothing about delivering services is ever static; for example, in an outsourcing contract, things must be allowed to change almost continuously. To preserve the integrity of the larger solutions of which they might be components, every new template was therefore equipped with an interface layer. As long as the interfaces were preserved, the implementation details could adapt over time according to the technology and business forces. Interface descriptions allowed Web Services to facilitate larger-scale and enterprise-wide integration, and while they were technology-agnostic, templates were capable of being deployed into either .NET or J2EE process streams. These decisions fleshed out an emerging principle: the UK would acquire previously developed solution templates — most often from Japan — translate them, add a service layer and interfaces, and make them available as service propositions able to easily plug into much larger solutions. ITIL and ISO20000 compliance provided a framework for standardization and acceptance.

Challenges often came from unexpected directions. Even though manufacturers' products were available worldwide, it was often found that their parts were combined in different ways depending on where they were built and sourced. Minor details that might not seem to matter could quickly create problems when template components believed to interoperate were discovered to be incompatible. These and similar issues led to the establishment of the UK TRIOLE

Integration Centre, in which all new templates are staged, assessed, and integrated. More layers of complexity followed with the need to maintain product and supply alignment matrices, together with knowledge of an item of equipment's original manufacturing location.

In their own search for improved quality, hardware and software suppliers are constantly refining and enhancing their products, and it can startle them when, instead of being asked for the latest or cheapest model, they are asked for a model that has been known to function seamlessly with the other elements of a proven TRIOLE template. Robustness, reliability, and manageability of a service relate very closely to an equipment supplier's ability to provide exactly the same model that has already been verified at the integration stage. As the industrialization of services develops, suppliers are expected to become more adaptable to these kinds of requirements. Ultimately, perhaps, it will be possible to form arrangements with suppliers for them to maintain a product catalogue of TRIOLE part numbers, against which major elements of large service solutions can be easily sourced.

Shaping a work product into a TRIOLE service template is a painstaking and detailed process. From the myriad of small details such as part numbers and software revisions embodied in a template emerges a description of capabilities at a business level. A template for, say, a database server will make promises about its degree of resilience, availability, scalability, and so on. These business level promises are seen as key to the future market acceptance and adoption of the principles of TRIOLE.

By the end of the first year of TRIOLE in the UK, the team had launched several templated, industrialized service offerings across their local markets. A customer requirement no longer automatically meant a protracted exercise involving senior architects and many months of intense design effort. Common service needs could be addressed by a combination of avail-

able plug-in service modules that were more robust, less invasive, and more cost-effective than bespoke solutions.

4. Four-row model

4.1 Developing the four-row model

Turning an existing technology template into a TRIOLE services template takes effort and resources. The amount of effort and resources depends upon the size of the template and the level of commitment it mandates; for example, mission-critical templates take more time and resources than general-purpose templates. Resolving to understand how these factors influenced the financial case underpinning template development, the team synthesized a model that described the interplay between the key technology and commercial forces involved. That abstract model, known internally as the four-row model (**Figure 1**), became an essential tool in the team's eventual ability to forecast and justify future template offerings. The model would also come to provide senior management with strong indicators of customer need, together with the means to differentiate Fujitsu's service offerings from those of competitors. The four rows of this model are described below.

Row 1 is the closest row to the customer. It involves everything required to look after a customer's specific direct interests. The four-row model is a generalized concept, but as an example, in a typical services organization this row might contain several functions, for example, functions for sales, account management, contracts, and service delivery management.

Row 2 includes everything an organization needs to answer a client's questions and respond to their problems. It embodies a supplier's inherent know-how and might also be the center of expertise for evolving templates that are not yet in a repeatable state.

Row 3 incorporates the capability to repeatedly deliver a customer service. It is a delivery unit or factory unit, for example, a car manufac-

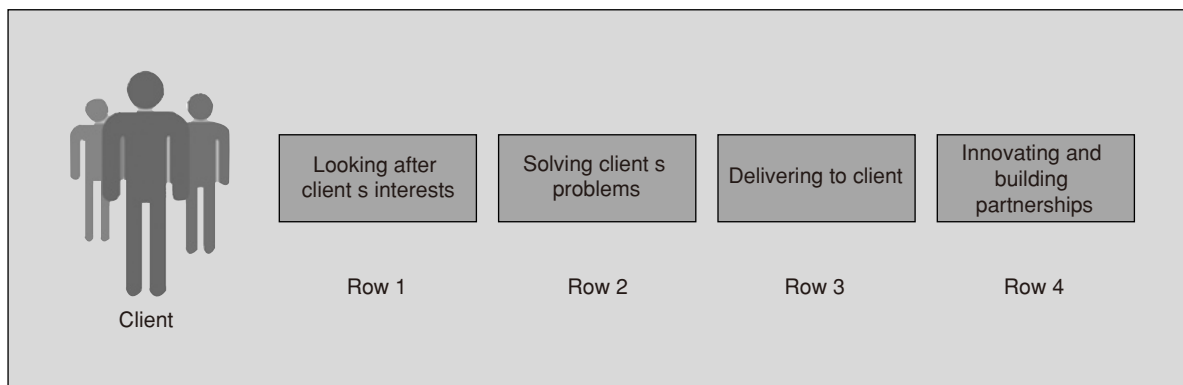


Figure 1
Four-row model structure.

turing plant. Production-ready templates live here.

Row 4 is where the Research and Development function resides. Its role is to innovate and develop new solutions and templates, including, where appropriate, to form partnerships with other business units or even other organizations.

So much for the structure of the model, but how can it be used to inform decision-making and drive strategy? This is where information flow comes in (**Figure 2**).

In the four-row model, information flows in two directions: from the customer to the organization and from the organization to the customer.

The information that comes into the organization from the customer arrives in the form of requests via the organization's client touchpoints; the team chose to refer to this information as "outcry." When aggregated, this kind of information is likely to signal a strong leading indicator of need, and when need reaches a tipping-point measured by counting the number of repeating requests, a template (or an idea for a template) moves a notch forward in its lifecycle. Outcry can often reflect the emergence of a trend, and this itself changes the relative desirability of a need being met by a new template or a bespoke effort.

Information flowing in the other direction, from the organization to the customer,

is termed "strategic intent," and it percolates outwards through all four rows of the model. Strategic intent reflects moves by Fujitsu to change the service it offers its customers, either because of straightforward innovation or because of influences within its own supply chain. For example, the emergence of a new operating system revision might stimulate the strategic intent to migrate customers to the new platform over time (Microsoft Windows Vista is a case in point here). Strategic intent is key to seeking new opportunities to offer customers improved services — a company that only listens to outcry will never be (or be seen to be) innovative.

Keeping track of and acting on the many levels of information flow was key to the team's success, and the reality is more complex than the picture described so far. For example, outcry at local, divisional, and regional levels might be required to commence the development of a global template in several languages, and tipping points would also have to be tracked at multiple levels. The TRIOLE Tracking System was developed to keep accurate records of all of this vital information. A well-understood governance structure would also be required to ensure that the key template go-ahead decisions would be made at the correct level of authority across the organization.

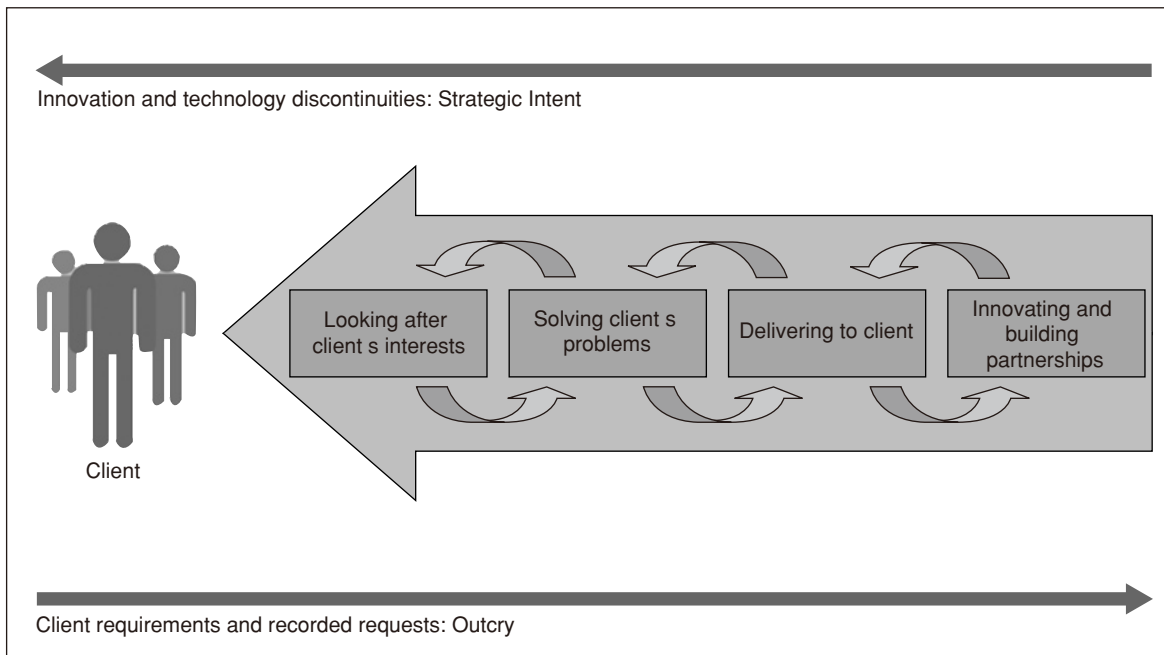


Figure 2
Four-row model: information flow.

4.2 Extending the four-row model

Deep in its DNA, the four-row model suggests a way to organize and motivate an entire TRIOLE business. First, because it is a generic model, it can be easily customized to any specific business domain. For example, in a high-tech supply environment, the four rows might be tagged as Sell, Solve, Deliver, and Innovate; but just as cogently, in a government agency, they might be called Engage, Address, Deliver, and Form Policy.

The model can also be applied to any part of a business structure or group, from headquarters through regional divisions to departments and individuals, because it delivers repeatable outcomes and is usable everywhere. Coupled with the principles of TRIOLE, it can form the basis for incentivising business units, departments, and individuals to exploit opportunities for reuse, standardization, and commonality across their areas of responsibility. Ultimately, the team hopes to orient the entire services business around TRIOLE and the four-row model.

Much progress has already been made, and it is now common for individuals' work objectives to feature elements that mandate the reuse, commonality, and standardization of a TRIOLE working culture.

5. TRIOLE for services

For some time, the team had realized that the principles underlying TRIOLE were capable of addressing a much broader business context than infrastructure alone. By abstracting core elements of the TRIOLE philosophy, the UK group progressed into the applications space with a program called Kaname,¹⁾ which facilitates the production of TRIOLE templates for applications services building blocks using a Service Oriented Architecture (SOA) approach. Already being applied within a small number of UK consulting customers, Kaname will be fully launched in 2007, when a .NET version (developed with Microsoft) and a .J2EE version (developed with colleagues from Japan) become available.

TRIOLE is also being developed so it can

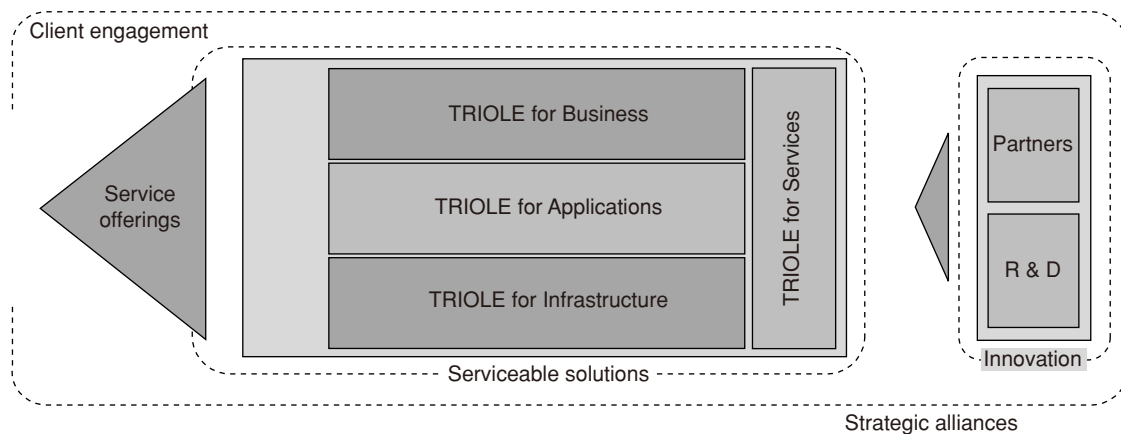


Figure 3
Industrialization model.

Table 1
Benefits of TRIOLE for Services.

At a glance: Benefits of TRIOLE for Services
TRIOLE services are more robust, simpler to deploy, and more cost-effective than bespoke solutions.
Both customer and service-provider can plan for and recognize innovation.
Innovation is rapidly communicated throughout the Fujitsu organization in the form of robust templates that can be quickly deployed with customers.
TRIOLE for services leverages the unique and best perspectives of two cultures.
Initiative is receiving major internal and external investment and embeds lean business wherever it is adopted.

deliver a collection of templated business processes standardized for small, medium, and large enterprises. As TRIOLE is refined to accommodate more services across even more business domains, a fully populated layered stack model is emerging as part of the Industrialization model shown in **Figure 3**.

The TRIOLE Service Management Framework (TSMF) has been developed to provide the service management capability that all templates — infrastructure, applications, and business — need so they can be managed and operated in a consistent, efficient, and reliable way. This framework itself is a mandated compulsory plug-in component of all templates.

TSMF is a key component of TRIOLE for services and unites ITIL/ISO20000-conformant processes and other mandated standards with toolsets to begin the transformation towards a

fully automated service delivery platform. Over time, TRIOLE for services will be extended to provide the means of delivering complete service catalogues, automated from customer order through configuration and build to service delivery.

6. Conclusion

TRIOLE is not a panacea for the global services industry — at least not yet. Much of the needed change in attitude will have to come from customers, many of whom still specify elements of their managed-service requirements at a technology level and not a business level. No one would insist that their logistics company should only use a particular type of vehicle to deliver goods, but analogous situations are commonplace in IT services. Customers need to be encouraged to specify their requirements in terms of business

outcomes — just like their corporate objectives — and not in terms of technology composition or design. All this said, the UK experience with TRIOLE for services has led to some compelling and tangible benefits for both customers and Fujitsu (**Table 1**).

The impact of TRIOLE for services is likely to be extremely significant for Fujitsu. Traditional, bespoke methods lead to an organization that cannot grow its service business faster than it can hire people. TRIOLE delivers a more agile, proven, and robust response to customer service needs and allows an organization to scale non-linearly with business demand without

compromising on quality.

The program has demonstrated that working together across a global organization produces benefits that can be shared around the world. Japan's rigorous engineering approach and continual-improvement philosophy has combined with the UK's service perspective and market awareness to deliver a new synthesis that is showing all the signs of helping to shape a refreshing and different global company.

Reference

- 1) I. Morita: Toward Realization of Service-Oriented Architecture (SOA). *FUJITSU Sci. Tech. J.*, **42**, 3, p.306-315 (2006).



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