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Agile SOA Framework For Process Automation And Integration

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By Alexandre Samarine, Ph.D.

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IT *does* matter, but changes are needed. One is an *agile, service-oriented framework for business process automation and integration*. That provides a systematic, architectural approach to make business processes explicit, to decide how and where (in the business process) IT tools should be used, to provide automation and integration, and to facilitate total business process management anywhere, anytime, for everyone and anything.

A general consideration behind the architectural framework is that 80 percent of software life cycle costs are incurred during post-release maintenance. The architectural framework can be designed in such a way that it delivers systems that are easily maintainable, i.e. highly adaptable.

The business process, which is the basis of the automation and integration, is driven by *business events*. For each event, there is an associated business procedure to be executed. A business procedure is defined as a set of other business procedures to be carried out in accordance with *business regulations and rules*. An elementary business procedure is called a *business task*. Each task operates with some *business entities* or *business objects*, e.g. a product, client, document, Web page, etc.

We can classify very roughly the tasks as follows: *intellectual tasks* (added-value activities), *verification tasks* (quality control activities), and *administrative tasks* (process-support activities).

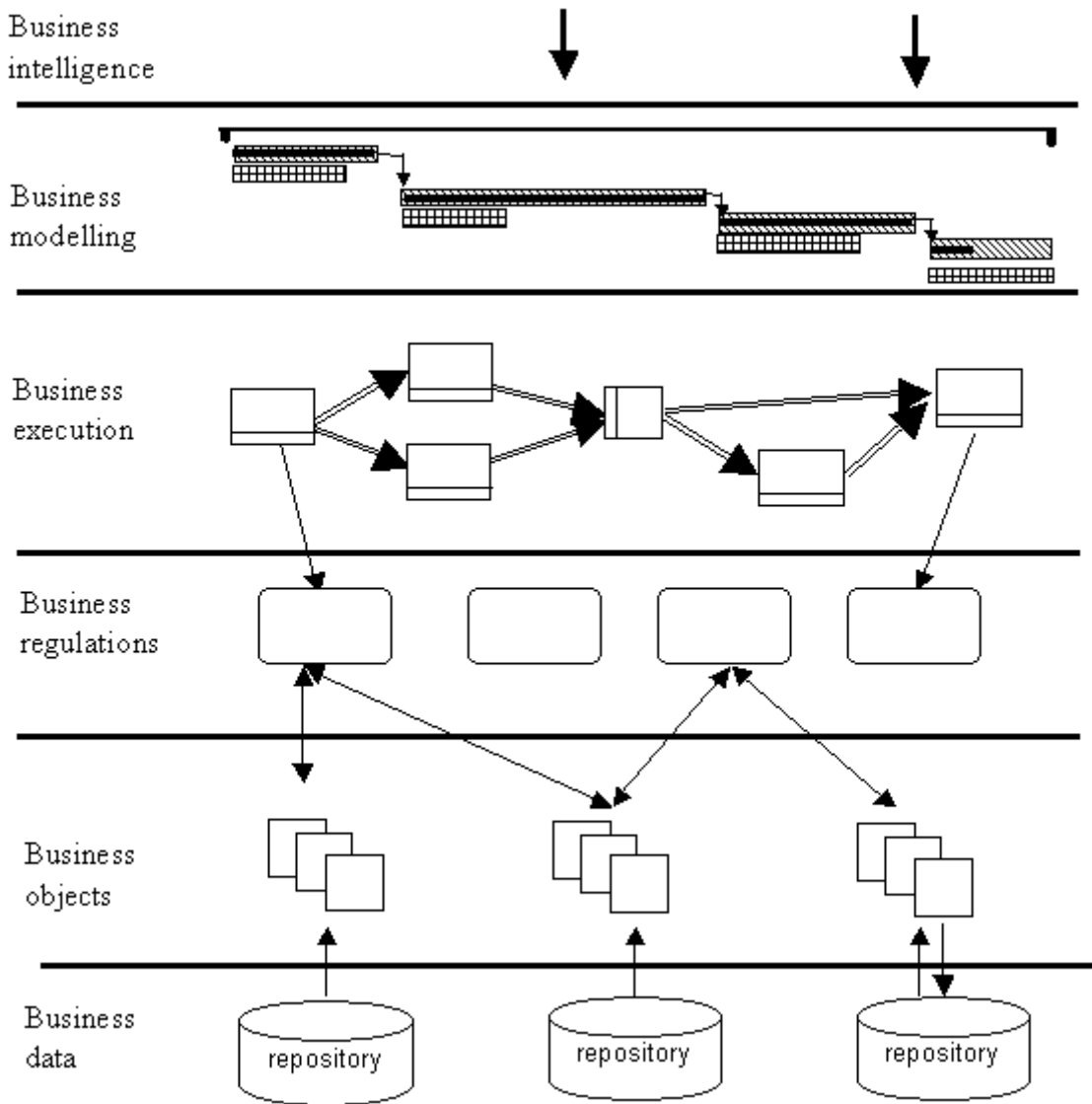
The most common pattern of business procedures is comprised of a mixture of the various types of tasks:

- "getting" some business objects from some repositories (administrative)
- "doing" something with these objects (intellectual or administrative)
- "checking" the integrity of the work done (verification)
- "putting" the objects and/or any new objects into some repositories (administrative).

To automate and manage such business procedures, you can use a multi-layer architectural framework (see the figure below). This framework is designed to integrate many diverse elements (information, events, processes, people, existing systems and IT tools).

I call it Enterprise Architecture for Integration and Automation (EA/IA). Each layer is a level of abstraction of the business and addresses some particular concerns:

- The *business data* layer comprises information that is stored in existing repositories
- The *business objects* layer comprises universally accessible business data containers
- The *business regulations (and rules)* layer comprises the actions on the business objects, which must be carried out to perform the business tasks
- The *business execution* layer carries out the business procedures
- The *business modelling (and monitoring)* layer analyses the business events, which summarize the execution of the business procedures
- The *business intelligence* layer implements enterprise-wide planning, performance evaluation and control actions applied to the business procedures.



The business execution layer is implemented via a COTS workflow engine. Each workflow is made up of a mixture of tasks for humans and for "robots". With respect to the workflow engine, the robot is an external and asynchronously executed program that systematically examines the "robot in-box" and executes a program corresponding to the particular task. The programs for the robots comprise the business regulations layer.

An intrinsic feature of the multi-layer architecture is the possibility of using COTS and freely available products in each layer independent of each other. Each layer is a "service," and its building blocks are also available as services, and hence are highly reusable and easily replaceable.

In some ways, the traditional three-tier architecture is perpendicular to the plane of the figure, as each service has some of these three tiers. For example, a CMS (just a building block) is used as a repository for some business data. Such a CMS has a database underneath it, some features of an application server, a Web-based user interface and some service APIs.

Another practical observation is that different layers have life cycles with different time scales. Each layer may evolve at its own pace without being hampered by the others. Because of the operational independence the building blocks, many versions of the business rules and services may co-exist at the same time.

A lot of maintenance and operational responsibilities can be delegated to the users. Systematic migrations are easier, because usually only a part of the whole system needs to be changed. The project management typical "time per cycle" is two to three weeks. A project becomes a series of cycles like Deming wheels.

In the production process that I automated, we estimated that about 25 percent of the work was comprised of administrative tasks, and 15 percent of verification tasks. It was feasible to automate half of this 40 percent in less than a year. Over a two-to-three-year span, all administrative and most verification tasks could be automated. At the beginning, EA/IA was used for only one business procedure that led to the saving of "human" time amounting to about 10-15 minutes work for about 1000 operations per year (i.e. about one man-month per year), and improved quality.

The EA/IA addresses different aspects of adaptability:

- The policy, priorities and structure of the company — Web-based workflows can operate across the units and even organizations; any part of the EA/IA is replaceable; the projects are small and quick
- The existing data, IT systems and equipment — data, systems and COTS are decoupled; the migration patterns are known
- The constantly changing business processes — business events, workflow and business rules enable a high level of adaptation for different business concerns; the EA/IA implements the basic principles of the ISO 9000:2000 quality management system
- The size and complexity of problems to be addressed — we can employ external resources similar to grid ideas
- The available budgets — the ROI is very quick and the EA/IA implies incremental deployment
- The level of computerization within the company — the approach used for production automation as well as the automation of some collaborative and administrative activities
- The computer knowledge and culture of the users — this approach has been used to deliver applications for a wide range of users.

About the Author

Dr. Alexandre Samarine is an IT and business systems architect. He has more than 25 years experience as a provider of IT services. In recent years his professional specialization (and personal interest) has been focused on "how information technology can be used to transform business operations to significantly improve their effectiveness and efficiency."

Prior to becoming independent, Alexandre was the IT coordinator for electronic publishing at the ISO Central Secretariat in Geneva, Switzerland. Before that he worked as a consultant at CERN, Switzerland, and at IHEP, Protvino, Russia. He is the co-author of many publications including the book "The LaTeX Companion." [More by Alexandre Samarine, Ph.D.](#)

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