# Semantic technological framework for integrating software paradigms in organizational solutions.

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**Abstract.**

The continuous changes in informational and organizational technological development have led to fail many software projects, due to lacks in the adoption of strategies for technologies alignment with the business. With the existence of Internet, the organizations need software solutions that provide security, confidence administration, integration, automation and standardization of process and information to make decisions and new ways for offering service and products. The integration of different software development paradigms rises as a potential solution for gaining flexibility, adaptability, efficiency and agility in business solutions. The objective of this article is to propose the semantic web as a model for an ideal space and possible solution to the integration of several software paradigms, through analyzing and showing of important results of recent years. It is analyzed trends of development and integration of organizational IT solutions, as well as its main strengths and weaknesses. It is described how the semantic web technology absorbs the principles and benefits of each one of the software approaches and moderates its deficiencies, so that it is proposed an integrating technological framework for software development in the semantic web applications area. The application of this new idea about integration of concepts of architectures and software paradigms, applied to current technological innovation in business solutions, should allow the reduction of gaps between the needs of different domains, such as the modeling and management of business processes, information and knowledge, the architecture of services, business rules and the characteristics of current programming languages.

Keywords: semantic web, software development, technology integration, IT alignment, software approaches.

## 1. Introduction.

The organizational environment has been characterized nowadays by instabilities, and therefore, derivations of reevaluations of the growth prospects of entire companies, as well as repositioning and consolidation of various markets. According to Martins [1], the causes for these turbulences are diverse and interdependent, but so far, what seems to be one of the major grounds for these fluctuations is technology, that means, the rapid development of technological changes for the business environment, which has brought changes in procedures and organizational methods.

In the growing recognition of the central role of information technology (IT), strategic alignment between it and business objectives, is an important management tool to determine the success of the organization. An early and appropriate strategy of IT alignment with the business for the fulfillment of its objectives will help to increase the operational profits, starting from the processes efficiency and effectiveness with the IT's support. Consequently, the additional costs for changes in any process of business adaptability will be much lower and the transformations in the IT will be minimal (Figure 1). In this sense, managers, concerned with restoring the competitiveness of their organizations, are abandoning traditional approaches to strategy for searching of new approaches to achieve vital guidance in a changing environment [1, 2].

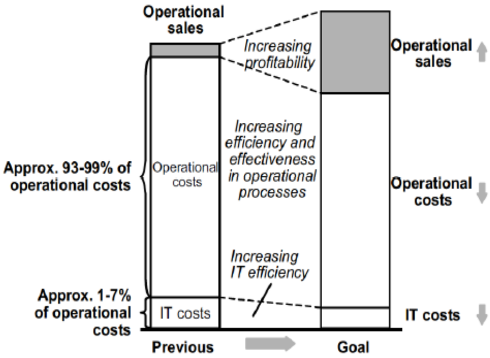


Figure 1: Contribution value of IT. Source [Kearney, cited by 3]

A critical opportunity is to integrate internal systems into an architecture that considers a long-term vision. It is necessary to integrate what is being developed with that has been built and what will be developed, as well as the systems of the users, the suppliers and the business partners. In addition, the large volume of information generated every day, makes it necessary to develop systems for its management in an intelligent way, be processed and interpreted automatically by each of the systems involved in the business processes and so to gain interoperability. Another necessary faculty in the new systems is the rapid capacity of adaptability to the changes, both technological and organizational, that allow continuing and evolving the operation of the business and where the costs are often the most important part of the efforts to align with each one of the objectives of the organization.

The Semantic Web (SW) is a prolific area, located at the confluence of several technologies and one of the dominant technological movements today. It proposes techniques and paradigms for representation and management of information and knowledge, in order to facilitate its location and sharing, as well as the integration and recovery of resources.

The main objective of this article is to present the SW and its technologies as a possible space for a strategic alignment with the business. Based on the analysis of the main trends of software development models and architectures and their possible integrations for a business solution. In addition, it will be demonstrated the previous objective through a semantic technological framework of integration, not only for heterogeneous data, but also for concepts software development approaches and

## 2. Technological trends in business information systems development.

The current preference of end users of information systems and computer applications has to do with a computer model, in which there is access to data and applications through the Internet. As consequence, the main lines in software development are centered on mobile platforms and web applications, which have been aimed since the mid-2000s towards the integration of several technologies. Among these technologies are the management of business processes (BPM), the services oriented architecture (SOA), decision models, the application of ontologies and the reuse of knowledge, the SW, the management of business rules (BRM), the processing of large quantities of data, business intelligence, the cloud, etc. [2, 4-20]. In addition, standards have been established to support these paradigms, whose guidelines are given mostly by organizations and consortiums such as OMG (Object Management Group), W3C (World Wide Web Consortium), BRG (Business Rules Group), BPMNI (Bussines Process Managment Initiative), IBM (International Business Machine), ORACLE, etc.

Nowadays, the Web is considered as a universal platform, which requires the client the use of an essential software: the web browser. All applications, documents, files and services, accessed through an interface or web browser (Opera, Chrome, Firefox, Iexplorer...), behave in the same way independently of the operating system [21]. There are authors who have expressed predictions about the different Web extensions for the future, including someone that even predict the dates of events, perhaps due to the experienced behavior of the web applications development and the technologies that revolve around them (Figure 2).

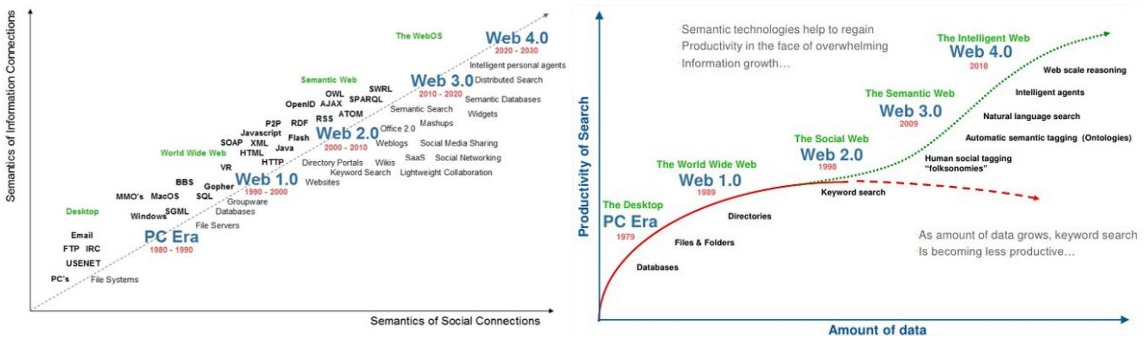


Figure 2: Trends in the development of web applications. Source [22].

The current web pages are the result of the efforts of a web community that helps to define the technologies supporting them, such as HyperText Markup Language (HTML), Java Script Object (JSO), Cascading Stylesheets (CSS), Hypertext Preprocessors (PHP), .NET , Web Graphics Library (WebGL), eXtensible Markup Language (XML), etc. They also make sure all this technology is supported in all web browsers, incorporating the latest combinations and capabilities (e.g. HTML5 + JavaScript for front-end). There is an interaction between technologies and browsers, which try to become more compatible in an incessant struggle to be able to give the user a better experience with the new rising evolutions (Figure 3).

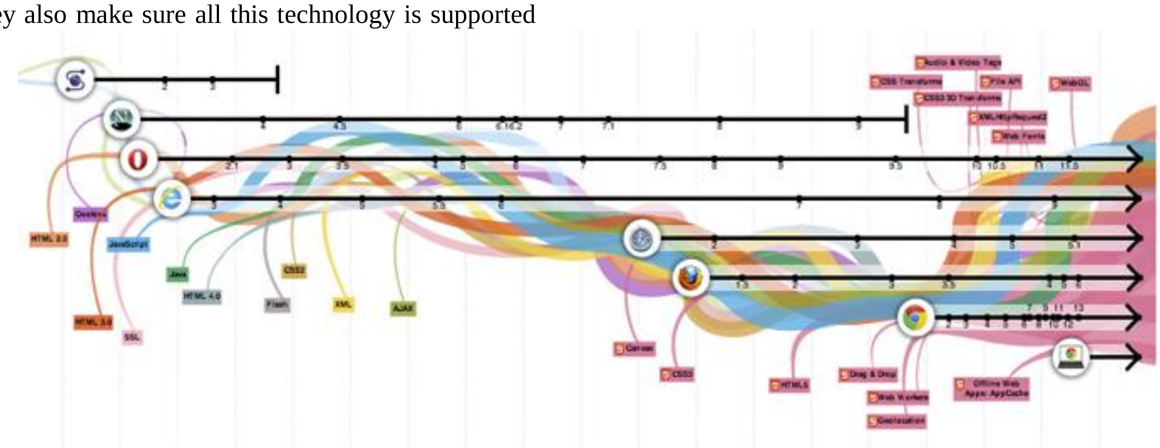

Figure 3: Evolution and interaction between web technologies and browsers. Source [23]

Many times the decision makers choose (without consulting) models, systems or applications to adopt and to implement a new technology, usually influenced by technological and market trends. As a result, the systems or models meet very particular needs, so that many common data and processes of the organization are isolated. Then, they warn that they have reached a point where integration is needed in order to continue advancing, either from the perspective of the models or from the business applications.

## 3. Technological integration. Strengths and weaknesses.

### *3.1. Applications and systems integration.*

In the applications and information systems area, the development of suites for Enterprise Resource Planning (ERP) and its adoption by organizations grew rapidly in 90's (century XX). However, the cost of implementing these systems began to grow and required additional costs by personalized codes, advisors and training [24]. Years later, an initiative known as Enterprise Application Integration (EAI) emerged with a similar idea, but with a focus on the development of systems that provide fluid business functionality and where integration is in the capacity to exchange and share data without knowing where they are located and what format they have [4].

While ERP was a specific type of IT solution, EAI expressed a way of using IT tools. Some of the current solutions are raised through the cloud. With a SaaS (Software as a service) solution, smaller companies can use the same ERP software, which larger companies have been using for years, tested and adapted to the sector [24, 25]. The phenomenon of application programming interfaces (APIs) and web services has greatly facilitated the work of integration, especially the simplification of the data exchange format that has involved the *JSON* (Java Script Object Notation) against HTML. Applications like *Hadoop* and *Mashup* can combine data and functionality from multiple external sources hosted as web services. They can also support the highest performance computing that involves the file system, distributed with petabytes of data and parallel processing on more than hundreds of thousands computers [26].

Among the main benefits of the enterprise applications integration can be mentioned the integrity and access to the information between applications in real time, the simplification and optimization of business processes, the improvement of the efficiency, the development and maintenance of the systems is much simpler and cheaper. Also, it improves relations with customers and cooperation between components of the supply chain, standardization and more adaptability of the business is achieved, furthermore it gains in capacity to respond to changing business needs.

Nevertheless, some aspects associated with this type of integration can be highlighted as challenges. For instance, it is a complex task and its process can increase its difficulties if problems occur, like lack of technological and business skills, leaving security issues, do not think about the significance of performance, lacks of planning an adequate supervision and control system. In addition, lacking of an integration strategy or misunderstanding this process as part of some other project, which is supposed to be the largest entity, insufficient communication, gap on data governance, etc.

### *3.2. Software paradigms integration.*

The eventual and simultaneous application of different approaches or models make possible to combine methods and fragments of models to achieve specificities of certain scenarios, which can be a more effective way to achieve stakeholder concerns. Managing dependencies between and within different models is crucial to guarantee communication, consistency and alignment among the different participants of the software project [27]. However, the integration of multiple models causes challenges at the level of coherence and regularity, as well as traceability, since it is difficult to maintain links between elements of different models, even more when different tools create them. Buschle, Johnson and Shahzad [28] present other challenges, for example, in the analysis and evaluation of alignment between business goals and capabilities of IT. The interpretation of the detailed and complex information contained in the combined models is difficult, and the latter are unsuitable for automatic processing with the limited analysis capabilities of the support tools.

Next will be described some examples of software paradigms integration, as well its advantages and weakness for a business solutions.

#### *3.2.1. Business process management and service-oriented architecture.*

Several results have been published with the BPM-SOA integration since many organizations turned their attention to these paradigms. BPM products became an important category of software product such that large suppliers offer comprehensive solutions through BPM systems or BPMS (Business Process Management System). Then at this point, the BPM and SOA solutions begun to converge. Although BPM and SOA have characteristics that make them very different, the most important thing is that they complement perfectly with considerable contributions to business processes.

In a generic way, it could be said that SOA is at a low level, focused on technical level development, while BPM is at the highest level oriented towards the business. Generally, the tasks that are executed in the processes are implemented as services. BPM without SOA is useful for creating applications, but difficult to adapt to the company. SOA without BPM is useful to create reusable and consistent services, but with a deficiency in the ability to turn them into an agile and competitive organization [29-31].

For a better understanding of the structure of a BPM-SOA architecture Hitpass_Heyl [32] distinguishes three levels (Figure 4):

- BPA (Business Process Analysis): business perspective of the processes, that where the activity is understood and the processes are analyzed and designed.
- BPE (Business Process Execution): first technical layer with specific process management tools
- SOA: Technical layer with a more general purpose and focused on the integration of systems, applications and components.

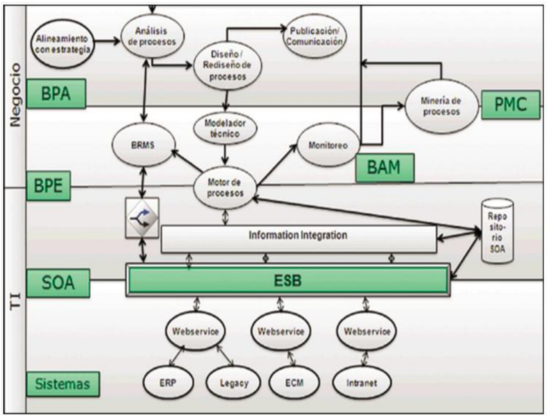

Figure 4: BPM-SOA architecture. Source [32].

The business layer has the responsibility to deliver a specification (automation-independent process model) that can be automated (business logic) and the technology layer has the responsibility of taking it to a technically executable model (BPE)

*3.2.2. The business rules inside SOA-BPM.*

According to Weigand [cited por 33], many methodologies for business rules-based software development are limited, since they focus on the application for decision making and do not address the business process constraints that underlie the composition of the service. In an SOA environment, this means that the business rule (BR) used in the creation of processes is too rigid.

SOA implements business processes through the business services orchestration that use data formats and standard communication protocols. Among these services, the decision services stand out, which are based on the execution of BR with the data as raw material [34]. Then, the productivity improves through SOA facilities to adapt quickly to new BR based on the available services.

A Business Rules Management System (BRMS) is crucial within a SOA strategy because it facilitates the reuse of services, consistency and quality of the data, as it allows the creation and deployment of transparent decisions service (TDS) without additional software programming, being totally based on BR.

The combination of BPM-SOA technologies forms the basis of many of the new architecture maps of business when they redesign their systems to face any change. However, these maps often remain incomplete if they do not also incorporate a BRMS [35].

*3.2.3. Business rules inside the management of business processes.*

The management of the rules and the management of business processes have as a common objective to increase the capacity and agility of operation and adaptation of the organization, but they serve completely different and complementary purposes. Processes are defined at a higher level than rules, which means that rules can be used to implement processes and are generally exposed as services while, on the other hand, processes consume services [36].

Some BPM tools couple or join the logic of the process with the BR and this causes high complexity of maintenance and updating of the processes and the BR, with consequent intensive work times and technical knowledge. The idea that the BR are components of one or several business processes, is based on the fact that a process is defined by its objective or productive goal, which can be broken into subprocesses and each of them in functions or task. BR can organize these last.

Integrating decision making with a business process oriented approach allows creating simpler and more agile processes, for achieving an explicit development and maintenance in more flexible business applications. In addition, as shown in figure 5, guidelines are set to establish life cycles in the generation of the versions, from the life cycles of each approach separately.

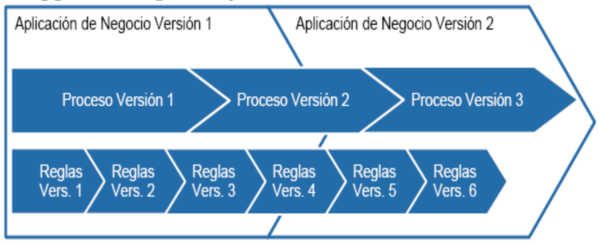

Figure 5: Development of versions based on the BPM and BRM lifecycles. Source [37]

BRM tools are often used to complement BPM tools. The last one aims to improve the efficiency and quality of work flow through a sequence of tasks or activities, while the first one intend to improve the efficiency and quality of the tasks involved in making decisions. According to Mark Allen [cited by 38] most BPM tools include basic BRM functionality, but they are generally limited to routing or work assignment tasks and are not well suited to automate operational decision making.

*3.2.4. Semantic technologies inside others paradigms.*

Semantics web services and business processes.

One of the main challenges that BPM deal with, is to allow the analysis of business processes to be automatically executed. To face that, it appears semantic business process management (SBPM) approach, through which it is tried to increase the level of automation of BPM with the use of ontological languages and semantic web services (SWS) for the representation, both of the business and implementation perspectives of a business process [20].

The semantic web services.

The SWS were developed by the need to automate the discovery, execution and composition of web services, which through the syntactic specification of these as enablers of SOA was impossible. The SWS consist in the fusion of the traditional web services and the WS technologies, which allow the machines to interpret the information, by means of the automatic reasoning, starting from the formal descriptions through using the ontologies as data model [33,39,40].

Standards have also been defined that facilitate its use as the OWL-S (Ontological Language for describing Services) [42], WSMO (Web Service Modeling Ontology) [43], WSDL-S (Web Service Semantics) [44] and SAWSDL (Semantic Annotations for WSDL and XML Schema) based on WSDL-S [45], as the most important initiatives. The most implemented models are OWL-S and WSMO.

It is said that the SWS help in the interoperation without interruptions between the systems, so manual effort is reduced; however, they have not yet been fully adopted by the industry. There may be several reasons for this. One of the biggest challenges for SW in general and for SWS in particular is the lack of availability of semantically annotated content for its use [47].

The semantic processes.

The design of the business process is at the interface between business experts and IT experts. Mendling et. al [48] points out that comparatively textual content of process models have been by far less attention than research in the area of behavioral semantics.

The integration of semantic technologies within the BPM life cycle makes it possible to flex and increase the degree of automation of this cycle, with new functionalities or strengthening existing ones in the BPMS. There are theoretical approaches that focus on obtaining formalizations and BPM ontologies; while other authors publish results on tools, architectures and functional requirements for a SBPM; like the case of Pacheco et.al [49], who presented a fully functional BPMS based on semantic technology, called *SWBProcess*. It is an open source industrial software, which supports the complete cycle of a BPM, with the ontology-driven systems development, although it does not include semantic services as part of the implementation of semantic processes and the BRM approach is limited too.

As shown in figure 6, the primary input to a SBPM turns out to be models, standards, library references, mining tools, etc. Then come the specifications grouped into two large formalisms, the notations for the processes (eg BPEL[*Business Process Execution Language*, EPC) and generic representations. Both formalities must be defined and referenced by ontologies.

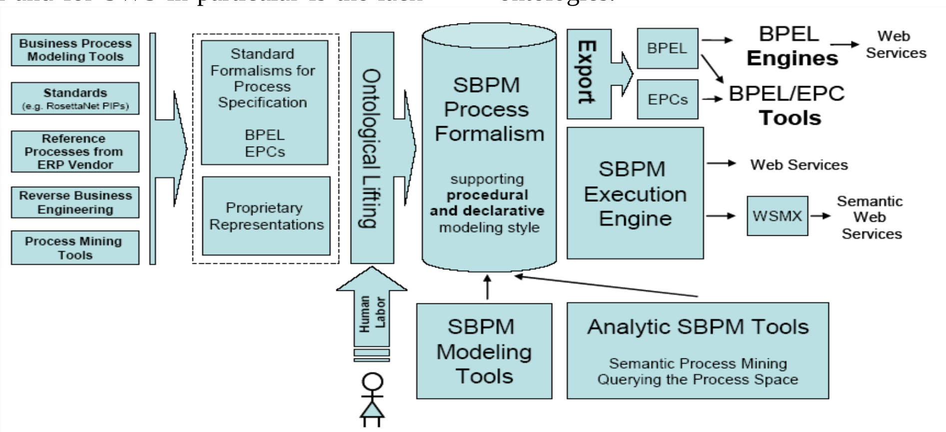


Figure 6: Life cycle of a semantic business process. Source [50]

The first steps in the integration of the BPM, SWS and WS approaches came with the presentation of the SUPER research project [12, 33, 51 ], where BPMO (Business Process Modeling Ontology) stands out as the cornerstone for the SBPM approach. Others approaches to the understanding and semantic enrichment of business processes take the BPMN (Business Process Modeling Notation) standard as their starting point for the creation of ontologies with different purposes [52-61].

The creation of BPMNO (Business Process Modeling Notation Ontology) [54, 59] was the most notorious of the contributions of integration BPM-SW, whose authors highlighted it against the rest, from its comparison with the ontologies released or published, regarding deficiencies that they presented in the taxonomy, completeness, availability, etc. As standard, the BPMNO does not attempt to model the dynamic behavior of a process designed in BPMN, ontologies are not particularly suitable for specifying behavioral semantics [59], nor does it intend an ontological analysis of its elements as Natschläger [57] did. This ontology provides a formalization of BPMN as a graphic language, that is, it describes all its graphic elements and how they can be used to construct diagrams in this notation; this includes the restrictions of its attributes, assigned by definition.

*3.2.5. The business rules in the semantic web.*

Improved communication between people is the main goal of the community of BR, while improving communication between machines is the goal of the SW community. Both sides focus will with the aim of analyzing the formal specification languages rules in general and exchange BR in particular, in the context of the SW.

Systems development approach based on the BRM within the SW is a not yet consolidated issue. According to Korea et. al [62] there is no clear definition of how to combine semantic technologies with the BR, although there is a consensus in the literature to use logic programs to express rules on primary ontologies. This can be seen in Figure 7, where a layer of rules that can access the ontology shown by logical programs.

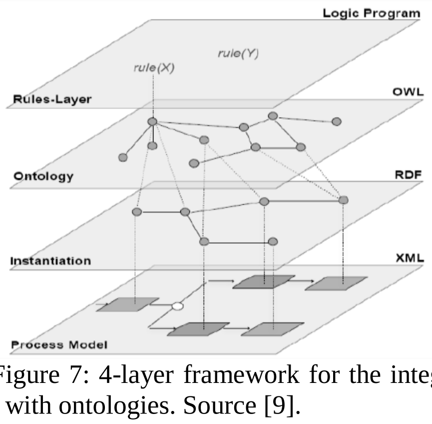


Figure 7: 4-layer framework for the integration of BR with ontologies. Source [9].

There are other items that link BR with semantic technologies, but are not oriented approach on the principles of BRM. Efforts to provide results of semantic technologies based rules are focused on the inclusion of first - order logic, from the restrictions of property, and logic for reasoning, particularly with the implementation of SWRL (Semantic web Rules Language) in reasoners resources [18, 63].

Gomes_Figueiredo [64] has analyzed several BR notations and representation forms for its treatment according to the statutes of BR manifesto [65] within of the software development area for business solutions. It is argued that the real power lies in the formal or conceptual model, because this should not only be sufficiently clear and precise to express all knowledge about the BR, but must also allow its classification and automatic, rigorous and reasonable processing to some kind of performance language or production rules.

The main advantage of using ontologies in the BRM is the possibility of representing its taxonomy and structure, constraints, their relationships with elements of the model itself or with elements of organizational domain; and therefore represents the behavior of the process and describes the business logic software on the same model.

Having defined the ontological structure of the BR, the automatic generation ensures correct syntax rules patterns and instances that make the repository of rules and facts. The process of transformation of the ontological model to a specific language format is practically direct, because there are currently many tools that allow it. Particularly Protege [66, 67] it is classic popular support for ontological management.

An important result was the ontological description of BR for ontology-based processes BPMNO [68]. With the definition of the BR it was possible to include a broad spectrum of categorizations found in the literature. The logic description of BR achieved from type object relationships ontology classes BPMNO and reached to represent the structure IF..THEN for BR. With this result the entities, attributes and relations under the principles of reuse and semantic interoperability and the approach specified BR.

## 4. The semantic technologies as support of the software paradigms integration for business solutions.

The main objective of the SW has been to allow data stored on the Web to be processed by machines in an intelligent way, making it easier for people to search, to integration and to analysis available information [69]. The use of ontologies as fundamental models for the development of software systems represents an evolution in the fusion of the research lines of software engineering and the SW, emerging that way the ontologies-driven information systems development (ODIS) [70]. The main ideas of this form of development consist of all the domain modeling of an application, the automated reasoning, the automated programming, the executable specifications and the processing of the data, through the semantic technologies.

The first results have been given by the Fund for Information and Documentation for Industry (INFOTEC) of Mexico [69]. They raised in 2008 the building of a platform and framework for accelerated applications development, in order to ensure that the information within the applications will have a well-defined structure and meaning. This platform, called *SemanticWebBuilder* Platform [49, 71] achieve systems development following the approach ODIS.

Various schemes of the possible Web have been structured by extension, from Web 1.0 to Web 4.0 even to web 9.0, anticipating the transition from web at different stages, where data integration, inference and data exchange between heterogeneous applications, is possible [72]. It is about not only integrating data from heterogeneous sources, but also involved elements of the physical world and its interaction with the virtual world, by establishing analysis processes, services and semantic information processing. Probably remain some time for the whole incorporation of ontologies to information systems to become a widely recognized approach, accepted and implemented [70].

## 5. Technological framework for a semantic web architecture as an integrating space for software paradigms.

From the beginning of semantic technologies, ontologies were being used to represent application architectures, whose functionalities would be available from a web services interface and another end user interface through a web browser. The structures of the input and output data of these services are formally represented in terms of the OWL, so that they can be located and used correctly by external agents.

In the literature there is no consensus on the question of how many layers should have a model in a business architecture. Most of the frameworks that were developed in the 90s and 2000s, mention three layers: business, applications and IT infrastructure. However, nowadays this classification does not respond to the current concept of orientation to processes and services. According to Hitpass_Heyl (2015), the business and technology layers require defining components with a greater degree of decomposition to achieve more flexibility in adapting to change.

The multilevel models in the application layer arise mainly for integration platforms, due to the improvements achieved in the network technology and the fact of having servers with public and stable APIs. The main advantage of this style is that the development can be carried out in several levels and, in case of any change, only the required level is confronted without having to check between mixed code, achieving a logic of application less coupled with the management of resources. In addition, it allows to distribute the job of creating an application by levels; in this way, each working group is totally abstracted from the rest of the levels, so that it is enough to know the API that exists between levels, which allows the design of scalable architectures, with reusable and portable elements.

The main challenge in an architecture of integration of several technological paradigms lies in choosing a harmonious combination of the respective methodologies of its particular implementation, in such a way as to guarantee a successful deployment and operation of the resulting software. Failure to do so would increase the complexity and cost of interconnection between layers, generating a loss of performance in that case.

The technological framework presented in this contribution is based on a semantic model for a web architecture, which is presented as a conceptual representation and describes its division into layers or levels, with a modular structure based on the nature of the information managed by each layer of it. In this model, three main layers are defined, one of which is decomposed into several sub-levels, with the aim of achieving the aforementioned advantages (Figure 8).

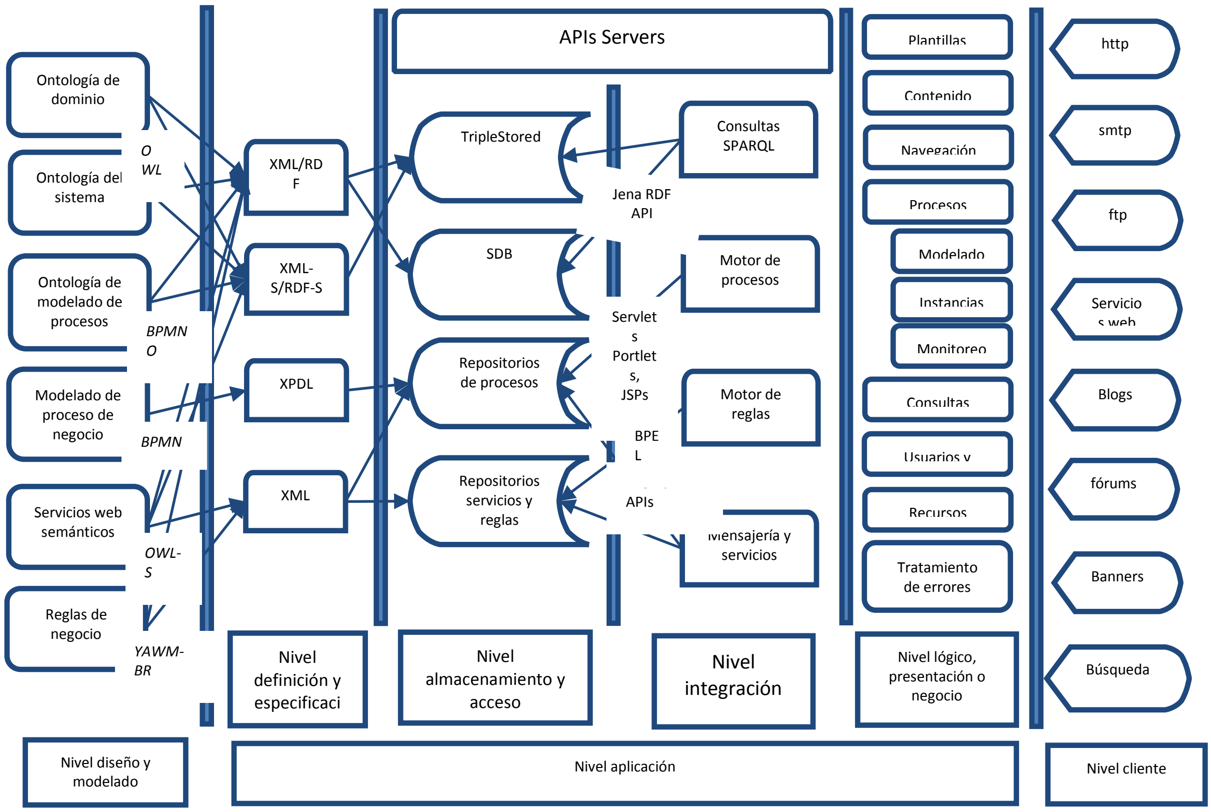


Figure 3.8: Multilayer model of a semantic web architecture as an integrating space for technological paradigms.

Briefly, this structure is based on the clear separation of the following levels:

• Level of design and modeling: It provides the design, construction, integration and modification of the ontological models with the most formal elements of the entire organization and the information system to be built and defined from the requirements engineering stage, carried out by all the IT project participants. Its creation occurs mainly in the “Platform Independent Modeling” stage and all its elements can be described in a graphical and structural way, preferably in the OWL language.

• Application level: Responsible for providing all specifications and coding for business logic, service management, storage media, use of APIs, as well as the necessary technologies or support to carry out the execution of the tasks, processes, queries and business logic in general. This level is composed of the following sub-levels:

 Sub-level of specification: In the procedural generation of code, all the knowledge is translated, stored in the ontologies, to code for the chosen language and platform. The formats and structures of the knowledge bases and the models in general are defined for the processing of information and possible exchanges to other formats or platforms.

 Storage sub-level: Data storage forms are specified, for example, triples are used to store knowledge bases constituted by conceptual models and their instances. In this case several bases are used, to say of the elements of the domain of the business, the business rules and elements of the ontologies of the processes and the semantic services.

 Sub-level of integration: In this layer, the means to achieve the integration of different servers or services are decided. Also called middleware, it is composed of all the servers that the system tries to integrate. These servers, in turn, can be complete applications of different architectures, Servlets, Portlets, etc.

 Sub-level of presentation: In charge of showing the logical view of operation of the information system, the "back-end". It is the module in charge of customizing the input commands of the user, the current state of the processes, the decision making and the actions carried out, about what is to be presented to the user, communicating it to the different engines of the system, to control the flow of and the decision maker. This layer always maintains a state, which is managed through instances, of the different elements that make up the model.

• Client level: This level has been the "front-end" and from the architectural point of view, it is responsible for loading external resources, processing user input and presenting the results in a minimum of process. The components of this layer are usually specified from the early stages of development, even in the majority of cases, using external middleware. It is also known as a graphical interface and must have the characteristic of being "friendly" (understandable and easy to use) for the user. This layer communicates only with the business layer

## 6. Conclusions.

Integration of application by designing a model for deploying enterprise IT solutions has its advantages, as described before. Modern approaches encapsulated programming, represented by the API, web services, *Hadoo* and *Mashups* have facilitated the rapid structuring of responses to the needs by allowing advantages as the combination of data and functions from various sources, making easy streamlined maintenance and rapid adaptation to changes, in addition to supporting high utility computing. However, knowledge and skills to implement them can be an obstacle, because they can lead to different principles and forms of development.

The models resulting from the integration of various paradigms offer maximum flexibility in the procedures for responding to persistent market changes and allow maintenance of the application without much instruction in computer programming, and above all leads to the understanding of the main elements of IT alignment with the business. Despite all that, also leads to knowledge and mastery of the characteristics of the models involved in the construction of a meta-model that allows its "mapping" or set the correspondence between them, especially when they have different symbols and technologies.

Among the most paradigms integrations treated in the literature are pairs of combinations BPM-SOA, SOA-BR, BPM-SWS and BPM-WS. Results have also been published integrations models where more than two models involved like BPM-SOA-SWS and BPM-BR-SWS, where semantic technologies are increasingly present.

Although the BR paradigms and SW have a high degree of conceptual and technological maturity, there is not yet relevant results of its integration with the rest of approaches discussed in this article. Still remain studies to achieve results of a comprehensive IT alignment model for enterprise architecture, with the advantages that involve each and every approach together.

The emergence of the SW, the mechanisms of knowledge representation and reasoning techniques, have triggered the creation of models and tools that combine modeling and process execution, modeling organizational knowledge and any other type of information to be processed and interpreted by machines. Among the main results may be mentioned BPMNO, SWS, extension BPMNO to BR, etc.

As example of achievement of the technological integration of development paradigms, a model of software architecture is shown where conceptual models are combined and then converted and processed in the different levels of system development to achieve an interdisciplinary solution that fulfils with the current ones adaptive demands of organizational and technological changes.

This changes the approach to methodologies that take as its starting point the relevant information to determine the flow and structure of processes, decisions and services in an enterprise architecture. In addition, they give freedom for operations structured and unstructured data making the SW an ideal paradigm for integrating enterprise software solutions space


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