An Approach to the Enterprise Integration

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Abstract. This paper describes the evolution and the results of the
research work carried out by the IRIS group in the field of enterprise
integration. This research work began with the ARDIN project, the aim
of which was to develop and validate a step forward in the state of the art
of the Reference Architectures for Enterprise Integration. The ARDIN
project was focused on the internal integration of the enterprise. So, the
next research activity to be conducted was to extend ARDIN to include
inter-enterprise integration. Then, the IRIS group has participated in
several projects in this context, like EDICER and CRM-Pyme project.
Finally, the research work currently being carried out by the IRIS group
is oriented towards knowledge management as a new aspect to be con-
sidered in enterprise integration.

1 The problem

To maintain and improve their competitiveness while reacting to the fast changes
that take place in the opportunities and needs of the market, enterprises must
adopt a kind of organisation and operations that will allow them to obtain the
maximum benefits from their resources.

Therefore, an enterprise must efficiently manage all of its elements, aligning
and integrating them in order to improve the ability to work together in a con-
tinuous improvement process that enables that the objectives and the strategy
of the enterprise to be accomplished.

2 What has been done

In this context, the research Group in Systems Integration and Re-Engineering
(IRIS) began to work on the ARDIN (Spanish acronym standing for Reference
Architecture for INtegrated Development) project in 1994. The IRIS research
group is a multidisciplinary group made up of faculty members from different
departments at Universitat Jaume I in Castelló, Spain. The mission of the group
is to establish a stable framework in which to carry out research in the fields of
enterprise organisation and computer systems, working according to the condi-
tion that the goals and results of the research activities have to be always oriented
towards solving the real problems facing companies and public organisations.

The objective of the ARDIN project was to develop and validate a step forward in the state of the art of the Reference Architectures for Enterprise Integration.

The IRIS group has applied the methods and techniques developed in the ARDIN project to enterprises of different sectors [2]: Tile Industry, Construction, Transport, Textile, Information Technology and Governmental.

Once the problem of the integration of a single enterprise had been solved, the next research project conducted by the IRIS group was oriented at extending ARDIN for virtual enterprise integration. Virtual Enterprise Integration means improving the performance of a temporary alliance of globally distributed independent enterprises that participate in the different phases of the life cycle of a product or service by efficiently managing the interactions among the participants. This is a very complex task that involves different approaches concerning technology, management and cultural elements.

At that point there were different proposals for enterprise integration (usually called Reference Architectures) that were very useful in applications for a single enterprise. However, they needed to be adapted to support the new requirements that appear in virtual enterprise integration.

The modifications that were made to ARDIN to help in the design and management of an efficient and flexible virtual enterprise can be synthesised in a methodology, a set of reference models of best business practices and in the design of a technological infrastructure.

Figure 1 shows the Virtual Enterprise Integration Programme that was proposed following the methodology of the extended ARDIN architecture, from a practical point of view. See [3] for further details about the extended ARDIN architecture and methodology for virtual enterprises.

In addition to the methodology, a Technological Infrastructure was also designed which makes use of the new information and communication technologies to support the smart integration of the virtual enterprise. The technological infrastructure automates the information traffic in the virtual enterprise so as to aid the cross-organisational business process.

Within this framework, part of the work was oriented towards the development of a Performance Measurement System (PMS) for virtual enterprise integration as a fundamental tool for achieving a high degree of integration [5].

The results of this research work were applied to two case studies: one from the tile sector [4] and another from the transport sector [1].

In addition, in inter-enterprise integration field, the IRIS group worked in the design and application of a methodology that described the activities and techniques required to develop (1) a tile sectoral profile for EDI messages under internationally accepted standards and (2) a set of guidelines for implementation that helps EDI to be incorporated in a quick and simple manner. This project was called EDICER.
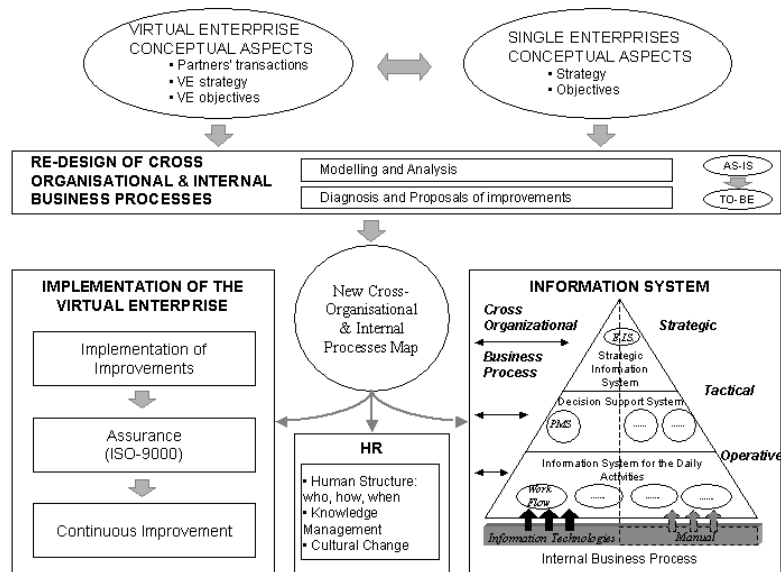
Fig. 1. Virtual Enterprise Integration Programme.

3   What is being done

One special aspect in inter-enterprise integration is the relation between the enterprises and the final customer. CRM (Customer Relationship Management) can be defined as a set of business, marketing and communication strategies and technological infrastructures that are designed to help build a long-lasting relationship with customers, which, to a large extent, is achieved by identifying, understanding and satisfying their needs. Yet CRM implementations are often unsuccessful.

To solve this problem, the IRIS group has developed a formal methodology (called the CRM-IRIS methodology) that guides the process of developing and implementing a CRM System. This methodology takes into account different aspects of a CRM system, such as the definition of a customer strategy, the reengineering of customer-oriented business processes, the administration of human resources, the computer system, change management and continuous improvement.

This methodology, together with the CRM software that was developed, was applied to 26 Spanish small and medium enterprises from different sectors as part of the CRM-Pyme project (a System of Managing Relationships with customers in SMEs; see http://www.fue.uji.es/crm-pyme/). The aim of this project, which began in 2003 and is about to finish, was to use the new information technologies

to identify innovative forms of organisation and of working in the relationships between small and medium-sized enterprises and their customers.

4 The future

Nowadays, the work of the IRIS group is oriented towards knowledge management as a new aspect to be considered in enterprise integration. A virtual textile enterprise collaborates with the IRIS group in the collection of data and the validation of the results.

Yet, the IRIS group's scope of action is not limited to just enterprises but also deals with other types of problems. The IRIS group is, then, beginning to work in the field of ontology by developing an ontology for the Genomic Epidemiology of Cardiovascular Diseases [6]. This work is part of the work plan of INBIOMED, a Spanish cooperative research network in Biomedical Informatics (http.//www.inbiomed.retics.net). This network is developing a technological platform for (1) the storage, integration and analysis of clinical, genetic and epidemiological data, and (2) images supporting the research on human pathologies.

5 Conclusions

This paper has described the work being carried out by the IRIS group in the enterprise integration field. It may serve as an example to illustrate the progress that has been made in this field, as regards: the internal integration of the enterprise, taking into account activities, decisions, resources and information; the integration of the enterprise with the other participants in the value chain and more especially with customers; and finally the identification of the roles played by human resources and the knowledge they possess.

References

1. R. Chalmeta. Virtual transport enterprise integration. *Journal of Integrated Design and Process Science*, December 2000. Publisher IOS Press publishes.
2. R. Chalmeta, C. Campos, and R. Grangel. References architectures for enterprises integration. *Journal of Systems and Software*, July 2001. Publisher Elsevier.
3. R. Chalmeta and R. Grangel. Ardin extension for virtual enterprise integration. *Journal of Systems and Software*, Setember 2003. Publisher Elsevier.
4. R. Chalmeta and R. Grangel. Virtual integration of tile industry (viti). In *Conceptual Modeling for Novel Application Domains*, volume 2814 of the serie Lecture Notes in Computer Science. M.A. Jeusfeld and O. Pastor, October 2003.
5. R. Chalmeta and R. Grangel. Performance measurement systems for virtual enterprise integration. *Journal Computer Integrate Manufacturing*, in evaluation.
6. O. Coltell, M. Arregui, D. Corella, and R. Chalmeta. Building an ontology on genomic epidemiology of cardiovascular diseases. In *Eighth World Multi-Conference on Systemics, Cybernetics and Informatics*, July 2004.