

Market-Leader ERPs and Cloud Computing: a Proposed Architecture for an Efficient and Effective Synergy

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Introduction

This paper deals about exploiting the possible synergies between Cloud Computing and Market Leader ERPs: Starting from the existing situation of Cloud Computing, ERPs and based on major player's recent declarations, is it really possible to merge benefits from cloud computing and market leader ERPs? Is it possible for instance for the most popular of these products, to work in a cloud as its managers theorise and gain from cloud benefits? The Authors' theory, as stated before, is that it's feasible. And based on their international, over 15 years-long experience especially on Retail and Fashion projects, they propose a possible architecture suitable for instance for retail chains.

The nature of consulting experience gained by the Authors over more than the last decade at national and international companies, pointed out problems related to so-called Back Office,

representing for all those companies that have geographically distributed branch networks and especially sales points / local agencies, one of the major constraints to the development of functional business processes. Traditionally, the disadvantage of the common back office applications is the fact that they are not connected online, real-time with the Enterprise Resource Planning Central Component (ECC) business management and, consequently, are not able to update continuously information managed at the central level (such as orders, production, stock availability, pricing, etc.). For many years this "independence" of the Back Office was considered a success by many companies, because in case of trouble connecting to the network of shops / local units could continue working without suspending activities. On the other hand, in recent years, the evolution of market demand (characterized by a pattern Cross and Cross

Demand Technology) has de facto forced companies to adopt marketing strategies than in the past using a different approach laminate Retail Marketing; consequently, the increasing need for business competitiveness, and thus innovation, both methodological (Business on Demand, Online Business), and technological (Web Services, Cloud Computing Applications), is of vitally strategic importance for companies. Some of the major players in the world in ERP production or in System Integration noticed this need and have developed specific tools. However, these tools have not found a complete success in the market, as they were seen, often with good reason, too complicated or too linked in the operation related to the specific architecture of origin from which they were developed (with the obvious constraints in terms of flexibility). The idea of the Authors is that it is possible to combine the benefits of using innovative methods such as cloud computing (in its meaning of SaaS - Software as a Service) and those resulting from modern technology of the ECC's market leaders (eg SAP ©, JDEdwards© etc.) to develop a new generation of tools for Back Office. In particular, it is now possible to integrate the ECC according to SOA - Service Oriented Architecture (for example, in a configuration where the back office applications in a store are based on web interfaces that draw on all the logic and databases directly from an ERP) using structures that allow the sharing of information online - Real Time (such as dialogue structures Application Programming Interface - API) making it easier and more flexible back-office management procedures and also allows to integrate other hardware necessary (scanners, PDTs, PDAs, etc.).

Exploiting The Synergy Between Cloud Computing and Traditional ERPs

The experience gained by the Authors in ERP systems originated more than 10 years ago (for some of them 15) from a project to improve customer service through the use of innovative tools for a large chain of distribution, with some topics of advanced research carried on in cooperation with the University of Genoa – Faculty of Engineering. By subsequent professional experience (mainly with companies in the retail distribution and Fashion) and from collaborations with major industry players, the Authors have developed the idea to turn on an R & D project, focused on the development of a Java™ technology Innovative back office application. The idea was comforted by many sponsors that stated their interest in supporting the initiative, achieved during the presentation of the same in different corporate environments. In particular, it was analyzed the status of the product currently produced by one of the absolute leaders of the world market in ERP / ECC to improve the potential of back office applications they already produce, through Cloud Computing and SaaS in particular, especially considering the high level of integration with the ECC in its innate tool, and highlighting the virtues and defects to be corrected. After the analysis of this product and its current status (As-Is), has carried out an analysis phase, expressible using the potential of Cloud Computing Technologies applied to the instrument, that dialogues Online - Real Time with ECC via API in Java™ in order to interact with the network of surrounding applications. The experience of some of the Authors in

developments through Java™ for distributed applications over the Web, along with the application knowledge of retail outlets and experience about the ERP/ECC architecture and processes (especially for areas Retail and Fashion) of the others were put into practice in a detailed analysis of the solution to be realised (To-Be), also expressed significant interest to the back office applications innovative aspects of the idea, which should have a deep impact on the market. The involvement of system integration experts can also help in spreading products worldwide, to enhance the dissemination and commercialization of the application in the Fashion and Retail customers already using ECC. Some companies have already established that, having expressed an interest in innovative back office applications, could become a pilot for the prototype.

Analysis of Back Office architecture at its “to-be” situation is currently 80%, development is ongoing and stages of verification and validation are still to be completed with the testing and accreditation phases to achieve a market-ready product with a time horizon of short period in order not to hamper competitiveness. It is therefore obvious how the application potentially can cover significant part of the market meeting a demand firmly rooted in the fields of IT retail-oriented companies. The consequence is that the potential market numbers for application are very significant, as involving all companies that until now, have a central ECC and a store chain, and all those who, in the near future (one or two years) plan to acquire a management tool of this kind. Moreover, the market penetration of the application would be further favoured by its nature cross-market, i.e. independent of the type

of market the company that its size from the market (multinational, national, SMEs).

The formalization of the idea has also found considerable scientific interest during his presentation at conferences and seminars organized by the University of Genoa, under an innovative methodological approach consists in developing in Java™ API, the application of technologies Cloud Computing kind SaaS (Software as a Service) to an ERP / ECC for the finalization of an instrument of front-end/back-end for store locations and decentralized offices of all companies Retail-Oriented

The idea is to link ERP with web services, for instance in a configuration where Back-Office applications in a shop are just web interfaces recalling all the logics and databases directly from an ERP; more generally, they are called APIs.

Just to clarify concepts, some specific Application Programming Interfaces exist inside ERPs as a set of interfaces to object-oriented programming methods that enable to integrate third-party software into the proprietary ECC. For specific business tasks such as uploading transactional data, ECC special APIs are normally implemented and stored in the ECC system as remote function call (RFC) modules.

An application programming interface (API) is more generally an interface that a software program implements in order to allow other software to interact with it, very similarly to the way in which a software might implement a user interface in order to allow people to interact with it. So it's the same concept, but more generalized.

APIs are implemented by applications, libraries and operating systems to define how

other software can make calls to or request services from them. An API determines the vocabulary and calling conventions the programmer should employ to use the services. It may include specifications for routines, data structures, object classes, and protocols used to communicate between the consumer and implementer of the API.

So the idea is to exploit APIs to connect through web ERP and user interfaces, that make

more easy, user friendly and appealing the back-office procedures, possibly enabling to integrate other useful devices such as scanners, PDTs etc.

The architecture of APIs connecting specific market-leader ERP/ECC and user interfaces through web has been already used in some Master Data Management (MDM) applications for industry solutions, so the application to retail store back-office seems to be more than feasible.

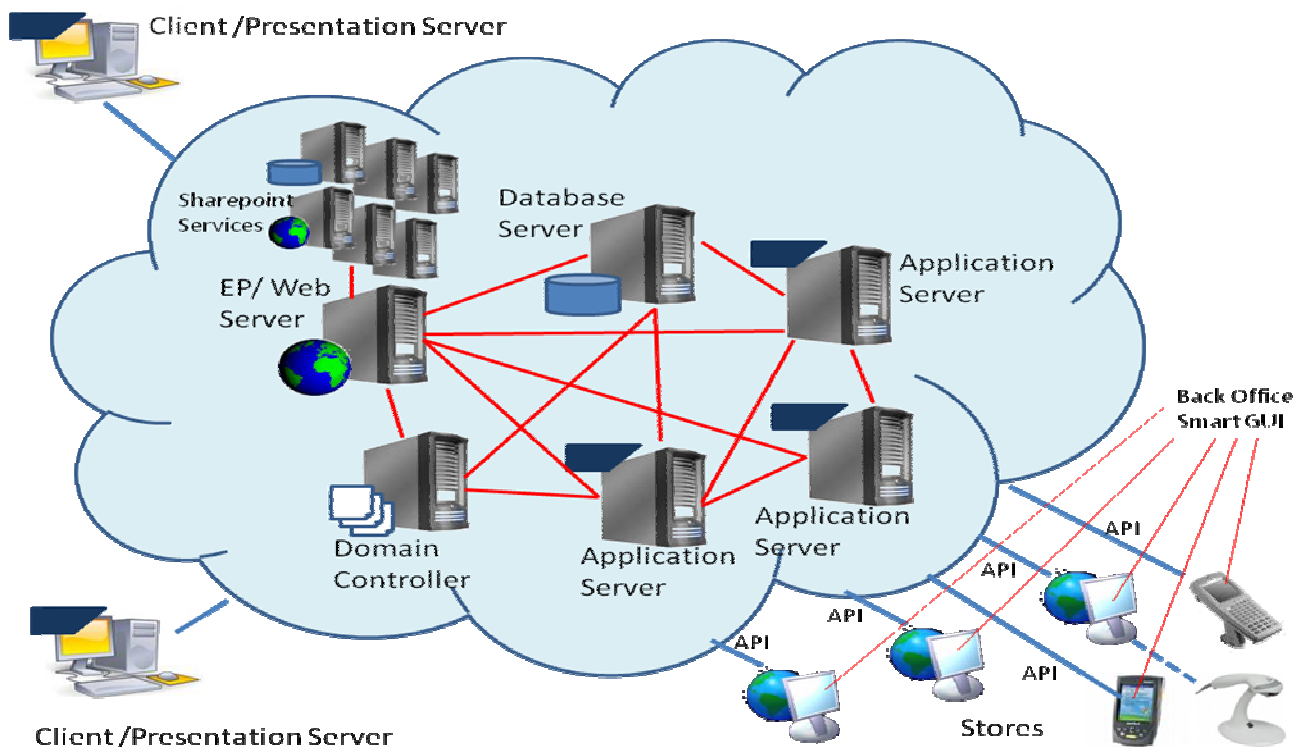


Fig. 1 – Proposed Cloud/ERP Integration for integrating Retail Back office

This proposal is not in contrast with the evolutions on ERP solutions that as mentioned before is going towards the concept of SOA. The idea of SOA in fact is to integrate ERP functionalities with evolutions and enhancements of existing legacy enterprise information systems (EIS), where in some cases are stored enormous amounts of data.

Sun Microsystems defined SOA in the late 1990's to describe Jini, which is an environment for dynamic discovery and use of services over a network. Web services have taken the concept of services introduced by Jini technology and implemented it as services delivered over the web using technologies such as XML, Web Services Description Language (WSDL), Simple Object Access Protocol (SOAP), and Universal

Description, Discovery, and Integration (UDDI). SOA emerged as the premier integration and architecture framework in a complex and heterogeneous environment. There were previous attempts, that any case didn't enable open interoperable solutions, because relied on proprietary APIs and required a high level of coordination between groups. SOA enables the software as a service concept: eBay for example, is opening up its web services API for its online auction with the goal to drive developers to make money around the eBay platform. Through the new APIs, developers can build custom applications that link to the online auction site and allow applications to submit items for sale facilitating mostly the sellers to upload offers, but in this way they also automatically enlarge customers base. SOA and web services are two different things, but web services are the preferred standards-based way to realize SOA.

The Current Situation as Starting Point

The idea of a market leader in ERP adopting SaaS is very common nowadays: starting from Salesforce.com through Oracle Cloud Solution called "CRM On Demand" and was already attempted also by SAP© in 2007, when the Company launched on the market the Business ByDesign application, destined to SMEs that do not want to invest too much in a "standard" ERP, but would like anyway to simplify their flows of processes and documents, sharing information no more by mail, spreadsheets and so on, but with a common database available all over the world.

But all these products are limited to one specific set of processes, and not as wide-coverage as a "traditional" ERP should be.

The concept at the basis of all these solution is to manage simplified and standard business flows on a web-based architecture, with no servers, no system administration etc., sometimes with standard processes and a common helpdesk for all companies using the same application. This simplifies the IT structure in terms of fixed costs (hardware, personnel) and variable costs (customizing and maintenance), without any doubt, but has a little flexibility in customizing. This solution is suitable especially for all SMEs that have simple processes to manage, and not all the business areas covered with traditional ERPs.

If we think to merge this solution with another recent hot topic, we can delineate more clearly the bonds and edges of the new idea proposed in this paper. In the middle of November 2009, SAP© announced an enforcement of the bridging solutions to support back-office applications to be connected to ERP/ECC through Business Communication Management (BCM) to integrate contact centers with other back office applications and a host of other connectivity points. This provides a backbone for business process applications, but seems to be especially devoted to contact center and communication with customers, with a series of functions still demanded to other back-office applications.

The disadvantage of common back-office application is that they are not connected on-line real time with the ECC, capturing in batch and not updating continuously information managed centrally, such as orders, production, stock availability, pricing, etc. In past years the independency of back-office has been considered positively by many companies, because in case of net connection problems the stores/local units

could continue to work without stopping activities. But nowadays with the new technologies and service levels this problem is almost no more impacting, and the necessity of a “local” tool for back-office operations seems no more needed. The priority has moved on a lean flow of information, able to give on-line real time details on the parameters needed by the store/local unit, partially typical from the point of sales, partially common to central warehouses or departments (e.g. bills, availability check for reordering, new products assortment and pricing are information managed at the level of central company management, other information such as shelf capacity, on-store availability etc. are managed at level of single point of sales).

At the moment the majority of back-office tools available on the market are resident application communicating in batch with the ERP through LANs or WANs secured through VPN, with the advantage of keeping functionalities always ready-to-use even in case of connection to server lost, but with the great disadvantage of exchanging just offline information.

SAP itself produced a tool for the back-office applications: SAP© Point-of-Sale, that offers many back and front office functions and integrates mobile devices, but the potential of this solution, that was born naturally to dialog with an ERP, could be much more increased by the new technologies exploiting the ideas described above and by offering more enhanced and user-friendly interfaces.

Future Developments

Based on the long experience achieved on store operations, on Java™ web applications for

commerce, on ERP processes implementation and architecture, the Authors have developed an analysis of as-is in existing store application products, and has developed the analysis and the first development of a new architecture exploiting benefits of existing tools, combining advantages of Cloud Computing and learning lessons from projects experience and customer’s opinion on common gaps and pitfalls of such applications. This work is being sponsored by various subjects of R&D/Academy world but also from Companies and System integrators, and will soon be released a prototype for a pilot on a Retail Fashion Company. The research and improvement will take benefit from the lessons that will be learned during this pilot.

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