FROM SOFTWARE-AS-A-GOOD TO SAAS: CHALLENGES AND NEEDS

Developing a Tool supported Methodology for the Migration of Non-SaaS Applications to SaaS

Leire Orue-Echevarria Arrieta[1], Juncal Alonso Ibarra[1], Jan Gottschick[2] and Hannes Restel[2]

[1] *Tecnalia Research & Innovation, ICT-ESI, Parque Tecnológico de Bizkaia, Geldo Street, Zamudio, Spain*
[2] *Fraunhofer-Institut fur Software und Systemtechnik ISST, Berlin, Germany*

Abstract: For all software vendors, but especially small and medium ones and in the current downturn economic situation with such a high competition, businesses that are not prepared to migrate the offerings of their software solutions to the form of online-services not only miss the opportunity to acquire new customers but they also run the risk of losing their existing customers towards new competitors. This transition from a software-as-a-good approach to a software-as-a-service one, is not trivial at all, and there exists a real demand for proven methods to perform the transition from traditional software products to the service concept. Based on this premise, the objective of this position paper is to provide software organizations with a stepwise procedure, methods and tools to migrate non-SaaS applications into SaaS, taking into account not only technical and technological issues but also issues related to business models and how to monetize the final solution. The solution presented here is a theoretical approach that is currently being validated in eight use cases in the Basque Country.

1 INTRODUCTION

In the course of establishing Cloud Computing concepts and with the inherent build up of service infrastructures, generic software products are increasingly being offered as individually configurable services in the form of Software-as-a-Service (SaaS) over the Internet.

As these new technologies emerge, a transition of business models is taking place: more and more software vendors are changing their business models from the Software-as-a-Good (SaaG) principle to the SaaS principle. According to a study commissioned by the EC in 2009 (Giron et al., 2009), SaaS market sales are expected to increase by approximately 20% per year, reaching 7,000 M€ in 2012 for EU27.

All in all, the transition from the traditional SaaG approach to the SaaS world is not trivial at all, and an actual demand exists for proven methods to support the transition from traditional software products to the service concept. Some of the problems encountered by software vendors,

especially SMEs, in this transition activities include among all, the determination of a correct business model, a pricing model, automatic billing, users' activity monitoring and auditing and service provisioning.

This position paper argues for the necessity of a migration method that pursues to solve the issues above and introduces the description of a tool supported method for the migration of non-SaaS applications (legacy applications, partial or complete, packaged software, Software-as-a-Good) to SaaS, in order to support all companies, but especially SMEs, in successfully migrating their traditional business model to a SaaS-based business model. Some parts of the approach presented here are currently being validated in several companies in the Basque Country. While it is still too early to determine the correctness of the approach, no major shortcomings of it were encountered.

2 A GLOBAL MIGRATION APPROACH: FROM TECHNOLOGY TO BUSINESS

The transition from a traditional software development and delivery model to the SaaS world is proving to be not trivial and many changes are therefore needed to accomplish both the technical and business side of SaaS.

This double migration is complicated and an overall systematic and standardized approach is not publicly available. Thus, companies humbly face the decision of which existing technology to migrate to and via which distribution channels to make it available, without risking the sustainability of their business. Nevertheless, a stand-alone method is not sufficient, which means that supporting calculation tools are essential. These tools shall at least cover the calculation of the running costs for SaaS solutions as well as the calculation of the income expected from such offers, while considering also additional and numerous factors, which can be levied only based on the choice of a specific platform.

2.1 Current Situation

While transforming an application to SaaS, many issues need to be taken into account. Technically, SaaS applications are built up from SOA. That is, all SaaS applications are based on SOA, while not all SOA applications are SaaS.

Transforming legacy applications to a service based approach allows systems to remain mostly invariable while exposing functionalities to a large number of customers through well-defined service interfaces. Some migration strategies to SOA, by wrapping components or modules as Web Services may be relatively straightforward but in the long term not efficient. Characteristics such as platform, language, architecture and the target environment play an important role in this complicated task. Some proposals for legacy migration to SOA like SMART (Grace, et al., 2008), or IBM SOMA (Kishore, et al., 2004) are available on literature. In spite of approaching the problem from different points of view, they all share some common aspects but also shortcomings. These shortcomings appear mainly in the way in which they treat interoperability, reliability, QoS, SLA Management, scalability, configurability and multitenancy, basic issues in the development of a SaaS application. Of course, several commercial solutions, such as Oracle's (Davies et al., 2009), do tackle these problems in their tool-suites but they lack of an independent and holistic method to prepare companies to a SOA and SaaS migration, where both requirements of current legacy systems and business needs have to be considered to establish a successful migration strategy.

The consequence of these shortcomings and vendor-lock-in causes that most companies, when trying to migrate their application to SaaS, start from scratch putting up a high investment with little security that the product, offered as a service, will be accepted by their current customer spectrum.

Needless to say, that none of the aforementioned methods cover the business requirements that SaaS applications require.

The next sections describe a method that provides a solution to the problems expressed above.

2.2 Approach

Thus, as expressed above, when transforming a product-based company into a SaaS provider, more than just a few technical issues have to be dealt with. Most prominently, the company has to change its business model for that particular product, while trying to make it coexist at the same time, with other products' business models. This situation will surely change its whole culture and processes. Therefore, it is needed a procedure model, which helps enterprises improve their technical know-how in order to migrate their software to cloud computing platforms as well as to supply them with methods and principles with respect to developing a SaaS-ready business model. The proposed solution in this position paper mainly consists on having a holistic view of the problem backing it with various tools, which support the migration to improved business models and sophisticated technical platforms in a safe way.

The proposed approach introduces some innovative points which are not being tackled in current existing solutions:

- Holistic focus mixing technological challenges and business related aspects.
- Stepwise approximation to the problem enabling the coexistence of both business models (SaaG/SaaS), minimizing failure risks
- Complete technical scope including current needs related to Cloud Computing challenges

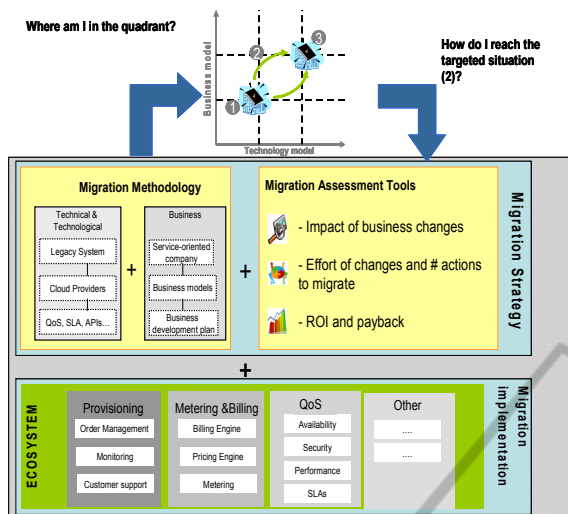Following, the envisioned approach is shown:

Figure 1: Solution overview.

2.3 Proposed Solution

Following the needs and challenges foreseen in the previous sections, the proposed approach will provide a twofold (tool-supported) methodology consisting on 1) tools to assess the impact, cost, effort, ROI and payback that a migration implies and 2) stepwise procedure with tailoring strategies supported by a SaaS ecosystem to migrate legacy software to a service oriented paradigm taking into account SaaS basic concepts.

2.3.1 Assessing the SaaS Readiness of a Company: A SaaS Migration Methodology

A company striving to improve its position in the market has to know very clearly where it stands and where it wants to go. Therefore, a benchmark, which allows a company to measure its position in the SaaS market is needed. The main idea is that if the actual characteristics of a company's solution in the SaaS market can be identified and measured, the actions required to improve the current characteristics rated as weak can be derived. The SaaS market demands a move to state-of-the-art technologies like SOA and cloud computing in the back office as well as web-based user interfaces and applications maintainable in as simple a manner as possible. Beyond the pure technological changes, the exploitation and implementation of the improved business model in the new context of SaaS is a key factor of success. It is important to notice that there does not exist a single path to a successful repositioning, as both the preconditions and environment of companies differ.

Such an approach of benchmarking a company (or one of its products) and determining the required improvements has been successfully adopted using balanced scorecards (Cobbold, I et al., 2002) to define IT strategies in large enterprises. The figure 2 below outlines the evaluation of a company's position using a quadrant. Similar to the evaluation of quality criteria as motivated by the ISO 9126 quality model standard (ISO, 2011) and used in the methodology of the "bidirectional quality model" (Simon, F., et al., 2006) the approach will measure several metrics by evaluating check lists or analysing features of the existing software. The measured metrics are aggregated to indicators, which define a characteristic used to calculate the maturity of the business model and the maturity of the technology model. The pricing model constitutes one possible candidate (but not the only one) for a typical characteristic of the business model. An example for a characteristic of the technology model is given by the usage of a service-oriented architecture in the existing technical solution.
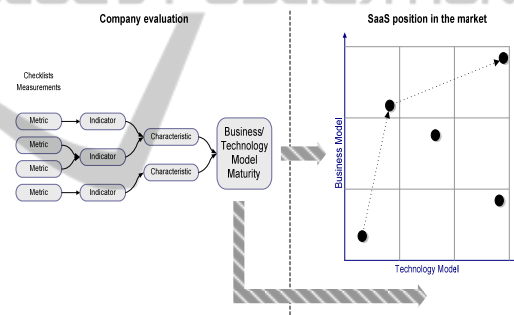

Figure 2: Quadrant approach.

2.3.2 Migration Assessment Tools

Furthermore, tools to help companies in the decision process of whether to migrate or not are needed.

These tools comprise the following ones:

- Impact of Business Changes: tool to measure how the business model of the migrated solution will impact the overall results of the SME as a whole, compared to the situation in which the product is not migrated.

- Effort of Changes and Required Actions to Migrate: This tool should analyse code patterns, how coupled the code is and from there, calculate how many actions will be required to migrate the code and how much effort they will cost. Monetization of the effort can easily be derived.

- Calculation of ROI and Payback: This tool should calculate the return of investment and

payback, taken into account as entry parameters how much the migration will cost, and the expected benefits.

2.3.3 Migration Implementation Resources

To support the migration strategy and speed up the migration process, it is necessary to create and make available to these companies an ecosystem of standard solution components and services. These components shall include at least those related to how to monetize a SaaS application (i.e. a billing engine, a pricing engine), performance monitoring, security techniques, auditing, mechanisms to measure and monitor QoS, and SLA management.

3 CONCLUSIONS

For an organization trying to get involved and take advantage of the undergoing technological wave under the Internet-of-Services paradigm, the migration to SaaS is an important challenge to face. Current solutions mainly concentrate on the technological aspect of the SOA approach but lack in the business and organizational aspects. Furthermore, most of the existing propositions tackle this situation with a big bang approach vision proposing solutions based on migration from scratch rather than a stepwise-risk minimizing procedure.

To face these challenges, a complete solution is needed, including key features like:

- A benchmarking tool to assess the maturity of the current and desired business model as well as the maturity of the established and desired technologies.
- A risk minimized, stepwise procedure model, that envisions all applicable directions and options to SMEs for the next step to go, especially the financial and business implications to be expected, and the overall impact for the technical and business improvement in comparison to the state-of-the-art.
- Tools to calculate the impacts of core issues, e.g. to calculate the impacts of changing the existing pricing model from a product-based solution to alternative business models (simple, composite or hybrid).
- A catalogue of essential services and components needed to develop and deploy a successful and sustainable SaaS application.

The theoretical solution presented in this position paper will bridge the transition towards the new era of Internet of Services providing methods and criteria that will enable important breakthroughs in software engineering methods and architectures, allowing flexible, dynamic, dependable and scalable provision and consumption of advanced SaaS applications.

ACKNOWLEDGEMENTS

REFERENCES

Davies, J., Shaffer, D., Demed, L., 2009. Oracle SOA Suite 11g. *Available at: http://www.oracle.com/ technetwork/middleware/soasuite/overview/wp-soa-suite-11gr1-2-129551.pdf.*

Giron, F. et al., 2009. D2 – The European Software Industry - Economic and Social Impact of Software & Software-Based Services, Paris, France: Pierre Audoin Consultants SAS (PAC). *Available at: http://cordis.europa.eu/fp7/ict/ssai/docs/20090730-d2-eu-ssbs-industry_en.pdf.*

Grace A. L., Edwin J. M, Dennis B. S, Soumya S., 2008. SMART: Analyzing the Reuse Potential of Legacy Components in a Service-Oriented Architecture Environment, Carnegie Mellon University. *Available at: http://www.sei.cmu.edu/reports/08tn008.pdf.*

Kishore C., Kerrie H., Edward M., 2004. Migrating to a service-oriented architecture. IBM Global Services & IBM Software Group. *Available at: ftp://service.boulder.ibm.com/s390/audio/pdfs/G224-7298-00_FinalMigratetoSOA.pdf.*

Simon, F., Seng, O., Mohaupt, T., 2006. Code-Quality-Management - *Technische Qualität industrieller Softwaresysteme transparent und vergleichbar gemacht. dpunkt Verlag, Heidelberg.*

Cobbold, I et al., 2002. The Development of the Balanced Scorecard as a Strategic Management Tool. *Available at: http://www.2gc.co.uk/pdf/2GC-PMA02-1f.pdf*

ISO, 2011. Software engineering -- Product quality -- Part 1: Quality model. *http://www.iso.org/iso/ iso_catalogue/catalogue_tc/catalogue_detail.htm?csn umber=22749*