

SOA Adoption in the Italian Industry

Maurizio Leotta, Filippo Ricca, Marina Ribaudò, Gianna Reggio, Egidio Astesiano, Tullio Vernazza

Abstract:

We conducted a personal opinion survey in two rounds - years 2008 and 2011 - with the aim of investigating the level of knowledge and adoption of SOA in the Italian industry. We are also interested in understanding what is the trend of SOA (positive or negative?) and what are the methods, technologies and tools really used in the industry.

The main findings of this survey are the following: (1) SOA is a relevant phenomenon in Italy, (2) Web services and RESTful services are well-known/used and (3) orchestration languages and UDDI are little known and used. These results suggest that in Italy SOA is interpreted in a more simplistic way with respect to the current/real definition (i.e., without the concepts of orchestration/choreography and registry). Currently, the adoption of SOA is medium/low with a stable/positive trend of pervasiveness.

Digital Object Identifier (DOI):

<http://dx.doi.org/10.1109/ICSE.2012.6227074>

Copyright:

© 2012 IEEE. Personal use of this material is permitted. Permission from IEEE must be obtained for all other uses, in any current or future media, including reprinting/republishing this material for advertising or promotional purposes, creating new collective works, for resale or redistribution to servers or lists, or reuse of any copyrighted component of this work in other works.

SOA Adoption in the Italian Industry

Maurizio Leotta¹, Filippo Ricca¹, Marina Ribaudò¹, Gianna Reggio¹, Egidio Astesiano¹, Tullio Vernazza²

¹DISI, ²DIST, Università di Genova, Italy

{maurizio.leotta|filippo.ricca|ribaudò|gianna.reggio|astes}@disi.unige.it, tullio@dist.unige.it

Abstract—We conducted a personal opinion survey in two rounds – years 2008 and 2011 – with the aim of investigating the level of knowledge and adoption of SOA in the Italian industry. We are also interested in understanding what is the trend of SOA (positive or negative?) and what are the methods, technologies and tools really used in the industry.

The main findings of this survey are the following: (1) SOA is a relevant phenomenon in Italy, (2) Web services and RESTful services are well-known/used and (3) orchestration languages and UDDI are little known and used. These results suggest that in Italy SOA is interpreted in a more simplistic way with respect to the current/real definition (i.e., without the concepts of orchestration/choreography and registry). Currently, the adoption of SOA is medium/low with a stable/positive trend of pervasiveness.

Keywords—Industrial Survey; SOA; Web services; Rest

I. INTRODUCTION

SOA (Service Oriented Architecture) [2], is an architectural style for the development of software systems in the form of interoperable services (often implemented as Web services). Currently, it is not clear if and how SOA is known, adopted and perceived in the context of the Italian industry. The main aim of this work [5] is investigating to what extent and how Italian IT professionals knowledge/use SOA and how they perceive the trend of SOA. We are also interested in understanding which methods, technologies and tools are really used in the Italian industry for developing SOA systems and for migrating legacy systems towards SOA.

II. STUDY DEFINITION, DESIGN, AND PROCEDURE

We conducted a personal opinion survey [3] receiving 159 answers by Italian software professionals in two different rounds: during 2008 (first round) and during the end of 2011 (second round). For this reason, this work can be considered a longitudinal study¹.

The data were collected with the help of self-administered Internet questionnaires (20 questions in total).

The perspective is mainly of software engineering researchers, interested in understanding how much and how SOA is known and applied in industry, but the results could be also useful as guidelines for IT professionals often forced to take decisions in this field without sufficient information.

¹The essential feature of a longitudinal survey is that it provides repeated observations over time on a set of variables for the set of persons belonging to the survey [1].

A. Goals

The *goals* of the survey are four:

- **Research**: understanding whether or not SOA can be considered a promising research field.
- **Education**: evaluating whether and which SOA methods, technologies and tools have to be integrated in university courses.
- **Collaboration purposes**: finding new opportunities for collaboration with the industry to experiment our proposals (e.g., [4]).
- **Dissemination**: using the results of this survey to provide the industry with interesting information about market and technological trends.

B. Research Questions

Given the above goals the survey aimed at addressing the following *research questions*:

RQ1: *What is the knowledge and the usage of SOA in the Italian industry?* We are interested in understanding how many professionals know SOA and which are the technologies really used in this field (e.g., BPEL, Web service, REST). In particular, we would like to understand which are the most common methods, technologies and tools used for the creation of new systems and for the migration of existing systems towards SOA.

RQ2: *What is the perceived level of adoption of SOA in the Italian industry?* We are interested in evaluating the level of adoption achieved by SOA in the Italian industry. This information is important to infer the relevance of SOA.

RQ3: *What is the perceived trend of pervasiveness of SOA in the Italian industry?* We are interested in understanding the perceived trend of pervasiveness of SOA for the future (positive, stable or negative?). This information become particularly interesting when compared with the results of RQ2. For example, it may be interesting to conduct research on SOA and teach SOA even if the adoption is not widespread but whether the trend is positive.

C. Target Population and Sample Identification

The target population is the set of individuals to whom the survey applies. In our case, the population consists of Italian software professionals (e.g., project managers, architects, developers). Our sample consists of: (1) professionals working in IT companies; their skills are related to the production, maintenance or management of software

systems (they are 75% of the sample in 2008 and 74% in 2011); (2) professionals who work in companies that do not directly belong to the IT field but using information systems to carry out and support the company's business activities (15% of the sample in both the executions); (3) professionals who work for public agencies, government enterprise or performing other kinds of activities (10% of the sample in 2008 and 11% in 2011).

The sample was obtained in two ways: (1) by convenience, i.e., relying on the network contacts of our research group and (2) by sending invitation messages on mailing lists and Web groups concerning software engineering. We opted for non-probabilistic sampling methods even if we know all the problems of this sampling (e.g., the risk of using a sample not representative of the target population) [3] because this survey is exploratory and we thought that the target population was hard to identify and of limited availability.

III. SUMMARY OF THE RESULTS

RQ1 (Knowledge): Concerning the knowledge of SOA, it is rising (82% in 2008 and 88% in 2011). We found that in 2011 sample (see Fig. 1) Web services are well-known (96% of the respondents) and used (71% has personal experience with them). Also RESTful services are known given that 65% of the 2011 sample affirms to know them (38% has personal experience with them). Conversely, BPEL and in general the orchestration languages are not so used in the industry (only 11% of the sample uses them), even if a large percentage of our sample knows its existence (51% in total). A similar consideration can be done also for UDDI. Even if we have not inserted a specific question about UDDI in our questionnaire, we can infer its level of adoption from the list of SOA methods and tools really used in the Italian industry [5]. Only two respondents out of 159 reveal to know UDDI. The SOA experience in the companies of the respondents is augmented in the 2011 sample (61% in 2008 vs. 65% in 2011). Concerning the experience to migrate legacy systems towards SOA, we can state that is quite high (46% in 2011).

RQ2 (Adoption): The SOA level of adoption in the IT field of our sample is medium (48%) / low (43%) while partitioning by company size, it appears that respondents working in micro and small companies are in proportion more negative about the SOA adoption, while the others (medium+large) are more positive. This could be a direct consequence of the fact that medium/large companies are more involved in large projects where SOA is more used.

RQ3 (Trend): Our sample estimates as stable/positive the trend of SOA adoption; 51% opted for *Stable*, 45% for *Positive* and only 4% for *Negative*. Partitioning for company size, we find that respondents working in large companies always opted for *Positive* (21%) and *Stable* (23%). The more sceptical about a positive trend of SOA are the respondents

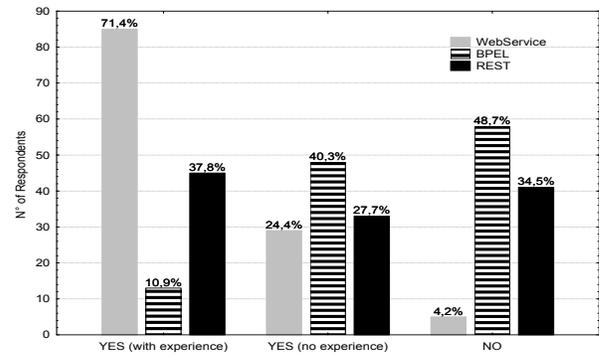


Figure 1. Do you know Web services, BPEL and REST?

working in micro companies. Partitioning for IT/non-IT companies and for industrial domains, we observe a more positive SOA trend of pervasiveness for non-IT companies. This finding suggests a reasonable explanation: given that non-IT companies have less IT expertise they are less inclined towards novelties (in this case SOA) but they think to reduce the gap with the IT ones in the next years (i.e., introducing SOA more quickly).

IV. CONCLUSIONS

SOA is a relevant phenomenon in the Italian industry: it is well-known (and used enough) and the same is true for its key components (Web services and RESTful services). On the contrary, orchestration languages and UDDI seem little known and used. These results suggest that in Italy SOA is interpreted in a more simplistic way with respect to the current/real definition of SOA. Currently, the adoption of SOA is medium with a perceived trend that is more stable than positive (but surely not negative).

The evident widespread knowledge and relevance of SOA emerging from our study should prompt the industry to invest more in SOA training/research and the university to produce students with SOA expertise. As future work, we would like to replicate this study in other countries and to compare the obtained results; to this aim we are looking for foreign partners. Moreover, we would like to execute a third round of this survey next year.

REFERENCES

- [1] N. Buck and J. Ermisch. Assessment of Longitudinal Survey Designs. Report prepared for New Zealand Treasury, 1995.
- [2] T. Erl. *SOA Principles of Service Design*. Prentice Hall, 2007.
- [3] B. A. Kitchenham and S. L. Pfleeger. Personal Opinion Surveys. In F. Shull, J. Singer, and D. I. K. Sjoberg, editors, *Guide to Advanced Empirical Software Engineering*, pages 63–92. Springer London, 2008.
- [4] M. Leotta, F. Ricca, G. Reggio, and E. Astesiano. Comparing the Maintainability of two Alternative Architectures of a Postal System: SOA vs. non-SOA. In *Proceedings of CSMR 2011*, pages 317–320. IEEE Computer Society Press, 2011.
- [5] M. Leotta, F. Ricca, M. Ribauda, G. Reggio, E. Astesiano, and T. Vernazza. An Exploratory Survey on SOA Knowledge, Adoption and Trend in the Italian Industry. In *ESEM 2012*. (submitted).