

Opening up Context-aware Services Compositions to End-Users*

Ignacio Mansanet¹, Victoria Torres¹, Pedro Valderas¹, José Javier Berrocal²,
José Manuel García², Juan Manuel Murillo², and Carlos Canal³

¹ Universitat Politècnica de València, Spain
Pros Research Center

`imansanet, vtorres, pvalderas@pros.upv.es`

² Universidad de Extremadura, Spain

`jberrocal, jgaralo, juanmamu@unex.es`

³ Universidad de Málaga, Spain

`canal@lcc.uma.es`

Abstract. The interconnected world in which we live opens many possibilities to create, consume, and share knowledge and services. Even though end-users are more than ever prepared in terms of technology (e.g., by using smartphones), their specific context (i.e., personal interests, geographical location, etc.) is not yet properly considered in existing solutions to explore these possibilities. Therefore, we need to provide end-users with tools that allow them to create, consume, and share added value services by using the proper knowledge and services according to their context. In this sense this paper discusses how existing solutions could be integrated to achieve this goal. In particular we explore the possibility of extending EUCalipTool, an end-user mobile tool for service compositions, with the context-aware notification capabilities offered by nimBees.

Keywords: Service Discovery, Context-aware discovery, End-user Development

1 Introduction

Nowadays we live surrounded by an ecosystem of devices, applications, services, and data that allows monitoring and supporting our daily activities (e.g., commuting from home to work or monitoring users health (sport activities, blood pressure, sleeping quantity and quality, ingested calories, etc.)). Within this ecosystem, the amount of services that are made available is growing exponentially, turning their search into a cumbersome task. In addition, many times

* This work has been developed with the support of MINECO under the SMART-ADAPT TIN2013-42981-P project, the RCIS TIN2014-53986-REDT network, the TIN2015-67083-R project, the TIN2015-69957-R project and co-funded by the ERDF, the Consejería de Economía e Infraestructura of the Junta de Extremadura (GR15098) and by FEDER funds.

users would like to make a combined usage of these services in order to better fulfill their specific needs. However, there are not yet tools targeted to end-users that allow them managing available services effectively.

Within this context, to achieve a more effective usage of all these services a new type of tools is required. In order to be successful, this type of tools should 1) take into account the profile of the user (e.g., age, gender, etc.) as well as her current context (e.g., location, season time, etc.), 2) run in mobile devices (e.g. smart phones), and 3) provide a user-friendly interfaces that stimulate users to use them.

As a first approach in this work we explore the possibility of combining the capabilities offered by two existing tools which are EUCalipTool[1,2] and nimBees⁴. On the one hand, EUCalipTool is a mobile tool that supports end-users during the composition of services from an integrated repository. Despite the fact that services and applications registered in EUCalipTool are tagged semantically, currently, it is the end-user who has to perform the search and selection of the interesting ones at each moment. On the other hand, nimBees is a push notification platform[3] based on the the People as a Service (PeaaS) paradigm[4] that uses the capabilities of modern mobile devices to gather the sociological profiles of their owners and provide them as services tightly related to their owners context.

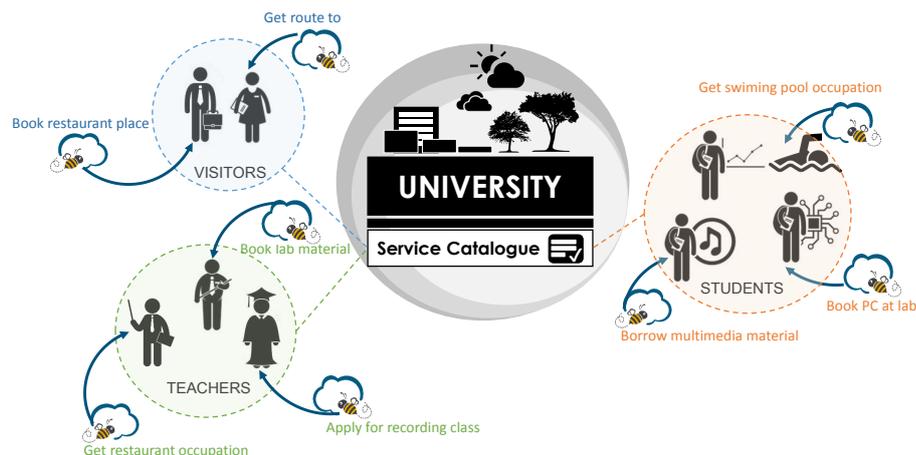


Fig. 1. Services are suggested based on the user profile and context

Therefore, by integrating these two tools we are endowing EUCalipTool with context-aware capabilities. This will help end-users finding services according to their current needs, i.e., based on their profile, preferences and location.

For illustration purposes take a look at figure 1. This figure shows a possible scenario at the university where different type of users exist (e.g., students,

⁴ <http://www.nimbees.com/>

teachers and visitors). The university manages a services catalogue (or repository) with all the services offered to the community. Based on the user profile, preferences and context users are suggested about potential useful services at this exact moment. These suggestions can then be taken by the user to be part of a new composition.

2 Integration Plan

To achieve the integration between EUCalipTool and nimBees requires reconsidering some of the architectural aspects initially designed in EUCalipTool. In particular these aspects refer to the EUCalipTool repository and its service search and sharing mechanisms.

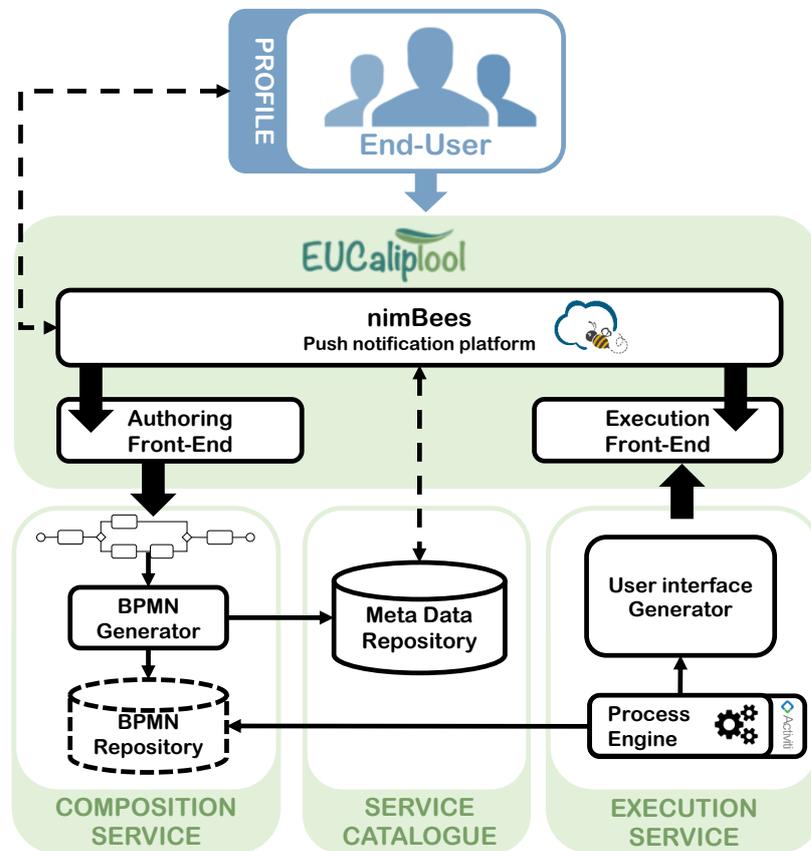


Fig. 2. nimBees integration into the EUCalipTool architecture

As figure 2 shows, nimBees should be able to access and search the services registered in the catalogue. For this purpose, services are tagged semantically,

so these tags can be used to match the user preferences, profile and context. The result of this search is then sent to end-users via the corresponding Front-end so they can use potential interesting services either to directly execute them (via the Execution front-end) or to use them as part of a new composition (via the Authoring Front-End). All the knowledge produced during this process (e.g., the individual/composed usage of service S in context C by user U) is stored in the repository as valuable data to improve the service selection.

Concerning the sharing mechanisms, the push notification mechanism offered by nimBees allows reaching not just users connected through social networks as was initially designed in EUCalipTool. Instead, potentially interesting services are sent to users that show common interests (through their profiles) and that are reachable at that precise moment.

3 Expected Benefits

Up to date, services and applications are designed to be used by end-users as these were conceived originally. However, it has been proven that the one-size-fits-all approach is no longer valid and that new tools, approaches, and mechanisms are required to better fit users needs. Therefore, by integrating EUCalipTool and nimBees we expect to get closer existing services to end-users based on their current needs. By using nimBees notification capabilities, service compositions can be shared with other users that may be interested on them based on their profile (i.e., their preferences) and also their current context (e.g., their current location).

References

1. Mansanet, I., Torres, V., Valderas, P., Pelechano, V.: A Mobile End-User Tool for Service Compositions. In: Actas de las X Jornadas de Ciencia e Ingenieria de Servicios (JCIS). (2014) 25–35
2. Mansanet, I., Torres, V., Valderas, P., Pelechano, V.: A Mobile End-User Tool for Service Compositions. In: Biblioteca Digital de Sistedes. Actas de las XI Jornadas de Ciencia e Ingenieria de Servicios (JCIS). (2015)
3. Miranda, J., Makitalo, N., Garcia-Alonso, J., Berrocal, J., Mikkonen, T., Canal, C., Murillo, J.: From the internet of things to the internet of people. *Internet Computing, IEEE* **19** (2015) 40–47
4. Guillen, J., Miranda, J., Berrocal, J., Garcia-Alonso, J., Murillo, J.M., Canal, C.: People as a Service: A mobile-centric model for providing collective sociological profiles. *IEEE Software* **31** (2014) 48–53