

RWTHApp: from a requirements analysis to a service oriented architecture for secure mobile access to personalized data

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Keywords

Mobile, eLearning, App, Service Oriented Architecture, OAuth, REST, Platform Independent, BYOD

1. Summary

Especially students with their natural BYOD mentality have changed their expectations on how universities should support their organizational and learning processes as well as their daily campus live. Pure web sites do not satisfy their needs anymore. Not only students but also universities are waiting to have their university app available in the app stores. We present our path to the RWTHApp and show the integration of this platform independent app into the complex existing IT infrastructure of the university.

2. Requirements Analysis and Current State

The first step in designing the RWTHApp was to collect requirements directly from the students. The ambition to understand the daily needs of the students lead to a competition where the students could hand in their ideas. Based on the result of this competition the best ideas were evaluated through a student committee and finally emerged in the current concept: An *army knife* to provide all the relevant information for the students at hand:

- A timetable to display when and where the next classes will take place.
- Recent activities on the eLearning platform such as new documents or announcements.
- University wide announcements and news as well as a room finder.
- University staff search.

All these features satisfy the needs of the students to receive information almost instantly. Also navigational capabilities give the students the possibility to find their way through the different buildings of the university spread all over the city of Aachen.

The data needed for these requirements already exists in current eLearning and campus management systems of the university. However these systems are not per se accessible by mobile applications and therefore were prepared with web services and security additions beforehand.

3. Architecture

To reach all the different mobile platforms that are already used by the students, our solution is a platform independent app: The RWTHApp uses Apache Cordova technology and JavaScript. Currently Android, iOS and Windows Phone 8 are supported.

The RWTHApp combines different existing source systems already used by the students and university staff for eLearning, Campus Management, Identity Management and other purposes. Data preparation and data consolidation between these systems and the app is done utilizing existing standards: REST, SAML and OAuth2. JavaScript is then used on the mobile device to render the data for the user. Figure 1 gives an overview of the infrastructure that was set up to access the already existing systems.

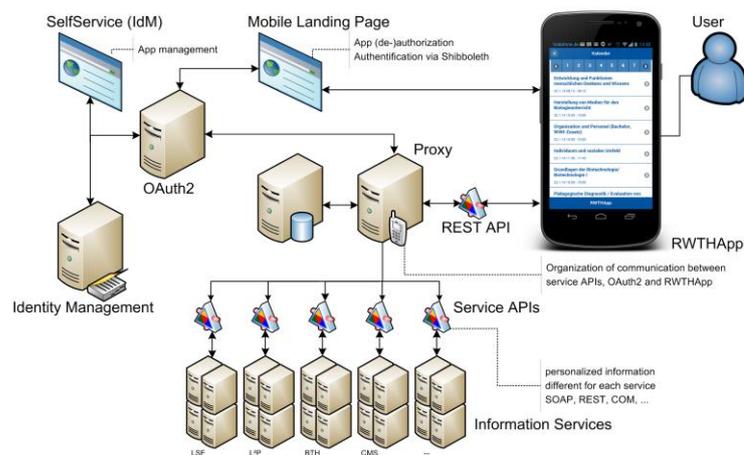


Figure 1 Architecture overview of the infrastructure to access data from existing systems.

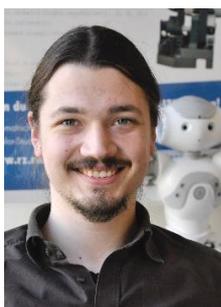
A proxy web service is used to route and translate REST requests from the RWTHApp to the different source systems. This proxy also prepares and caches the data for the RWTHApp to reduce the transferred data and processing time needed on the limited mobile devices. Furthermore it allows making legacy APIs (e.g. COM) accessible for the RWTHApp via homogeneous REST web services secured with the OAuth2 protocol. The OAuth2 protocol in turn allows secured, personalized access to the web services and handles the authorization from the user without supplying credentials to the RWTHApp itself. This also paves the way for 3rd party developers accessing the universities API.

4. Future Work

Based upon the current architecture additional capabilities will be added to the RWTHApp. Among other things the current focus is on integrating public transportation with stops and schedules as well as direct feedback from students within classes using the existing eLearning infrastructure. Also platform support of the RWTHApp will be extended further to support to Firefox OS and Windows 8 apps.

Since the first release of the RWTHApp in November 2013 it is emerging to be the central point for the students' daily way through the campus.

5. Authors' Biographies



Marius Politze, M.Sc. is research assistant at the IT Center RWTH Aachen University since 2012. His research is focused on service oriented architectures supporting university processes. He received his M.Sc. cum laude in Artificial Intelligence from Maastricht University in 2012. In 2011 he finished his B.Sc. studies in Scientific Programming at FH Aachen University of Applied Sciences. From 2008 until 2011 he worked at IT Center as a software developer and later as a teacher for scripting and programming languages.



Dipl.-Inform. Bernd Decker is deputy team lead of the IT process support team at IT Center RWTH Aachen University since 2011. From 2006 to 2009 he worked at IT Center as Software Developer and since 2009 as lead of the development group. His work is focused on IT solutions for processes in the field of eLearning, eServices and campus management systems.