

State of the Art & Technical Requirements

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In the first deliverable of PaaSword, we mainly focused on constructing a list of core technical and non-technical requirements that must be considered not only when building new cloud services but also when an organization or business wishes to migrate to a cloud environment. This comprehensive list of requirements will not only guide us through the development of our framework but we also hope that will provide valuable insights to both academia and industry in order to avoid common pitfalls and design even better cloud-based services. Requirements collection can be considered as the cornerstone activity of any successful project. It plays a key role for the successful scoping, defining, estimating and managing a project. With technological advances and trends evolving in dramatic rates over the last years, projects need to choose and employ the right methodologies for achieving the desired outcome with the requirements collection process, at the very beginning of the project. Successful requirements collection is typically unique in every project and circumstance, but also it can lead to many advantages. In addition to that, the collection and presentation of a concrete list of requirements can help towards a better understanding for the perceived solution that a project wishes to tackle. As a consequence, the methodology with which the collection of requirements is carried out is of paramount importance. Some of the beneficiaries of the requirements collected are managers, system analysts, user interface designers, system designers, and testers.

For the collection and definition of PaaSword's requirements the research partners closely collaborated with the industrial partners of the project. While all partners were aware of the importance of this activity for the development of the project, without proper methodology, organization, planning and communication between the partners of the project, it would provide the anticipated result. The methodology followed in the project promotes understanding between the business, technical and scientific needs of the project by laying out clear expectations at the beginning and at each checkpoint of the project. More precisely, the requirements are iteratively improved at each new checkpoint and are kept up-to-date to influence in parallel several of the activities in the project (development, testing, etc). The aim is to bring together technical and research partners of the project, and make them aware from the start with the important business aspects. The methodology promotes understanding of the partners' different views, consolidates opinions and defines what PaaSword should do. This enables requirements collection and delivery of concrete high-level requirements, promoting communication, alignment, consensus and active business user and customer involvement to meet the goals and needs of the project.

Furthermore, we thoroughly studied the state-of-the-art in cloud storage security through an overview of selected tools that will guide us during the development of our framework. To this end, we presented the main cryptographic primitives that will be used throughout the project and further analysed existing approaches regarding Searchable Encryption (SE) schemes. More precisely, apart from the presentation of the general model of SE schemes, a thorough analysis regarding efficiency and privacy issues was presented. Apart from studying the existing SE schemes, we also examined the existing encrypted persistence frameworks. This analysis provided us with valuable insights for selecting the tools that will better fit the needs of

the overall project. During the course of this study, we identified the limitations as well as the missing functionality from the existing tools. This analysis will eventually help us to design a framework that will cover some of the missing functionality in the market and will provide an added value to the present encrypted persistence frameworks.

In addition to that, we presented an overview of the existing approaches towards context awareness and policy modelling and enforcement. To this end, the most relevant state-of-the-art was presented, not only research-wise, but also approaches that have been adopted by the industry. Furthermore, research decisions and strategies that can affect the overall design of the architecture and its higher level structures were thoroughly discussed.

Finally, we presented an analysis of existing European and national projects related to PaaSword and we also provided a comparison with PaaSword. Through this comparison, we identified limitations and drawbacks of the existing approaches and gained essential knowledge regarding the missing functionality that PaaSword should cover. This analysis and presentation of related projects, we believe that can be proved as a good starting point for many researchers and key industry players that wish to develop similar services.