

BPaaS REFERENCES, DEFINITIONS, AND COMMON TERMS

D2.2

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EXECUTIVE SUMMARY

Lack of common terminology is a usual source of misunderstanding in research projects and may slow down the expected progress of the project, especially in the first phase. The CloudSocket project avoids this common pitfall by conducting a research and review in the literature and based on the partners experience in order to establish a common terminology to be used within the project as well as for external communication.

This led to the establishment of a publicly available Wiki:

www.cloudsocket.eu/terminology-wiki

containing a terminology and documenting the consortium-wide accepted terms.

This common terminology will provide a solid ground for the entire project communication. Moreover, it will also facilitate the technical discussions around the CloudSocket prototype architecture as well as the main research to be conducted. In order to stay up to date, the Wiki and the terminology it contains will be revisited every six months and adapted accordingly taking the project progress into account.

PROJECT CONTEXT

Workpackage	WP2: Use Case Requirements and Evaluation Criteria
Task	T2.2: Common Technical Understanding of Business Process of a Service
Dependencies	This is an accompanying document to explain the BPaaS References and Common Terms that provide the basis of common understanding between the consortium and to interested readers in form of a WIKI page. All other workpackages use this common term WIKI.

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TABLE OF CONTENT

1	Introduction	7
2	Methodology	8
3	Background Terminology	10
4	Structure of the Wiki	13
5	Sustainability and Maintenance	16
6	Conclusions	17

LIST OF FIGURES

Figure 1 High-level Taxonomy of Background Areas 11
Figure 2 Horizontal structure of the Wiki..... 13
Figure 3 Vertical structure of the Wiki..... 14
Figure 4 Frontpage of the Wiki 15

1 INTRODUCTION

Lack of common terminology is a usual source of misunderstanding in research projects and may slow down the progress of the project, especially in the first phase. The CloudSocket project avoids this common pitfall by establishing a common technical understanding of the project terminology in general and Business Process as a Service (BPaaS) in particular. In order to achieve this goal, a consortium-wide research and review in the literature and based on the partners experience has been executed.

The terms identified throughout this quest shall be used for communication within the project consortium as well as for external communication. As they facilitate the common understanding among all project participants, they will also be applied in the various project discussions to avoid any misconceptions and keep these discussions stringent by allowing to focus on the content. Also, a common terminology keeps the project deliverables consistent and allows a better structuring and a better pursuing of the main research objectives to be followed in the context of this project and beyond.

Our research has led to the establishment of a publicly accessible Wiki¹ containing and documenting the consortium-wide accepted terminology and a taxonomy on it. This accompanying document by no means tries to capture the full content of the Wiki whose content constitutes the actual Deliverable D2.2 and provides in-depth definitions as a publicly available stand-alone source of information.

Instead, besides explaining the methodology of how the actual version of the Wiki has been created, this document captures an overview of the background taxonomy and its relationship to the project. It also presents the structure of the Wiki, and clarifies the maintenance strategy we follow. Summarising, this document is structured as follows:

- It describes the methodology used in order to identify the respective terms and their definitions (cf. Section 2).
- It identifies background areas that CloudSocket touches upon and why (cf. Section 3).
- It describes the structure of the Wiki (cf. Section 4).
- It presents the maintenance strategy in order to keep the content of the Wiki up-to-date throughout the project lifetime (Section 5).

¹ <https://www.cloudsocket.eu/terminology-wiki>

2 METHODOLOGY

In order to derive the terms facilitating the common technical understanding, the consortium applied a terminology extraction approach where partners were first asked to provide an initial definition of what they consider important or unclear terms in the scope of the project. After initial input had been collected, the results were iteratively sorted, ordered, and the definitions refined and revised; also, gaps between the individual terms were filled by further research in literature and based on the expertise of the respective partners.

The detailed sequence of steps executed during the research was as follows:

Step I

UULM proposed the procedure during a telephone conference involving all partners. The proposal was accepted by the consortium.

Step II

UULM prepared a list of terms that they had extracted from the Wiki. Then, they sent out an email to the list asking for further terms that partners consider important in the scope of the project. They also asked for initial definitions of the terms in the extracted list and for all further terms partners contributed. For each term also sources such as publications, standards, and other material were requested to be contributed underpinning the view of the respective project partner and assisting in establishing a widely accepted definition of this term.

Step III

UULM compiled the input and identified terms where already a common understanding was available. They also identified problematic terms including those that had remained without definition, those with contradicting definitions, and those that were insufficiently defined. Also, UULM extracted terms whose definition referred to other terms that had not been defined.

Step IV

The intermediate results were discussed in a telephone conference in order to reconcile outstanding disagreements and close gaps in the definitions.

Step V

Based on the results, UULM proposed a taxonomy on top of the definitions. This taxonomy particularly addressed background work CloudSocket and BPaaS are built upon. This taxonomy was then put down as an internal Wiki on the project web site.

Step VI

At the project meeting in Stuttgart (2015/03/31-2015/04/01) the consortium accepted the taxonomy and reached agreement on the terminology.

Step VII

Based on these background terms and the respective taxonomy, a preliminary CloudSocket terminology was established. Further, for each of the leaves in the taxonomy technological aspects such as protocols and standards, but also tools were identified to technically guide consortium members as well as external parties (such as other research projects). The internal Wiki was enriched with this information.

Step VIII

UULM restructured the Wiki in order to match the structure that is described in Section 4. UULM collected feedback from consortium regarding individual definitions and minor corrections were performed.

Step IX

An index on the Wiki content was created and the Wiki was made publicly available on the project Web site.

3 BACKGROUND TERMINOLOGY

CloudSocket is located at the cross-road of five areas of research that can be coarsely identified as *Business Processes*, *Cloud computing*, *Service*, *Software Development and Operation*, as well as *Semantics*, *Ontologies*, and *Knowledge Engineering*. These relate to CloudSocket as follows:

Business Processes and Business Process Management is affected as CloudSocket aims at providing, managing, and executing business processes in a cloud-like manner. This means that business processes can adapt to the number of users and payment happens as-you-go without the need for any upfront investments for the user.

This fact naturally brings *cloud computing* in the scope of the project. Furthermore, the automatic execution of steps in a business process is often realised through the invocation of externally hosted services, which requires that the project considers terminology related to services as well. From a technical perspective, both cloud computing and service-orientation are part of the much broader field of *Distributed Computing* and share terminology defined therein.

Finally, CloudSocket uses semantic lifting on the one hand to map business-oriented specifications of business processes to technical requirements; and on the other hand to map low-level monitoring data back to the high-level requirements. Ontologies are being used in order to structure and name the respective semantic information needed.

Software development and operation is of importance for CloudSocket for multiple reasons. First, the project will develop software and hence requires that a certain development methodology and integration process be established. Second, even more important, within the CloudSocket project software components representing business processes will be assembled and operated automatically. Also, monitoring data is collected and interpreted automatically.

Each of the areas comes with its own context, history, terminology, and to a certain extent also taxonomy. In addition, the project faces cross-cutting issues that mainly address aspects relating to security and data classification. One of the main tasks executed for this deliverable was to review the individual areas and particularly their terminology and to identify those areas that are relevant for the project. All other areas and unrelated terms have been put aside in order to not bloat the terminology and to not introduce additional burden for accessing the project.

These considerations have led to a taxonomy of the project that follows the skeleton presented in Figure 1. As discussed above, we have put *cloud computing* as a sub-area of *distributed computing*, which reflects the historical aspects of the development of cloud computing, as well as accounts for the fact that access to cloud services is distributed and requires means to describe the distribution. Similarly, we put *services* as a sub-domain of distributed systems, as for CloudSocket a *service* will be commonly understood as a functionality remotely accessed over the Internet. *Business Processes*; *Ontologies*, *Semantics*, and *Knowledge Engineering*; as well as *Software Development and Operation* are associated with an own top-level hierarchy element in the taxonomy. Cross-cutting aspects are grouped in an own family of terms.

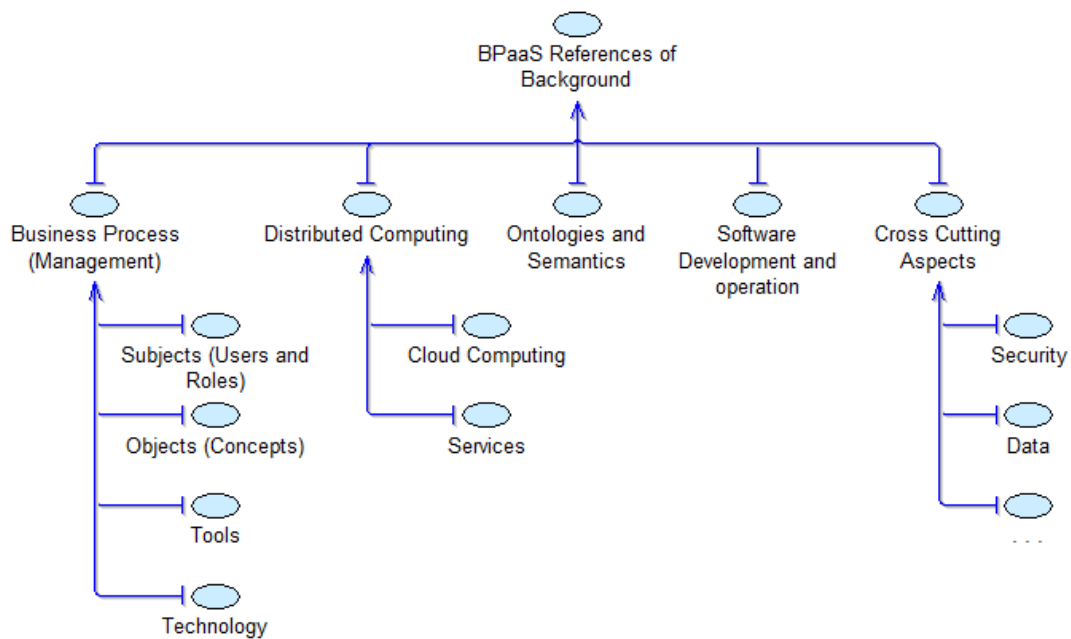


Figure 1 High-level Taxonomy of Background Areas

Obviously, a huge number of terms exists in each of areas of the top-level elements. To this end, we selected only those terms which are highly relevant for the project as a whole (cf. Section 2). Naturally, the taxonomies used in the various communities do not necessarily match regarding structure. Hence, in order to ease the navigation within our taxonomy – and indeed the Wiki – we introduce a common sub-structure to all main elements in the tree. This sub-structure differentiates between the entities *Subjects (Users and Roles)* and *Objects (abstract concepts or technical entities)*.

The sub-structure is further extended with *Technology* that aims at capturing all technical aspects of a family including technical specifications and protocols. For example, it captures amongst others the various network protocols for the distributed systems branch. For the Business Process branch, *Technology* for instance comprises various modelling languages to express business models and workflows. In contrast to *Objects* and *Subjects* that rather describe responsibility, the *Technology* describes how things are done, e.g. how *Objects* and *Subjects* interact. Hence, knowing the *Technology* used in an area completes the picture.

The final element of the sub-structure is *Tools* that comprises research and commercial tools that either built on existing *Technologies* or realise a *Technology*. Here, again, the goal is to provide an indicative overview on the tools that relate to the CloudSocket project or are being exploited by the project. *Tools* is separated from *Technology* as on the one hand, a single tool may be built on/realise multiple technologies and on the other hand the same technology may be exploited/realised by multiple tools.

These considerations lead to the overall taxonomy structure as it is shown in Figure 1. For the sake of readability, the sub-structure is only shown for Business Process (Management). It has to be read as “For *Business Process (Management)* different *Subjects (users and roles)* exist as well as several *Objects (concepts and technical entities)* and [their] definitions are to be considered. Each of them may be linked to one or multiple *Technologies*. Elements of this space are covered by some tools.”

The relationship between the objects, its subjects, technologies, and tools is captured in the Wiki and will not be repeated in this document. The structure of the Wiki itself is subject to Section 4. The Wiki itself does also cover CloudSocket-specific terminology that was not shown here, as it is not a background aspect. Nevertheless both CloudSocket as well as the Business Process as a Service concept that lies at the core of the project are captured in the Wiki. As we show in Section 4 their classifications follow the same structure as the other domains.

4 STRUCTURE OF THE WIKI

The considerations, in terms of the main taxonomy and the respective aspects described in Section 3 naturally lead to a corresponding structure for the Wiki pages: We are using the domain as a *horizontal* ordering whereas *Object, Subjects, Technology*, as well as *Tools* serve as a *vertical* schema. It is worth noticing that in contrast to Section 3, the horizontal ordering in the Wiki is extended by *Business Process as a Service* and *CloudSocket*.

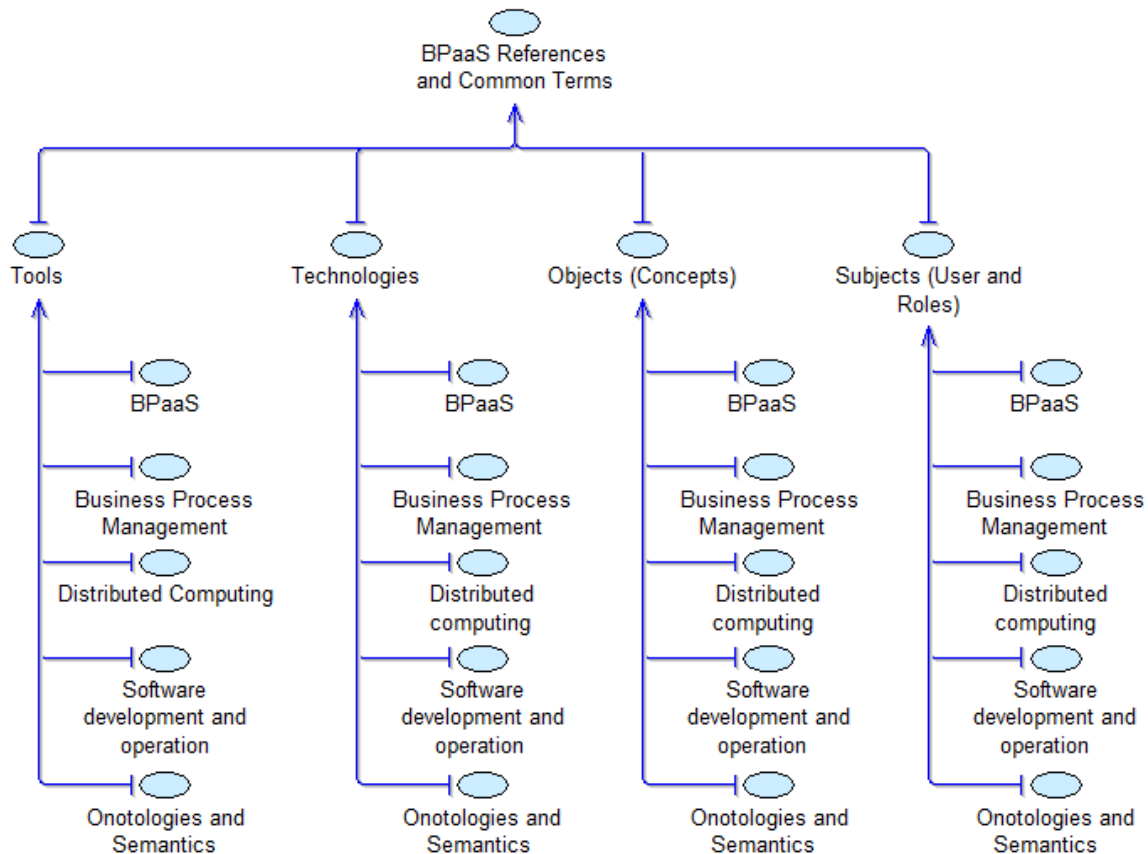


Figure 2 Horizontal structure of the Wiki

The front page of the Wiki offers a navigation according to both schemas as described in the following. From the *root page* of the Wiki (cf. Figure 2 with root page denoted *BPaaS References and Common Terms*), the user can navigate to the sub-root pages of the vertical elements (e.g. *Objects* and *Subjects*) and then to the specific pages of the horizontal elements (e.g. terms for cloud computing). From the leaf nodes, we link to other pages where applicable. For instance definitions for *Business Process as a Service (BPaaS)* make use of cloud terminology, and hence are linked to many terms in the cloud computing domain.

In order to browse in the opposite way of direction where an overview over a single topic (e.g., cloud computing) is desired, we offer an alternative taxonomy-oriented navigation scheme that is built according to what has been described in Section 3, but also includes *Business Process as a Service* and *CloudSocket* (cf Figure 3).

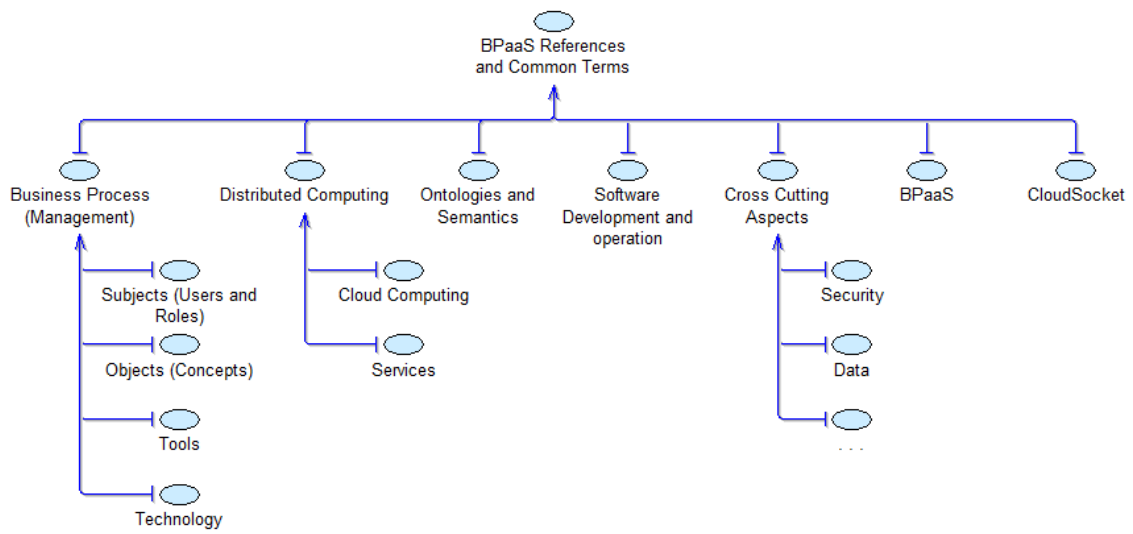


Figure 3 Vertical structure of the Wiki

In order to help users navigate through the Wiki, the root page further links to an index page where all defined terms are listed together with a link to the page where they are defined. Finally, the Liferay platform that the Wiki is built upon provides a free-text search functionality that quickly directs users to the definitions they are looking for. A screenshot of the Wiki's front page is shown in Figure 4.

Terminology Wiki - CLOU x

https://www.cloudsocket.eu/terminology-wiki/-/wiki/Main/FrontPage

Details Print Sign in

CloudSocket Technology and Terminology Wiki

This wiki is intended to create a common technical understanding of Business Process as a Service and CloudSocket in particular. It's main purpose is to collect, describe and explain the used concepts not only for the consortium members but also for other cooperative projects. In particular, it functions as a references to the project terminology that is used in all project documents such as deliverables, but also the web site and marketing material. There exist two navigation paths through this wiki. The first one takes Terminology, Tools, Technologies, and Users/Roles as a first level separator. The second path follows a taxonomy that captures the technological background of the project ranging from Business Process Management (BPM) to cloud systems, but also incorporates new terms coined by the project.

For quick access to individual terms, [the Glossary page](#) shall be used. The [references page](#) list all references that were used to emerge this wiki.

Domain-oriented Access to Content

The [domain-oriented](#) approach structures the content according to the four main enties:

1. [Terminology \(objects\)](#)
2. [Users and Roles \(subjects\)](#)
3. [Models and Technologies](#)

Figure 4 Frontpage of the Wiki

5 SUSTAINABILITY AND MAINTENANCE

While we trust both our methodology and our capability to incorporate external sources and definitions in our Wiki, we are aware that a project is a living organism and consequently, throughout the lifetime of the project, the meaning of terms may evolve over time as well as new terms or tools may be brought up as they are more pragmatic or more specific. Also, it may happen that definitions have to be narrowed down for the project, as a single term (e.g. service) is used with different semantics within the project. In that case, two different definitions for different types of services have to be introduced. Finally, the terminology as used by the research community and the industry may change.

In all those cases, the project definitions as established now (while remaining valid) may need to be adapted. In order to ensure, that such as adaptation is detected and realised in a correct manner, the consortium will implement the following sustainability plan:

Whenever a project Milestone has been reached, UULM will re-consider the established definitions with respect to the direction the project has taken. If needed definitions are put up to discussion. This may for instance be the case when one of the following situations has occurred: (a) new terms need to be introduced or (b) old terms need to be updated/re-defined.

Consequently, in the first year, the Wiki will be reconsidered at M6 and at M12. Hence, the later reconsideration will also take into account the finalised architecture (Deliverable D4.1) and the first research results incarnated in Deliverable D3.1.

Apart from these scheduled updates, any member of the project may asynchronously flag when she/he requires the introduction of a new term, the modification of existing terms, or has hit a reference (e.g. a research paper) that contradicts or enhances the currently used terms. Flagging can happen any time, but is supposed to happen either prior to or during project meetings. In all those cases UULM will make a consortium-wide effort to verify the need for modifications and if so, integrate them with the existing Wiki.

6 CONCLUSIONS

Deliverable D2.2 provides a common technical understanding of the project. In particular, it targets the background of the project namely *Business Processes, Distributed Systems, Services, Cloud computing, Software Development and Operation*, as well as *Semantics, Ontologies, and Knowledge Engineering*; but also the content of the project itself as well as the Business Process as a Service concept are addressed. This common understanding is captured as a terminology accessible in a publicly available Wiki².

This accompanying document has described the methodology of how the definitions were derived. It has further introduced a taxonomy structuring the background areas CloudSocket builds upon including the involved terminology and main aspects broken down to Objects (concepts and technical entities), Subjects (users and roles), Technology, and Tools. Finally, it has presented the structure of the Wiki and a strategy that ensures its maintenance throughout the project lifetime.

² <https://www.cloudsocket.eu/terminology-wiki>