4CaaSt

Building the PaaS Cloud of the Future

Use Case Applications eMarketPlace for SMEs: Scenario Definition D8.1.2

Version 2.0

WP8 – Experimentation

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Table of Contents

List of Figures

Abbreviations

4CaaSt	Building the PaaS Cloud of the future
AC	Application Component
API	Application Programming Interface
ATC	Air Traffic Control
BRT	Budapest RadioTaxi
CaaS	Context as a Service
ESB	Enterprise Service Bus
CAPEX	Capital expenditures
EU	European Union
GPS	Global Positioning System
HTTP	HyperText Transfer Protocol
IaaS	Infrastructure as a Service
IM	Instant Messaging
MMS	Multimedia Messaging System
NaaS	Network as a Service
NeaS	Network Enablers as a Service
OPEX	Operational expenditures
PaaS	Platform as a Service
PIC	Product Instance Component
PRT	Prague RadioTaxi
QoS	Quality of Service
REC	Runtime Execution Container
RP	Reporting Period
SaaS	Software as a Service
SDR	Service Data Record
SLA	Service Level Agreement
SME	Small and Medium Enterprise
SMS	Short Message Service
SP	Service Provider

UI	User Interface
WP	Work Package
XaaS	Anything as a Service: SaaS, PaaS, IaaS level services, but also Native or Immigrant APIs exposed as a Service
XML	Extensible Markup Language

Executive Summary

This deliverable describes the second release of the 4CaaSt scenario 8.1 “Applications eMarketplace for SMEs”, where the focus is on how Small and Medium Enterprises can benefit from the cloud, and especially from a platform like 4CaaSt, to provide new services at low cost and with a low entry barrier. It has been updated with input from the evaluation of the first release of the application prototype [4] which provided valuable insight on the capabilities of the 4CaaSt platform to support this scenario.

In this sense, this document describes a scenario in which an SME (SaaSSolutions) creates a new application on top of the 4CaaSt platform. To do that, it can integrate services offered in the 4CaaSt Marketplace by other SMEs. Furthermore, SaaSSolutions can delegate the commercialization of the application developed to the 4CaaSt Marketplace thus highly reducing trading costs. Other SMEs (Budapest Radio Taxi and Prague Radio Taxi) can access the 4CaaSt Marketplace to look for the application they need taking advantage of the advanced search functions is provides. In addition, all the trading process will be carried out within a secure and trusted environment.

This scenario covers several services from the 4CaaSt portfolio and helps to test the 4CaaSt platform and the lifecycles defined in the project.

The primary goals of the WP8 scenarios are to validate the 4CaaSt Value propositions being defined in WP1 and to provide measurable information for backing up the 4CaaSt exploitation strategy formulated in WP9.

4CaaSt can be seen from 2 different angles, i.e., as a generic PaaS platform and as a service portfolio.

- Generic PaaS platform: 4CaaSt is first of all a framework for managing the lifecycle of an application, from specification to billing including pricing, rating, deploying, execution and monitoring.
- 4CaaSt as a service portfolio: 4CaaSt is also a set of predefined components (described by blueprints) that an application/service developer can leverage in its application/service to:
  - *a)* Inherit some of the generic 4CaaSt features depending on the component, such as scalability.
  - *b)* Benefit by using those components “as a Service” without needing to take care of operation, updates, maintenance etc.

Porting a pre-existing open source application to 4CaaSt may have been sufficient for validating core 4CaaSt features. But this is not the case for the 4CaaSt portfolio services. For this purpose, WP8.1, 8.2 and 8.3 define 3 scenarios, each with its own prototype demonstrating some portfolio services.

The secondary goals of WP8 are

- Provide feedback on 4CaaSt platform usage to WP1 to WP7
  - Bug report
  - Usability report
- Provide material for dissemination

The following goals are not in the scope of WP8, although this work package may contribute to their achievement as a side effect of the iterative design and development approach:

- Define 4CaaSt value proposition (done in WP1-7)

- Unit test 4CaaSt platform (done in WP1)
- Confront 4CaaSt value proposition to market (done in WP9.1)

1. Introduction

This deliverable describes one out of three scenarios used to evaluate the 4CaaSt platform. While each scenario focuses on the evaluation of different aspects of the platform, some elements are shared among the three scenarios and are, therefore, described only once in deliverable D8.2.1 [1] to avoid repetition. Some of these elements are:

- The relation and dependencies to other WPs (see section on “WP8 Organization” in [1]).
- The 4CaaSt Value Proposition Whitepaper [2].
- The evaluation protocol/approach (see section on “WP8 Organization” in D8.2.1 [1]).

Besides, a set of common business goals have been described that apply to the three scenarios (Annex A).

Those documents describe the general approach, which needs to be adapted to the individual scenarios. For example, the overall evaluation approach requires specific evaluation criteria for the 4CaaSt components/features [3] in the context of a specific scenario [4].

This document is an updated version of the first release of scenario 8.1 description (D8.1.1 [5]). It has been updated with further details about the scenario and integrating additional features. For a detailed description of 4CaaSt’s features and how they are mapped to the scenario at hand, please, see [6].

Note D8.1.1 already contained an extensive description of scenario 8.1 so not many updates have been needed in this new release. Main changes are:

- Description of the main first scenario release evaluation results.
- Description of new capabilities integrated in the prototype:
  - Reporting tool for marketplace analytics.
  - Price model simulator.
  - Settlement engine.
  - Handling of SLA violation penalties.
- Removal of deprecated features like support for voice communications.
- More detailed storyline split into three different views (service provider, customer and internal views).

The document is organized as follows:

- Chapter 2 describes relevant feedback from the evaluation of the first release of scenario 8.1 prototype.
- Chapter 3 gives a detailed description of scenario 8.1 from three different perspectives. It introduces the business goals and actors and then goes on to describe the scenario rationale, internal details and its storyboard.
- Chapter 4 further elaborates the scenario description by means of use cases following the S-CUBE methodology. These use cases allow better analyzing the scenario and mapping its requirements to the 4CaaSt features as described in [6].
- Chapter 5 provides a set of conclusions.
- Annex A describes the 4CaaSt Business Goals, which are common for the three scenarios.

2. Input from the first release scenario evaluation

Input from [4], which evaluates the first release of the scenario, has been taken into account to update this deliverable. Main conclusions from the evaluation report are related with improvements to the 4CaaSt platform but there are also some suggestions on how to extend scenario 8.1 to better support 4CaaSt evaluation, among which:

- Blueprints for additional components should be provided. Notably network enablers, like SMS, have to be defined for the next release of the Taxi Application prototype.
- Scenario 8.1 is already quite challenging in terms of technical resolution since the Taxi Application is a complex application involving several integrated components. However, integrating more components and services in the scenario, as it is already planned, would make the technical resolution even more challenging.
- The scenario should adequately incorporate new parameters in the user request so as to be able to demonstrate advanced resolution capabilities.
- The Taxi application architecture is rather complex. This can be seen in the required software stack, which relies on Orchestra, which is a PIC that needs to be deployed on another PIC (JOnAS/Tomcat). This kind of dependencies can be handled by the REC Manager, but increase the complexity as well as deployment execution time drastically. So it would be better to define combined PIC blueprints (i.e. Orchestra-on-Tomcat) instead of having separate blueprints
- In order to ease fully automated deployment, it would be convenient to simplify the application prototype architecture that enables its configuration based on standard PIC Chef Scripts (e.g. handling JOnAS configuration files), and not on specific AC particularities.
- To support accounting, charging and settlement the Taxi Application and all its components must provide monitoring information according to the corresponding processes defined by 4CaaSt.
- The Taxi Application should integrate additional native services, at least SMS is planned, and provide corresponding monitoring information to 4CaaSt.
- An ESB (Apache ServiceMix) and a database (PostgreSQL) should be part of the new Taxi Application prototype release.
- In order to evaluate features related to the execution phase, quantitative experimentation dealing with e.g. load testing should be conducted.

3. Scenario Definition

Scenario 8.1 has the following objectives:

- To analyze the environment of cloud-based applications for Small and Medium enterprises, and to identify the needs and requirements that this type of companies expect from a PaaS framework like 4CaaSt. This issue is analyzed from the point of view of SMEs that develop software applications and are willing to shift their developments to the cloud, and SMEs that traditionally have purchased desktop/server applications and now consider contracting applications and services in the Cloud.
- To define a scenario in which several of the features and technologies provided by 4CaaSt can be defined and evaluated.

The scenario and application described in this section are not intended to result in a fully functional prototype, even though their functionalities and benefits are described in detail, but as a way to evaluate the features that 4CaaSt provides. Therefore, it must be clear that the object of evaluation is not the application described here, but the 4CaaSt platform itself.

3.1. Business View

Cloud Computing is expected to have a large economic impact in Europe. It is foreseen that this technology will provide a positive contribution of around 0.2% to the annual growth rate [7]. In particular, Cloud Computing is expected to reduce the high up-front costs for companies to enter new markets, thus contributing to the creation of new firms, and in particular, SMEs. This issue has a special relevance in the EU, since SMEs make up significant industry segments and account for the majority share in the EU employment [8].

A recent study [9] has revealed that the main interests of SMEs on Cloud Computing are: to avoid capital expenditure in hardware, software, IT support, etc., the flexibility and scalability of IT resources and the business continuity and disaster recovery capabilities. It also shows that SMEs are more interested in SaaS, PaaS and IaaS in this order. In relation to the business processes they are most likely to outsource to the Cloud, apart from the classical ERP tools (payrolls, CRM, etc.), vertical or internal application developments on the cloud capture a high interest. Finally, most SMEs are more prone to outsource processes to more than one partner, preferably to a federation of clouds, but in any case, always trusted partners, because trust and security are always an issue in cloud computing.

SMEs can obtain several benefits from the usage of the cloud. Although the recurring costs (OPEX) of contracting a cloud provider could be higher than the monthly depreciation of a traditional investment (CAPEX), the entry costs are much lower. As a result, scenarios in which cloud deployments bring benefits are those in which there is a short term need of resources. Also, when the need of computing resources is highly dynamic and unpredictable, the dynamic provisioning of resources of cloud computing is worthwhile. In addition, it is important to note that applications dealing with sensitive data, real time/mission critical scenarios and, in many cases, legacy systems are not appropriate for cloud deployments [10].

4CaaSt innovations bring a number of benefits in terms of OPEX/CAPEX that will be evaluated using this scenario:

- 4CaaSt blueprinting offers an enhanced formal description of applications, which enables smarter automations and optimizations to be built, ultimately allowing savings in OPEX (man power) and CAPEX (investment in infrastructure). SMEs developing software for the 4CaaSt platform will benefit from the possibility of easily customizing services and automatically deploying them for different purposes.

- The 4CaaSt Marketplace fills the gap between customers and providers by providing a virtual environment where demand and offer can meet. It also supports the automation of the sale process and takes care of the handling contracts, billing and payments allowing innovative SMEs to focus on their core competencies.
- Marketplace analytics allow vendors and customers to perform business optimization. Therefore, 4CaaSt does not only help to reduce the OPEX derived from management, but it also provides tools to find new business opportunities for providers, supporting them in different business models and thus increase revenues.
- The 4CaaSt portfolio of runtime components is reusable at all levels, supporting Platform and Service providers to build their solutions on top of a set of ready-to-use and maintained components. SMEs developing new services on the 4CaaSt platform will benefit from avoiding the cost of managing these platform components (OPEX reduction) and the lower barrier to use them (no upfront license fees, no installation of services, etc.).

Scenario 8.1 aims at evaluating, among other, the following features of 4CaaSt:

- **Virtualization of processing and networking end-to-end.** SMEs will be able to use computing resources and networking as if they were in their own premises.
- **Service platform technologies as immigrants on the Cloud.** Several examples of immigrant and native PaaS technologies (e.g. orchestration engines and context as a service) will be used to demonstrate how they can be used by an SME in the development of a new service and in the deployment of an existing application using the 4CaaSt platform.
- **Network Enablers aaS.** The best way to integrate and manage capabilities exposed by third party providers will be analyzed taking as example on-line services offered by Telco providers.
- **Context management and context-awareness enrichment.** The knowledge about the application, its customers and other information sources (weather, Social Networks, etc.) will enrich the application and service logic and will be available as an Enabler (Context as a Service) within 4CaaSt platform.
- **Support of multiple revenues models.** The most relevant revenue models (pay per use, subscriptions, revenue sharing, advertisement, etc.) for SMEs will be analyzed and implemented to understand the challenges that these models impose over the platform.
- **Rating and charging on multi-vendor Composition.** Since different types of services will be available to use/contract in 4CaaSt, different rating and charging models will have to be applied, imposing requirements over the accounting and monitoring layer.
- **Convergent Billing and Clearing aaS.** A service developed and marketed through 4CaaSt will generate incomes for several service providers participating in the final solution. These revenues will be distributed among them dynamically through the clearing house function.
- **Price model simulations.** The 4CaaSt Marketplace features a tool that allows for service providers to simulate how different pricing schemes affect expected revenues. This way they are helped to select the most profitable price for their products.
- **Marketplace Analytics.** Advanced reporting and business intelligence tools will be available for service providers to help them in their marketing decisions.
- **Advanced eMarketplace functions.** Users' interactions with the 4CaaSt Marketplace will be used to provide advanced functionality such as rich search and selection methods, recommendations, social enhancements, etc.

3.2. Business Goals

In Annex A, a set of global Business Goals that apply to the three 4CaaSt scenarios are provided. These business goals represent, among others, a formal description of the functionality depicted in previous section and will be used for identifying the value proposition that can be shown by the use cases described in this scenario. These are the Business Goals identified as relevant for this scenario:

- BG#WP2.BLUEPRINT.001: Abstract application design
- BG#WP2.BLUEPRINT.002: Application Lifecycle Management
- BG#WP3.MARKETPLACE.001: One Stop Shop
- BG#WP4.DEPLOY.001: Automated Provisioning and Operation for Heterogeneous Components
- BG#WP5.MON.001: Integrated Accounting of services
- BG#WP6.SM.001: Integration of native services
- BG#WP7.SM.001: Cloud aware software platforms

3.3. Roles

There are several roles involved in this scenario:

- Platform administrator: 4CaaSt administrator, in charge of managing the PaaS platform.
- Customer SME (Budapest Radio Taxi): an SME that owns a fleet of radio taxis.
- End customers: taxi users.
- Application Provider (SaaSSolutionS): it is a company that provides a taxi fleet management software application.
- Service Providers:
    - A NeaS provider (NewWave Telecom), exposing communication capabilities as services. An example would be the capability to send SMS messages from an application.
    - A CaaS provider (FindMyWay.com), exposing context information to the Application Providers and Final Customers in real or near-real time.
- Business Manager: manages business models in the 4CaaSt platform, it could be the same as the 4CaaSt administrator.

3.4. Scenario Rationale

This scenario is based on a hypothetical software company (SaaSSolutionS) that develops a SaaS application for the management of Taxi fleets.

SaaSSolutionS requires buying or hiring the hardware and software to deploy and sell its service. However, as there are many competing solutions, the business plan has a high level of uncertainty and they decide to use 4CaaSt PaaS services to deploy, provide, sell and bill their services. The ability to provide the service in a very wide geographical region attracts a high number of customers and thus allows SaaSSolutionS to achieve economies of scale and be able to offer the service at a very low price level. If the solution succeeds in the market, it will be easy and cheap to scale the application to the new requirements. On the

other hand, SaaSSolutionS will not have to worry about many issues such as: systems management, customer management, billing, network/telecom services, etc.

Using an advanced fleet management application with the 4CaaSt PaaS services has the following potential business benefits:

- Especially in the less developed countries the use of professional taxi operator software is very expensive and requires high upfront investment. This issue results in low penetration of software solutions, and therefore most companies are still using two-way radios as they did decades ago. A low cost cloud service would be able to a reach higher penetration by making the traditional mode of operation obsolete.
- The Telco provider data communication services are crucial elements of the solution since they can be easily integrated in the application and allow communications with taxi drivers and customers.
- The fleet management service could foster the easy creation of new, flexible taxi companies as the investment needed to set up a new taxi company would be significantly reduced.
- Availability of the context and profiling information within the SaaS will allow using this feature in the SME services. In the case of the taxi fleet management application this will allow optimizing the taxi management by properly planning taxis' routes based on e.g. client calls amount, traffic situation in the different city areas at certain moment and the quantity of requests per geographic area.

3.5. Taxi application description

SaaSSolutions makes the following main design decisions for the Taxi fleet management application:

- The User Interface (UI) is a typical browser based web UI either delivered as an AJAX (Asynchronous JavaScript and XML) or highly interactive Flash / Flex application. Preferably no software installation should be necessary on the taxi users' computers.
- For the maps service a cloud map provider like Google or Navteq will be used as a back-end.
- 4CaaSt will be using a back-end cloud service, which is shared by all SME's applications. This allows performing overall optimization tasks to make the solution resource efficient.

The Taxi fleet management application architecture is not simple: it has several layers and must integrate a set of building blocks like a database for persisting data, an application server to host the web interface and a communication bus to connect all its components [11]. Besides it must provide hooks to location and communication services. All these building blocks will be available in 4CaaSt, which will also provide the necessary means to easily build, commercialize, deploy and monitor the application.

The taxi fleet management application has a web based customizable operational dashboard for automation and optimization with the following functionality:

- General information services:
    - The system has some basic information about the taxies and their drivers:
        - Maximum number of persons able to carry.
        - Luggage compartment volume.
        - Taxi driver personal information.
        - Reputation, etc.

- Storage and management of historic information: business intelligence, reports, etc.

- Location services
  - All taxies have a GPS enabled terminal, which is in constant data connection with the cloud back-end and transmits the taxi location in real time.
  - The system keeps track of the routes of all taxies - starting / end point, number of persons.
  - The monitoring system is able to track whether the taxies are fulfilling the SLAs - e.g. they are at the requested start location in the acceptable time window.
  - The taxi service operator is shown a dashboard with a map where the location and route of each taxi can be displayed in real-time, like in an Air Traffic Control (ATC) system.
  - When a new request arrives to the taxi company the system runs an optimization engine, which automatically proposes one or more taxies for taking the new order. In this optimization process the position / actual jobs being served by the other taxies, actual traffic conditions and the number of people / amount of luggage to take is considered. Operator confirms the order with the selected taxi via mobile voice communication - e.g. by just clicking on the taxi popping out from the optimization process on the dashboard.
  - In the optimal case the ordered route is automatically pushed to the GPS routing software of the selected taxi via mobile data communication.
- City Smart Space / Context information service
  - The city's traffic management system provides the traffic situation in real-time;
  - The customers mobile phones could be also located (should the customer opt-in to such scheme) such that when a customer places a call to the taxi company it is automatically localized, so that the closest available taxi is called in order to have the shortest service time.
  - Some general information services, such as knowledge of the real-time situation about the taxi fleet and the customers, as well as all the location services, will be also provided as a part of the context-management framework within the cloud (SaaS or PaaS).
  - This particular service could potentially also be generalized to provide a generic logistics service serving several logistics operations and optimizations. One example is tracking the employees of different service provider companies where the work involves a lot of traveling to several work sites.
- Communications services
  - Data communication between the taxi service operator and the taxi driver happens via the mobile network. The Operator is able to communicate new customer requests to taxi drivers and notify customers when their taxi is arriving to the pickup destination.
  - Orders for taxies can be placed via phone calls with the taxi service operator or in the end user web interface, possibly with pre-paid option. If a taxi has arrived to the place where it was ordered an automated robot call is able to notify the person ordering the taxi.
  - Heterogeneous communication services allow contacting the taxi driver as well as the customer through the preferred communication means such as SMS, MMS, IM, HTTP Push message, etc. This feature is provided by the Telco capabilities available from the Cloud.

3.6. Storyline

This section provides a description of the scenario at hand from the different perspectives of the actors involved, including 4CaaSt platform's internal view.

3.6.1. The service providers view

3.6.1.1. The Telco NeaS provider view

NewWave Telecom offers a new SMS service and defines its blueprint for the 4CaaSt Platform. It uses the available pricing and revenue sharing schemas to be applied for other application providers. It selects a pay-per-use schema and 30% of revenue share for SMS services. The SMS is used for the taxi customer notification as well as for the taxi driver request of the service.

Moreover, the SMS service could be potentially replaced by other Telco services such as MMS, IM, HTTP Push, etc. In addition, a Telco operator may seamlessly provide the best way to notify the customer and the taxi driver based on the current situation (respective context) and on the preferences of the persons.

3.6.1.2. The CaaS provider view

A CaaS provider (FindMyWay.com) offers a location service (EasyFind) which can be used to keep track of the taxi fleet, and defines its blueprint for the 4CaaSt Platform. A FindMyWay operator logs into the 4CaaSt marketplace and publishes the service, setting a price models according to a pay-per-use schema with a fixed price per call. To define the price model, the 4CaaSt Price Editor is used.

A month after having published EasyFind in the 4CaaSt Marketplace, FindMyWay's CEO decides to check its latest sales figures. To do that, he launches the 4CaaSt reporting tool in his brand new tablet while he sips at his coffee in a terrace in Paris. Much to his surprise, he finds out that EasyFind's sale figures have gone down week after week and add up to a ridiculous total amount of 12 sales. He immediately calls FindMyWay's Marketing Director and together they decide to revise EasyFind's price plan.

Since they know that a new tool has been made available in 4CaaSt that allows SPs to simulate different pricing options to choose the most profitable one, they conduct a series of simulations. As a consequence, they decide to set a lower price to their service.

Some weeks later, FindMyWay's CEO checks again sales figures from his smartphone, using the 4CaaSt reporting tool, while he commutes to work and he is very happy to see that they have more than tripled since the new price plan was set. Once at the office he checks in his laptop, together with FindMyWay's Marketing Director, detailed reports about EasyFind's usage and revenues, as well as feedback from customers, which help them defining improvements to the service and next marketing campaigns.

3.6.1.3. The SaaS provider view

SaaSSolutions decides to deploy its Taxi Fleet Management application FleeTax-e in 4CaaSt. To do that they:

- Create an application blueprint, specifying the technical and functional features and requirements of the application, including:
    - PaaS requirements (Database, application servers, etc.)
    - Telco services required (SMS, MMS …)

- Context information required (about the taxi fleet, traffic, customers profiles and preferences, city information system, all in real-time).

- Define the pricing schemas for their application among the available ones such as, for instance:
  - Monthly fee:
    - 10-50 Taxis: 100 €/month + 0,1 €/SMS.
    - 50-100 Taxis: 150 €/month + 0,09 €/SMS
    - Over 100 Taxis: 150 €/month + 1€/taxi*month + 0,08€/SMS
- Publish the service to the 4CaaSt Marketplace.

3.6.2. The customer view

After browsing in the 4CaaSt Marketplace applications catalogue, Budapest RadioTaxi (BRT) decides to contract FleeTax-e platform. They register into the system and provide a number of parameters such as maximum price, minimum availability, security, reliability, license type, etc. Based on these parameters together with the customer profile and purchase history, 4CaaSt selects the best combination of resources that fulfills user requirements (for instance, a specific Database like PostgreSQL). Note this selection does not include the EasyFind service due to its high cost compared to BRT's expectations. One the final selection is made, BRT contracts the application and specified the number of taxis to be managed. The service is provisioned and their credentials are enabled to use the application. From that moment on, they can use the system and they will be charged on a monthly basis with the agreed fee and the consumption of location and telecommunication services.

After a successful start, SaaSolutionS realizes the application has low performance and therefore requests to raise the resources of their virtual infrastructure, which is done in a transparent way. After the change, a different price will be applied and taken into account in the clearing phase. Also, the context information demand is automatically increased according to the number of the customers to manage and services to provide.

BRT is very happy with FleeTax-e's performance and, consequently, decides to post some positive comments and ratings in the 4CaaSt Marketplace. Later on another Taxi company, Praga Radio Taxi (PRT), searches 4CaaSt's product catalogue for a fleet management application. The search functionality takes into account PRT's user profile and history together with 4CaaSt's application ratings and thus lists FleeTax-e among the first choices. Besides, 4CaaSt's recommendation system takes into account social information from BRT and PRT and consequently offers FleeTax-e as a very convenient solution for PRT. Thus, PRT decides to contract FleeTax-e and sets some business requirements in the same way BRT did. Taking into account these requirements 4CaaSt selects the best combination of products which now includes EasyFind since its price has been significantly reduced.

3.6.3. The 4CaaSt view

3.6.3.1. User Management

Both Service Providers (SaaSolutionS, FindMyWay.com and NewWave Telecom) and Customers (BRT and PRT) have to be registered in 4CaaSt before using the platform. A 4CaaSt administrator is in charge of registering new users. User profiles should include information such as user credentials, legal data, bank account, payment methods, preferences, etc.

The 4CaaSt platform administrator defines the blueprints and tools for managing runtime execution environments. This includes IaaS/NaaS resources, but the 4CaaSt platform administrator is also in charge of supporting the technological providers in order to integrate

their building blocks in 4CaaSt, that is, to create blueprints, to write deployment and configuration scripts, etc. At the end of this process, the technologies are ready to be "resolved" for application requirements, and deployed on the infrastructure.

3.6.3.2. Deployment

Once the FleeTax-e is contracted by a customer, it is automatically deployed in the 4CaaSt cloud. In this scenario, the appropriate IaaS resources are provisioned so that the software (application and platform) can be deployed and configured. If possible, the platform will minimize the use of resources by using multitenant services.

A set of predefined processes are executed for that purpose based on deployment information available in a set of deployment scripts, based on the information prescribed in the blueprints and the requirements specified by the customer in contracting time.

Deployment also encompasses setting up accounting agents for the components whose usage is to be charged, together with monitoring probes for the different technologies that provide useful KPIs that enable the elasticity. For instance, the use of SMS messages and location services needs to be accounted by the 4CaaSt cloud, and the response time of the application server can be monitored to detect a lack of resources.

3.6.3.3. Settlement

After the deployment, 4CaaSt starts monitoring the usage of cloud resources by FleeTax-e and produces accounting records accordingly. This accounting information is further processed according to the price models agreed with each customer and, as a result, billing information is periodically calculated. Bills are then sent to BRT and PRT containing detailed information about the different concepts charged (subscription, SMS messages, location services …).

Once customers have been billed, 4CaaSt has to distribute the incomes generated by the FleeTax-e application amongst the different service providers involved in its value network. This includes paying the providers of the SaaS, PaaS, CaaS and NeaS services being used. To do so, a clearing house process will periodically decide how much money has to be paid to SaaSolutionS, FindMyWay.com and NewWave Telecom. This calculation will be based on revenue sharing agreements between 4CaaSt and the different service providers.

3.6.3.4. Elasticity

For three days, coinciding with an important European conference, there is a public transport employees strike in Budapest. The first day, between 8h and 9h in the morning, there is an important rise in the usage of the system by BRT and the provisioned infrastructure runs out of resources.

4CaaSt detects the situation through the internally measured KPIs from the platform, and elastically increases the resources to meet the new requirements. The mechanisms used to scale depend on the deployed architecture and the scalability of the different components being part of the application.

In case the reallocation of resources fails and FleeTax-e cannot scale, this may affect its performance and result in a SLA violation. 4CaaSt will automatically detect this fact so BRT can be economically compensated in the next settlement period.

4. Use Cases

This chapter elaborates the scenario by describing appropriate use cases following the S-CUBE methodology. In the following section, the actors involved in scenario 8.1 are identified. After that, the most relevant S-CUBE scenarios are analyzed and mapped to the global Business Goals, as explained in section 3.2. In addition, a set of related use case diagrams are used to illustrate the relationship between S-CUBE scenarios.

4.1. Actors

In order to describe the use cases, a set of actors that interact with the 4CaaSt platform have to be identified. These are as follows:

- SaaS Service Provider (SaaS SP). In our particular scenario this role belongs to SaaSSolutions which is the company that develops and publishes the taxi application in the 4CaaSt Marketplace.
- NeaS Service Provider (NeaS SP) is a telecom company that sells communications services such as SMS messaging via the 4CaaSt Marketplace. In the scenario NewWave Telecom undertakes this role.
- A CaaS Service Provider (CaaS SP), called FindMyWay.com, offers location services in the 4CaaSt Marketplace.
- An IaaS Service Provider (IaaS SP) offers cloud infrastructure as a service for deploying applications and services. Note in this scenario it is assumed that 4CaaSt itself is the IaaS SP but this actor is included for the sake of generality.
- Customer SME (CSME). This is the SME that contracts the taxi application from the 4CaaSt Marketplace. Two such SMEs are identified in the scenario: BRT and PRT.

4.2. Use case diagrams

Four use case diagrams are associated to this scenario (Offer new service, Contract service, Rating and Charging and Revenue Sharing) as shown below.

The “Offer new service” diagram (Figure 1) involves the activities needed to specify and publish a new service offering in the 4CaaSt Marketplace. Both final applications and supporting services (like NeaS and CaaS) are addressed by this use case.

The “Contract service” diagram (Figure 2) involves the activities performed when a user contracts a service. Again, both final applications and supporting services like NeaS and CaaS are addressed by this use case.

The “Rating, Charging and Revenue Sharing” diagram (Figure 3) involves two different but intertwined processes. The first one deals with rating service usage, taking as input accounting information. The second one uses rating information to distribute revenues amongst the stakeholders involved in the service delivery.

Although several use cases are identified in these diagrams, only the most relevant are described as S-CUBE scenarios in the following section. Nevertheless, additional use cases may need to be identified and described in future releases of this deliverable.

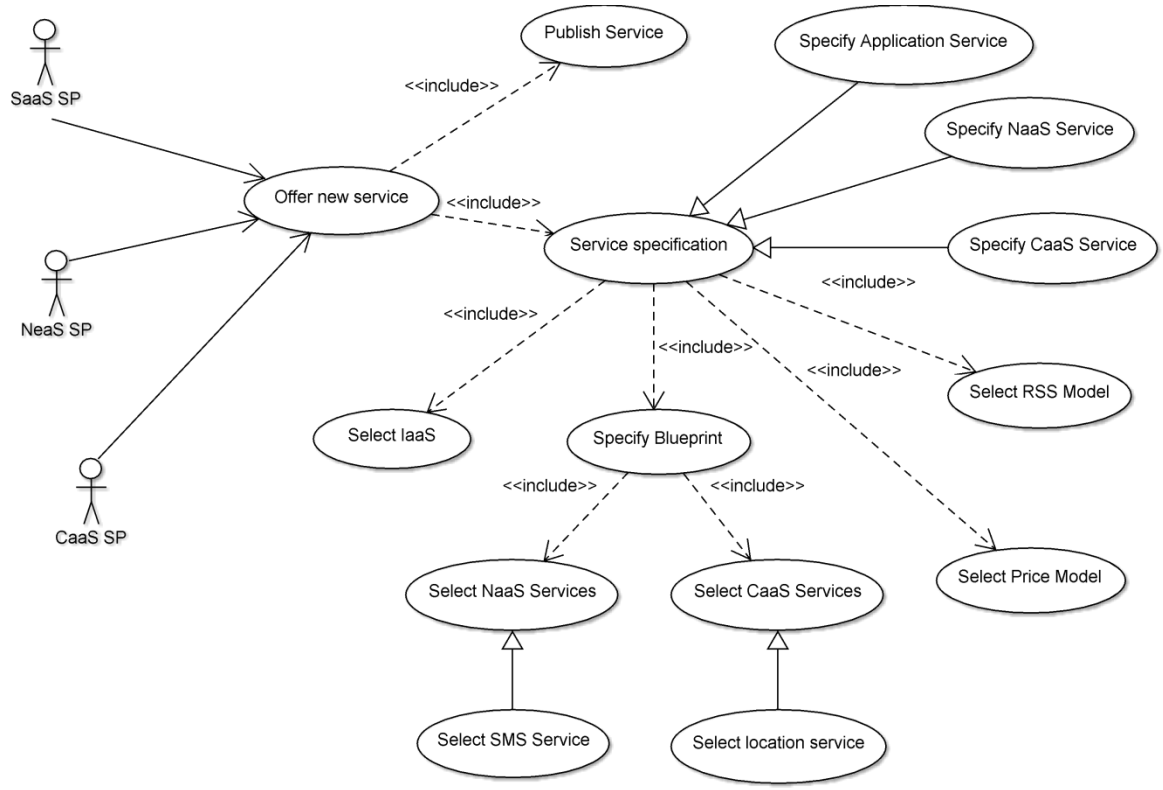

Figure 1: Offer new service

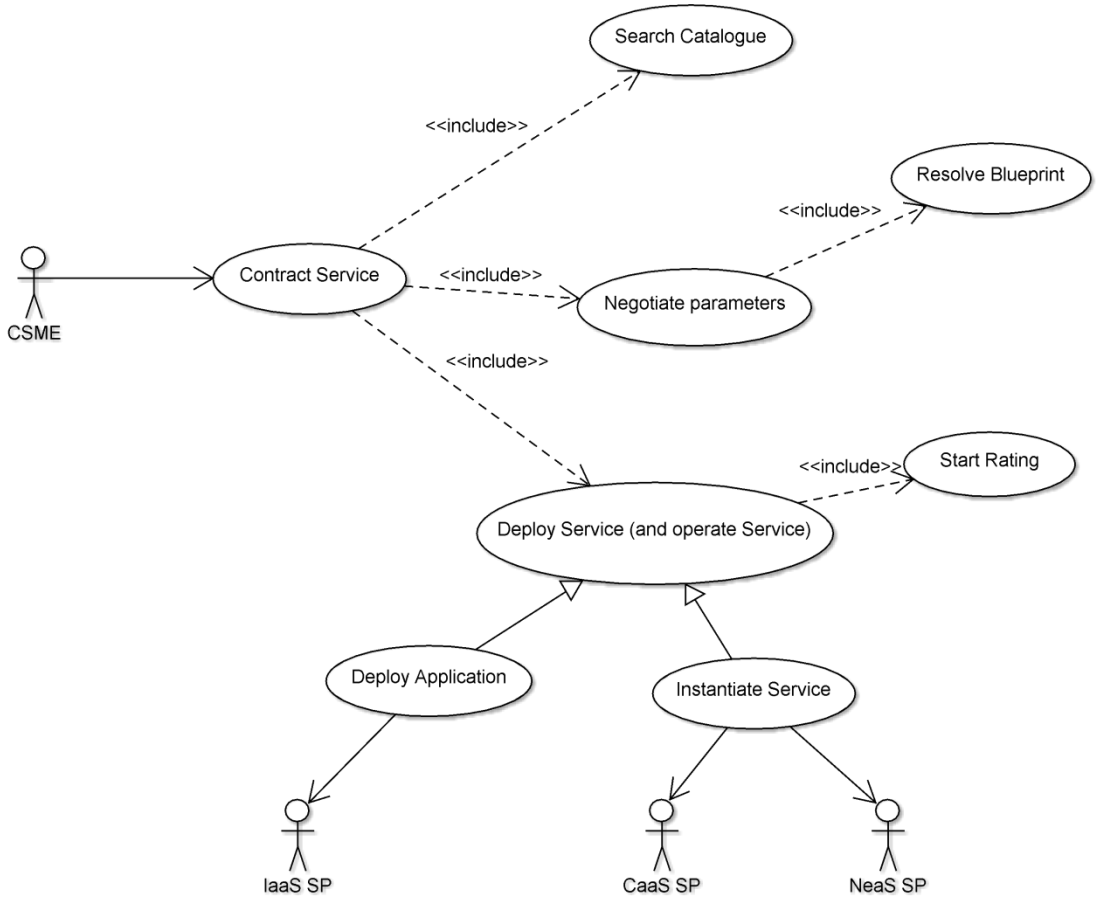

Figure 2: Contract service

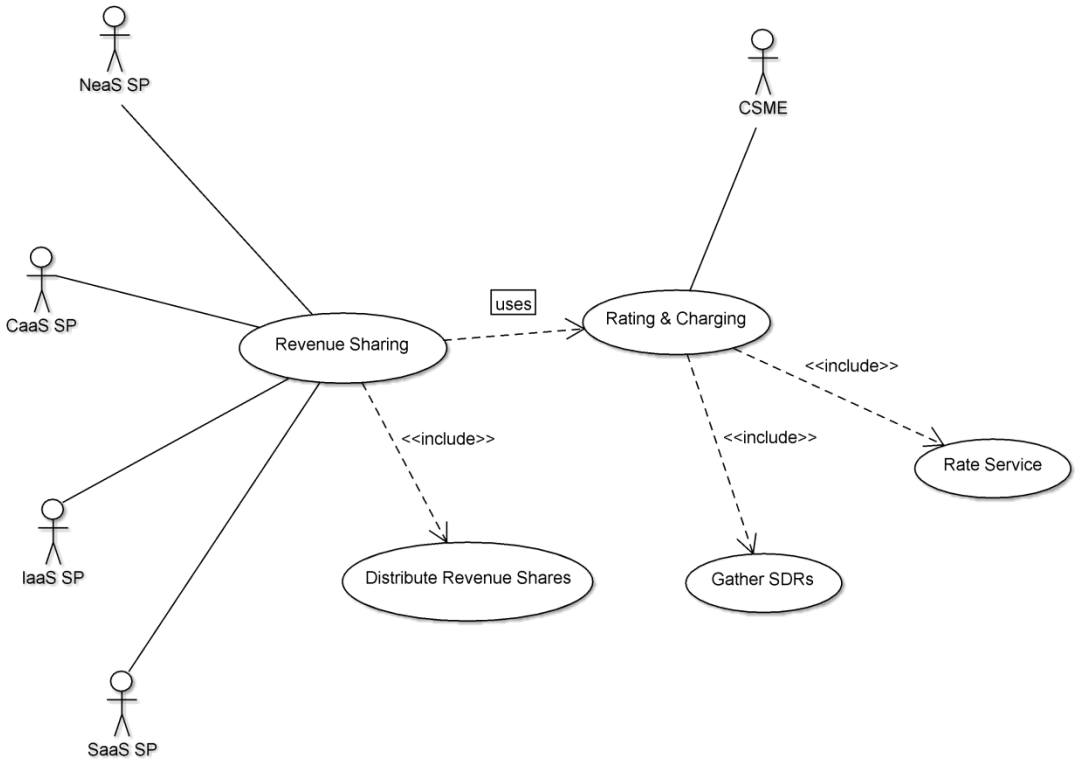

Figure 3: Rating, Charging and Revenue Sharing

4.3. S-CUBE scenarios

A set of S-CUBE scenarios are derived from the global Business Goals in order to provide further details about how those goals can be reached with 4CaaSt.

4.3.1. UC.8-1.001: Offer new service

Field	**Description**
Unique ID	UC.8-1.001
Short name	Offer new service
Type	S-CUBE scenario
Related to	• BG#WP2.BLUEPRINT.001 • BG#WP3.MARKETPLACE.001 • BG#WP6.SM.001 • BG#WP7.SM.001 • UC.8-1.005 • UC.8-1.006
Involved actors	SaaS SP, CaaS SP, NeaS SP, 4CaaSt

Detailed operational description	The system allows the publication of new services. These services can be either applications or service components. The system allows the assignment of previously defined price and revenue sharing models to the new services. The system also allows defining the technical features of services by means of Blueprints. At least three particular services must be available: • Sending SMS service component • Context information for geo-localization • Management of Taxi SME application
Problems and challenges	An appropriate taxonomy of services should be used and mapped to the blueprint format. The marketplace must provide the means for users to upload their service offerings.
Additional materials	Figure 1: Offer new service

4.3.2. UC.8-1.002: Contract service

Field	**Description**
Unique ID	UC.8-1.002
Short name	Contract service
Type	S-CUBE scenario
Related to	• BG#WP2.BLUEPRINT.002 • BG#WP3.MARKETPLACE.001 • BG#WP4.DEPLOY.001 • BG#WP7.SM.001 • UC.8-1.007
Involved actors	4CaaSt, CSME
Detailed operational description	The system allows the contracting of the deployed services. In particular, it is possible to contract a Taxi management application to support CSMEs. It also supports the specification of some service categories (price, security, availability …) and negotiations between 4CaaSt and the SME until the best option is chosen.
Problems and challenges	None
Additional materials	Figure 2: Contract service

4.3.3. UC.8-1.003: Rating and Charging

Field	Description
Unique ID	UC.8-1.003
Short name	Rating and Charging
Type	S-CUBE scenario
Related to	• BG#WP3.MARKETPLACE.001 • BG#WP5.MON.001 • UC.8-1.008 • UC.8-1.009
Involved actors	SaaS SP, NeaS SP, CaaS SP; 4CaaSt
Detailed operational description	4CaaSt rates the usage of the different services offered according to the pricing rules agreed upon for each of them. In addition, it charges users for service usage.
Problems and challenges	This scenario depends on the availability of monitoring information and appropriate business models.
Additional materials	Figure 3: Rating, Charging and Revenue Sharing

4.3.4. UC.8-1.004: Revenue sharing

Field	Description
Unique ID	UC.8-1.004
Short name	Revenue sharing
Type	S-CUBE scenario
Related to	• BG#WP3.MARKETPLACE.001 • BG#WP5.MON.001 • UC.8-1.003 • UC.8-1.008 • UC.8-1.009
Involved actors	SaaS SP, NeaS SP, CaaS SP, 4CaaSt
Detailed operational description	4CaaSt distributes the revenue generated by contracted services usage among the stakeholders involved according to the revenue sharing rules agreed upon. Incomes are distributed among the different stakeholders according to

	predefined business models.
Problems and challenges	This scenario depends on the availability of monitoring information and appropriate business models.
Additional materials	Figure 3: Rating, Charging and Revenue Sharing

4.3.5. UC.8-1.005: Service Specification

Field	**Description**
Unique ID	UC.8-1.005
Short name	Service Specification
Type	S-CUBE scenario
Related to	• BG#WP2.BLUEPRINT.001 • BG#WP3.MARKETPLACE.001 • BG#WP6.SM.001 • BG#WP7.SM.001 • UC.8-1.001 • UC.8-1.006
Involved actors	SaaS SP, NeaS SP, 4CaaSt
Detailed operational description	There are three options: 1) A SaaS SP decides to publish its application in 4CaaSt. It must do the following: • Create an application blueprint, specifying the technical and functional features and requirements of the application: o Select the Telco services to use. o Select the IaaS services needed. o Select the CaaS services needed. o Specify the deployment options for the application. • Define the pricing models for the application. • Define the revenue sharing models for the application. • Share the specification of the application in the 4CaaSt Marketplace. 2) A NeaS SP decides to deploy an SMS NeaS service in 4CaaSt. It must do the following: • Create blueprint for the SMS NeaS service. • Define the pricing models for the service.

	• Define the revenue sharing models for the service. • Share the specification of the SMS NeaS service in the 4CaaSt Marketplace 3) A CaaS SP decides to deploy a location service in 4CaaSt. It must do the following: • Create blueprint for the location service. • Define the pricing models for the service. • Define the revenue sharing models for the service. • Share the specification of the service in the 4CaaSt Marketplace
Problems and challenges	Blueprint support for business requirements. Formal specification of business models.
Additional materials	Figure 1: Offer new service

4.3.6. UC.8-1.006 Publish Service

Field	**Description**
Unique ID	UC.8-1.006
Short name	Publish Service
Type	S-CUBE scenario
Related to	• BG#WP3.MARKETPLACE.001 • UC.8-1.001 • UC.8-1.005
Involved actors	SaaS SP, NeaS SP, 4CaaSt
Detailed operational description	Once the service or application has been fully specified, its description is stored in the 4CaaSt Marketplace so it can be searched and contracted using the 4CaaSt Marketplace user interface.
Problems and challenges	Availability of a searchable product database and facilities to publish service offerings in the 4CaaSt Marketplace according to a service taxonomy.
Additional materials	Figure 1: Offer new service

4.3.7. UC.8-1.007: Deploy Service (and operate Service)

Field	**Description**
Unique ID	UC.8-1.007

Short name	Deploy Service (and operate Service)
Type	S-CUBE scenario
Related to	• BG#WP2.BLUEPRINT.002 • BG#WP3.MARKETPLACE.001 • BG#WP4.DEPLOY.001 • BG#WP7.SM.001 • UC.8-1.002
Involved actors	CSME, 4CaaSt, IaaS SP.
Detailed operational description	A CSME decides to contract the Taxi App published in the 4CaaSt Marketplace. Once this is done, the application is contracted and deployed in the 4CaaSt Cloud (IaaS SP). After successful deployment, application execution and rating is started.
Problems and challenges	According to the contract terms, 4CaaSt has to allocate the appropriate resources to deploy and execute the service.
Additional materials	Figure 2: Contract service

4.3.8. UC.8-1.008: Rate Service

Field	**Description**
Unique ID	UC.8-1.008
Short name	Rate Service
Type	S-CUBE scenario
Related to	• BG#WP3.MARKETPLACE.001 • BG#WP5.MON.001 • UC.8-1.003
Involved actors	CSME, 4CaaSt
Detailed operational description	Based on service usage information (SDRs) the Taxi application can be rated and charged to the CSME. Rating is done according to the price models agreed upon.

Problems and challenges	Accounting information (SDRs) is needed.
Additional materials	Figure 3: Rating, Charging and Revenue Sharing

4.3.9. UC.8-1.009: Distribute revenue shares

Field	**Description**
Unique ID	UC.8-1.009
Short name	Distribute revenue shares
Type	S-CUBE scenario
Related to	• BG#WP3.MARKETPLACE.001 • BG#WP5.MON.001 • UC.8-1.003 • UC.8-1.004 • UC.8-1.008
Involved actors	SaaS SP, NeaS SP, CaaS SP, IaaS SP, 4CaaSt
Detailed operational description	Revenues generated by the usage of the Taxi Application are distributed among the different stakeholders: 4CaaSt, IaaS SP, CaaS SP, NeaS SP and SaaS SP. For that 4CaaSt relies on an external payment broker.
Problems and challenges	An external Payment Broker is needed to take care of actually transferring money between parties.
Additional materials	Figure 3: Rating, Charging and Revenue Sharing

5. Conclusions and Next Steps

This document is one out of three ones describing the scenarios that will be implemented on top of the 4CaaSt platform in order to evaluate, using real scenarios, the value added by the project. All scenario documents follow a similar structure, leaving out the overall value propositions and evaluation methods, which are outlined in the 4CaaSt Value Proposition Whitepaper and D8.2.2 [1].

D8.1.2 addresses scenario 8.1, analysing the business value of 4CaaSt and cloud technologies for SMEs and describing a realistic scenario. In this scenario an SME creates a SaaS application to be sold to other customer SMEs. To do so it integrates services provided in the 4CaaSt cloud by other SMEs to create a composite service supported by a value/business network.

The next steps are targeted towards planning and starting the partial implementation of the scenario prototype based on the results from the technical WPs. This prototype will then be integrated with the 4CaaSt platform and an evaluation process, as described in [3], will be followed to assess the achievement of scenario 8.1 goals.

6. References

[1] 4CaaSt D.8.2.1, “Use Case Applications eMarketPlace for the Mass Market: Scenario Definition”, February 2012.

[2] 4CaaSt FP7 Project, “4CaaSt Value Proposition Whitepaper”, http://4caast.morfeo-project.org/publications/4caast-publications, 2011.

[3] 4CaaSt D8.4.1 “Experimentation Guidelines”, Deliverable D8.4.1, September 2012.

[4] 4CaaSt D8.1.5 “Use Case Applications eMarketPlace for SMEs: Report on Experimentation Results”, Deliverable D8.1.5, October 2012.

[5] 4CaaSt D8.1.1 “Use Case Applications eMarketPlace for SMEs: Scenario Definition”, Deliverable D8.1.1, Version 2.0, March 2012.

[6] 4CaaSt. D.1.1.3b. “Analysis of the State of the Art and Definition of Requirements”, Deliverable D1.1.3 (b), Version 1.0, July 2012.

[7] F. Etro. “The economic impact of cloud computing on business creation, employment and output in Europe”. Review of Business and Economics, vol. 54, issue 2, 2009.

[8] European Commission. “The European e-Business Report 2008. The Impact of ICT and e-Business on firms, sectors and the economy”, 6th Synthesis Report of the Sectorial eBusiness Watch, Brussels, 2008.

[9] ENISA. An SME Perspective on Cloud Computing: Survey. November, 2009. Available online: http://www.enisa.europa.eu/act/rm/files/deliverables/cloud-computing-sme-survey/at_download/fullReport

[10] Jothy Rosenberg; Arthur Mateos. “The Cloud at Your Service: The when, how, and why of enterprise cloud computing”, Manning Publications, 2010.

[11] 4CaaSt D8.1.3 “Use Case Applications eMarketPlace for SMEs: Integration report”, Deliverable D8.1.3, July 2012.

Annex A. Full list of Global Business Goals

A.1. BG#WP2.BLUEPRINT.001

Field	Description
Unique ID	BG#WP2.BLUEPRINT.001
Short name	Abstract application design
Type	Business goal
Description	**A formalism shall be provided for specifying application software architecture and dependencies toward other components and technology enablers.** The system **shall** enable the software providers to design applications describing the resources (**components and technology enablers)** they need to deploy in an abstract way, providing the functional and non functional constraints. This way, the software providers will be able to support an abstract application design that: • allows to offer software "service" in a generic way and • "use" software "service" from other providers. This mechanism should be supported by a composition tooling that will help and drive the developer through the process specifying all the variants that make sense for a given application.
Rationale	Lower cost and length of development and maintenance by enabling software providers to specify the reuse of existing software components (accessible either in an IaaS or SaaS way) and to focus on his part of a solution in which he is the expert.
Involved Stakeholder	Service Provider, Software Provider
Supporting materials	
Priority of accomplishment	Must have
Tentative scheduling	RP1 (first iteration, focus on functional aspects) RP2 (second iteration, focus on scalability and other non-functional) RP3 (third iteration, focus NaaS)

A.2. BG#WP2.BLUEPRINT.002

Field	Description
Unique ID	BG#WP2.BLUEPRINT.002
Short name	Application Lifecycle Management
Type	Business goal
Description	Platform shall provide full automation of application deployment, configuration, monitoring, healing, optimization using formalization data provided by the software. The system shall help the software provider in the management of the lifecycle of their applications. Basically, the software provider would concentrate only on the development phase, while the deployment, taking into account the service providers' and the customers' preferences and policies would be handled by the system itself. This includes deciding which concrete services and resources to use for an application both from the functional and non functional points of view, and both from the technical and the business point of view.
Rationale	Lower cost and length of deployment by enabling the software providers to subcontract the deployment management of their applications to the system. Be able to satisfy a broader spectrum of customers by enabling the service providers and customers to get customized deployments.
Involved Stakeholder	Service Provider, Software Provider, Customer
Supporting materials	
Priority of accomplishment	Must have
Tentative scheduling	RP1 (first iteration, focus deployment) RP2 (second iteration, focus scalability) RP3 (third iteration, focus NaaS)

A.3. BG#WP3.MARKETPLACE.001

Field	Description
Unique ID	BG#WP3.MARKETPLACE.001
Short name	One Stop Shop
Type	Business goal
Description	4CaaSt platform shall support the trading of any kind of Cloud Service (SaaS,PaaS,IaaS) in a unified way through the abstract description of the applications. This unified marketplace would handle different type of usage models for different types of roles: • A service provider may sell a running service to be used as SaaS in a multi-user way. • A software provider may sell an application to be deployed over concrete resources after customer contract. • A customer may contract the access to an application or the deployment of an application for own usage. • Etc. All the resources of the application, together with the own application, may be provided by different software/service providers and the generated incomes would be distributed among them according to the specified policies.
Rationale	Be able to satisfy a broader spectrum of service providers and customers by providing flexible configuration of cloud (XaaS) services and supporting multiple business models. Allow service providers to benefit from automatic settlement for the usage of their services.
Involved Stakeholder	Service Provider, Software Provider, Customer, End User
Supporting materials	
Priority of accomplishment	Must have
Tentative scheduling	RP1: publication, contracting RP2: social enhancement, settlement RP3: improved business models

A.4. BG#WP3.MARKETPLACE.002

Field	Description
Unique ID	BG#WP3.MARKETPLACE.002
Short name	Business customization
Type	Business goal
Description	Customers shall be able to configure how the applications they have contracted are going to be deployed or provisioned. Customers will define several non functional business related options that will be used to decide which of the possible solutions to deploy fulfils better their preferences.
Rationale	Be able to satisfy a broader spectrum of customers by enabling them to customize their contracted applications.
Involved Stakeholder	Service Provider, Customer
Supporting materials	
Priority of accomplishment	Must have
Tentative scheduling	RP1: basic preferences RP2: role based customization RP3: dynamic roles based on history

A.5. BG#WP4.DEPLOY.001

Field	Description
Unique ID	BG#WP4.DEPLOY.001
Short name	Automated Provisioning and Operation for Heterogeneous Components
Type	Business goal
Description	Application component and its required services and resources shall be able to choose among different platforms to be deployed to and be operated automatically. Based on this selection 4CaaSt will be able to automatically generate suitable deployment designs and automatically provision the corresponding resources. Resource provisioning will include selection of the most appropriate deployment designs considering resource, QoS as well as scalability requirements, the automated technical construction and configuration of virtual machines and their final deployment.
Rationale	Automated deployment reduces the operational and capital invests. An service provider must not care how the underlying are build, deployed and operated and therefore concentrates on the application/service development. Automated operation contributes reduced operational cost; the application provider must not care about all required services; the PIC provider must not care about the REC.
Involved Stakeholder	Service provider
Supporting materials	Referred to as • "Resolution process in combination with Blueprints" in the list of WP2 Innovations and • "Automated VM Construction and Provisioning for Heterogeneous Components" on WP4 Innovations
Priority of accomplishment	Must have
Tentative scheduling	RP1, RP2

A.6. BG#WP4.ELASTIC.001

Unique ID	BG#WP4.ELASTIC.001
Short name	Platform Elasticity
Type	Business goal
Description	An application component running on top of 4CaaSt shall be elastic meaning that it (horizontally and vertically) scales automatically while the 4CaaSt platform will use the minimal required resources to achieve the application's required SLA. An application component deployed on a 4CaaSt cloud will scale automatically and with the minimal resources consumption in terms of virtual machines used within given boundaries such as • defined SLAs • defined scale options of the AC (stateful, stateless, etc.) • defined scale/deployment options of the underlying PICs Minimal resource means that the selected deployment will try to used the deployment that uses the least resources to fulfil the defined SLA (i.e. prefer a one low end machine setup to a high-end load balanced setup) One way of minimizing the resource consumption could be for some workload introducing multi-tenancy.
Rationale	Reduce operational cost by enforcing SLAs while using minimal resources.
Supporting materials	Referred to as "Elasticity in the PaaS Layer" in the list of WP4 Innovations
Priority of accomplishment	Must have
Tentative scheduling	RP2 (stateless), RP3

A.7. BG#WP4.NAAS.001

Unique ID	BG#WP4.NAAS.001
Short name	NaaS Services - Layer 2/3 virtual networks for the deployed applications
Type	Business goal
Description	Applications and services with a defined SLA need to be able to request certain SLAs from the underlying network that connects it's components via network links within or across data centers. For some applications these network links may require certain functional and non-functional qualities, such as secure links, certain network latency or bandwidth guaranties as they effect the high level Application/Service SLAs. For example an application SLA that promises 99.9% availability requires at least 99.9% availability of all network links between the components. Therefore clients **must** be enabled to customize the defined networks (private or public, IP range, QoS requirements like throughput or latency) and dynamically assign virtual machines to the defined networks. IaaS Clouds provide fundamental computing resources to the consumer including processing, storage and network resources. Thus, logically NaaS is part of the IaaS offer. However, mainstream state-of-the-art IaaS Clouds provide only Layer 3 networking options that will not be sufficient for complex applications, especially in enterprise and telecommunications domains. Many use cases including legacy applications require functionalities like broadcast traffic, multicast networking, control over the IP address range used, multiple networks accessed by an application, guaranteed quality of service for network connections, etc. These functions are not provided by the IaaS Layer 3 network: the possibility to allow IaaS clients to have Layer 2 networks for their own purposes is needed.
Rationale	Guarantee Application or Services level SLA for distributed applications.
Supporting materials	Referred to as *"NaaS"* in the list of WP4 Innovations
Priority of accomplishment	Must have
Tentative scheduling	• RP2 (Design / Models) • RP3 (Implementation)

A.8. DA#WP5.MON.001

Field	Description
Unique ID	DA#WP5.MON.001
Short name	Integrated Monitoring
Type	Domain Assumption
Description	The system shall collect custom and built-in KPIs for any resource deployed and managed. This means that the system shall support capturing and aggregating specific KPIs for the different layers of the cloud stack (S/P/I/aaS), in order to enable advanced management capabilities, like scaling. In order to help developers to deploy monitorable applications, a set of tools will be provided to specify, trigger and generate the appropriate monitoring information
Rationale	Enable manageability of cloud applications and the resources they use.
Involved Stakeholder	Service Provider, Software Providers, Platform provider.
Supporting materials	None
Priority of accomplishment	Must have
Tentative scheduling	Iterative increments throughout the project.

A.9. BG#WP5.MON.001

Field	Description
Unique ID	BG#WP5.MON.001
Short name	Integrated Accounting of services
Type	Business Goal
Description	The system shall provide accounting for custom and built-in counters involving usage of the platform. This will allow for example detailed rating and bills to be generated. Different types of accounting capabilities can be provided so that developers and providers can make use of them and define their price models accordingly.
Rationale	Allow customers to have lower bills by enabling pay-per-use of services
Involved Stakeholder	Service Provider, Software Provider, Customer.
Supporting materials	None
Priority of accomplishment	Must have
Tentative scheduling	RP2

A.10. BG#WP6.SM.001

Field	Description
Unique ID	BG#WP6.SM.001
Short name	Integration of native services
Type	Business goal
Description	The software providers shall have the possibility of using external existing services and APIs in an easy way. A representative portfolio of services is needed, together with the mechanisms to easily integrate them in the applications. Software provider shall not have to manage those services nor their lifecycle.
Rationale	Lower cost and length of development and maintenance by enabling developers to integrate existing services without cost.
Involved Stakeholder	Software provider
Supporting materials	None
Priority of accomplishment	Must have
Tentative scheduling	RP2

A.11. BG#WP7.SM.001

Field	Description
Unique ID	BG#WP7.SM.001
Short name	Cloud aware software platforms
Type	Business goal
Description	**The system shall provide a set of well-known platform technologies available for use by software providers using basic configuration.** Therefore, software providers will not have to worry about the management of those technologies (installation, deployment of components or packages, configuration, etc.). Moreover, the software providers shall benefit from scaling and multi-tenancy features of those platforms. 4CaaSt platform shall provide facilities to integrate application servers, orchestration engines, relational databases and integration technologies like ESBs.
Rationale	Lower cost and length of development and maintenance by providing a set of cloud-aware well known technologies to support software development.
Involved Stakeholder	software provider
Supporting materials	Description of Work
Priority of accomplishment	Should have
Tentative scheduling	Several examples of technologies must have integrated by the end of the project.

