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SPICE
Service Platform for Innovative Communication Environment

FP6 - Integrated Project (IP)
Priority T2 – Information Society Technologies

WP N°: 1
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Title: Revised Requirements and Scenarios

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Project coordinator name: Christophe Cordier

Organisation name of lead contractor for this deliverable: FT

Revision: 2.5

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Executive summary

1 DESCRIPTION OF THE DELIVERABLE CONTENT AND PURPOSE (MAX 1 PAGE)

This document describes the revised SPICE requirements and scenarios. The content of this deliverable is divided into four major parts; the processes and methods used to create this document, the revised requirements, the unified scenario, and the conclusions.

The purpose of this deliverable is to provide a unified view of the SPICE requirements and scenarios, to reflect the developments in the technical work packages, and to serve as a reference document, in particular when building the SPICE project demos.

2 BRIEF DESCRIPTION OF THE STATE OF THE ART AND THE INNOVATION BROUGHT

SPICE Task 1.1 and Task 1.2 have jointly revised the SPICE requirements and scenarios, to produce this document. This work is based on the work done at the beginning of the project; namely the requirements defined in deliverable D1.1 [1] and the scenarios defined in deliverable D1.2 [2]. The scenarios have also been revised by WP8 in deliverable D8.2 [4], based on feedback from the focus groups [3].

The SPICE project aims at defining a unified Service Environment which supports all phases of the service life cycle, i.e. from the service creation, via the service deployment and service usage to the service deletion. To achieve this SPICE relies on a set of SPICE main features, which are distinguishing features of SPICE: Service Creation, Service Matching, Service Adaptation, Service Execution, and Service Roaming.

The SPICE requirements have been reviewed and classified, and the revised requirements are stored in a requirement database. They clearly document the distinguishing features of the SPICE project. The requirements were also linked to the scenario scenes, to create a coherent view of the requirements and the scenarios. The requirements database can be browsed as a web document [6], where the requirements are categorized and linked together by type (functional, non-functional), priority (mandatory, high, medium, low), category (user, device, technical, open market, enterprise) and SPICE features (service creation, service roaming, service matching, service adaptation and service execution).

The scenarios were processed in order to be more readable (shorter version), to stick to SPICE main features and to be aligned with the work carried out by the technical work packages and finally to reflect what will be available as demonstrators. The new SPICE global storyline should be considered as a reference by the technical work packages in the future, in particular for demo purposes.

3 DEVIATION FROM OBJECTIVES

This document was not deviated from its objectives.

3.1 DESCRIPTION OF THE DEVIATION

3.2 CORRECTIVE ACTIONS
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<td>SPICE</td>
<td>Service Platform for Innovative Communication Environment</td>
</tr>
<tr>
<td>WP</td>
<td>SPICE Work Package</td>
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<tr>
<td>SCE</td>
<td>Service Creation Environment</td>
</tr>
<tr>
<td>SEE</td>
<td>Service Execution Environment</td>
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<td>KMF</td>
<td>Knowledge Management Framework</td>
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<td>Service Description Repository</td>
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<tr>
<td>SB</td>
<td>Service Broker</td>
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<tr>
<td>SRM</td>
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<td>DCS</td>
<td>Distributed Communication Sphere</td>
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<td>DRM</td>
<td>Digital Rights Management</td>
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<tr>
<td>DD</td>
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<td>Multimodal Service Delivery and Control System</td>
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<td>CDM</td>
<td>Content Description Database</td>
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<tr>
<td>GBA</td>
<td>Generic Bootstrapping Architecture</td>
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<td>IMS</td>
<td>IP Multimedia Subsystem</td>
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<td>Service Level Agreements</td>
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<td>Charging Component</td>
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1 Introduction

1.1 Process and methods

SPICE started with a technology vision articulated in a number of specific objectives and embodied by a set of short scenarios, expressed by brief textual narratives.

The design process began with a very detailed requirement specification activity, in partial overlap with the scenarios definition and in reciprocal influence with other SPICE internal research activities, namely architecture work, initial analysis of business models and legal issues.

The requirements work produced an output of 48 use cases, considering four types of requirements: user requirements, enterprise requirements, technical requirements and open market requirements (for details see [1]).

The ensuing work on scenarios took into account the elaborated architectural view, the identified functions, and once again the parallel work on business and legal aspects to consolidate the first complete version of the project scenarios [2]. These scenarios provided the basis for the first evaluation round with end-users and professional users (e.g. service providers, service developers), conducted through a number of focus group interviews [3].

The user feedback generated in the focus group interviews, as well as the parallel work in business models and the technical progress of the work packages, has then been fed into a scenario revision [4].

Taken the revised scenarios, defined in [4] and the requirements, defined in [1] as starting point, the current document aims to consolidate the different scenarios into a unique and streamlined storyline, as well as to define a more compact set of requirements, prioritized against the most distinctive objectives and outcomes of the project.

1.1.1 Requirement revision methodology

The requirement revision is based on the initial SPICE requirements [1], which were collected at the third month of the SPICE project work. Revision work has started exactly one year after collecting the initial requirements. In this time the initial SPICE architecture has been established [5]. In parallel the SPICE scenarios have been created [2] and updated [4]. The revised requirements need to reflect the changes in SPICE design and development and need to be linked to the new scenarios.

As first step the initial requirements were parsed and uploaded to a database. The revision revealed that the requirements were on different levels of detail, partly outdated and that it was difficult to interpret them, because of their relative large number (#337). The revision also revealed that the requirements were linked to the use cases defined in [1], which were replaced by revised ones or outdated meanwhile.

The working group has decided to create a requirement database which is useful and manageable in size, by reducing the number of requirements to the order of one hundred. Each SPICE work package was asked to provide the most important requirements in textual format, which highlight the SPICE values ("Top ten requirements per WP"). These requirements were checked and uploaded to a database. As next step the requirements
were cross linked, dependencies between requirements were created and conflicts were resolved. As an intermediary step, the new requirements were linked to the actual scenarios [4], thus helping the scenario revision. As final step the requirements were linked to the new scenario scenes defined within this document.

The requirements can be browsed as a web document [6], where the requirements are categorized and linked together by type (functional, non-functional), priority (mandatory, high, medium, low), category (user, device, technical, open market, enterprise) and SPICE features (service creation, service roaming, service matching, service adaptation and service execution).

1.1.2 Scenarios revision methodology

Figure 1 provides an overview of the described process. The lower part of the diagram illustrates the scenario update steps, from the very beginning to the final revision specified in this deliverable. The upper part of the diagram includes the main sources and activities that have shaped the scenarios, with a special emphasis on the outcomes of the major evaluation round conducted by the focus groups. Table 1 shows the scenario update steps and maps this to the project tasks and deliverables. Table 2 shows the main sources that have shaped the requirements and the scenarios, and maps this to the project deliverables and milestones.
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<th>Scenarios process steps</th>
<th>Project stage</th>
<th>WP/Task</th>
<th>Deliverables/Documents</th>
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<td>Proposal</td>
<td>NA</td>
<td>SPICE Description of Work</td>
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<td>3 short textual narratives</td>
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<td></td>
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<td><strong>Step 2</strong></td>
<td>M6</td>
<td>WP1/Task 1.2</td>
<td>D1.2 “Scenarios for the representative next generation of communication and information services”</td>
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<td><strong>Step 3</strong></td>
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Table 1: Scenario process steps and corresponding deliverables

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Table 2: Requirement and scenario sources and corresponding deliverables
2 Revised requirements

2.1 Requirements overview

The following chapter gives an overview of the SPICE requirements. In addition to the present document, the SPICE requirements database (see [6]) contains the detailed description of the requirements. The requirements are organized in views (like priority, type, keywords, etc.), and are cross linked with the scenario scenes of the current document. The database is accessible from the SPICE website.

The SPICE requirements can be grouped as platform requirements, and actor requirements outside the platform.

The platform requirements are grouped around device and middleware requirements, content and service requirements, service creation and service execution requirements. The security requirements are distributed around the platform entities, and also act as gateway to the platform. The Knowledge layer gathers static and dynamic information from SPICE platform (like user profile and user context), processes this information and delivers ‘knowledge’ to the SPICE components. Using this knowledge, the SPICE components can adapt their behaviour. The knowledge related requirements are distributed among platform entities.

The main actors outside the SPICE platforms are the users, who connect to the SPICE platform, use services and download content. 3rd party companies may offer additional services and/or content. Business and regulatory requirements are also imposed on the platform.

![Figure 2 SPICE requirement groups](image)

Figure 2 shows the main requirement groups of the SPICE platform. The following subchapters discuss the main requirement groups in details.

2.2 Service Creation Environment (SCE) requirements

Efficient and fast service creation and service delivery is supported by the SCE. It enables creation of composed services, and facilitates the copyright and management of composite services when multiple parties are involved in the development. The created
services will be processed further on to the Service Creation Environment, which should support the following tool chains:

- Editors and/or wizards, that allows (graphical) service creation and service orchestration for professional developers and end-users.
- Support of service adaptation rules and knowledge sources.
- SPICE mobile ontology to define data types for the SPICE components.
- A tool chain for analyzing and testing services before deployment.
- Providing emulators and test beds, independent of the real execution environment, in order to allow user feedback on early prototypes.
- A tool chain for packaging and deploying services into the Service Execution Environment.

### 2.3 Service Execution Environment (SEE) requirements

The SPICE SEE is a distributed runtime environment offering the capabilities to bridge between the Telco world (e.g. IMS) and the SPICE component layers (e.g. media, control and service layer). SPICE will provide a SEE on different server and terminal platforms.

Therefore it will be required to provide the support of:

- Event-oriented, process-oriented and composed services.
- Capabilities and enablers, such as HTTP, Web Services, IMS and streaming.
- A single description language for defining and orchestrating SPICE services. This description language shall allow expression of synchronous and asynchronous interactions.
- Design time and run time composition for service orchestration.
- Same format for the output of human and automatic composition in order to reduce complexity.
- Flexible access to SPICE operation, management and administration instances.

### 2.4 Knowledge layer requirements

The basis of the knowledge layer is the Knowledge Management Framework (KMF) – see SPICE Deliverable D1.3 [5] for details. The KMF supports the service pro-activeness in the SPICE platform. It provides mainly, but not exclusively modality, content and service recommendations.

To achieve its goal, the KMF gathers information about the user profiles, the service profiles and various context information. This information is processed via specific algorithms (e.g. aggregators, learners, reasoners, predictors and recommenders) to provide higher level knowledge. The SPICE components shall consume this knowledge via well defined publish/subscribe and polling interfaces. The provided information will contain a ‘relevance’ score element, that describes how relevant is the information for a certain end user, group or service.

The knowledge is considered sensitive information in SPICE; therefore access to knowledge interfaces must be controlled by the Privacy Management System, and shall be used with user’s consent.
The KMF is a distributed framework containing knowledge sources and knowledge sinks. It facilitates the information flow between the sources and the sinks, using knowledge discovery, querying and brokering.

2.5 SPICE middleware, SPICE components and services

The SPICE components are the basic building blocks for SPICE services. The SPICE middleware is a distributed system that supports description, publication, discovery, brokering, roaming, and lifecycle management of SPICE components. Another important task of the SPICE middleware is to interface with 3rd party services and legacy systems.

The SPICE components have to comply with well defined requirements, which are described in details in [7]. In general, the SPICE components must support:

- A set of minimum interfaces and capabilities, such as lifecycle management, performance measurement and notification interfaces.
- Combining the service logic with the service semantics and metadata.
- A technology neutral methodology for development, publication and lifecycle management.

The descriptions of SPICE components are stored in Service Description Repository (SDR). The component descriptions contain three main aspects: functional metadata, non-functional metadata, and semantic annotations. The SDR provides multi-domain access to this information, based on formal query languages. It also supports service publication and discovery.

The Service Broker (SB) provides the reference point for the users to retrieve, subscribe and use services and service components that could be provided by multiple actors. The SB, in close cooperation with the SPICE access control system, supports the exposure mechanism, which allows access to the platform hosted services and service components.

The Service Roaming Manager (SRM) provides seamless service support for roaming users. The services might be hosted by the home domain, the visited domain or being distributed in different domains (home and/or visited). Service control shall be possible either by home or visited platform. The home operator’s roaming policies are used to define the service control. The SRM provides capabilities to replace individual components of a composite service whenever they fail.

2.6 Terminal and device requirements

SPICE assumes that in the future the user will have many different terminals and devices. Via these terminals, the user will be able to connect to different networks and to discover other public devices in his vicinity plus the capabilities and services that these devices offer. All these resources will cooperate in the Distributed Communication Sphere of the user in order to provide high-level user services.

We define SPICE devices and terminals as following:
A device is a basic device, that the SPICE platform can use to some extent (e.g. for multimodal rendering), preferably in a trusted manner.

A terminal is a special device, owned by the user that embeds SPICE foundation software. Using a terminal the user can access to the SPICE platform, can get recommendations and can launch services.

Devices must comply with the following requirements:

- Advertise their existence to the SPICE platform.
- Possess a unique identifier.

Devices can be used in multiple contexts in SPICE:

- To be used in trusted manner, the device has to be authenticated by the platform, i.e. it has an IMS subscription and a GBA smartcard.
- To be used in Multimodal Delivery Environment, the device must support services called activators and renderers. Activators are services that catch user inputs and renderers are services that are capable of rendering multimedia elements. If DRM support is needed for the delivery, the device must run a SPICE DRM agent.

Terminals must support:

- The installation and execution of SPICE foundation software (Dynamic Desktop, terminal SEE, etc.).
- At least screen output modality and keyboard or touch screen input modality.
- Network connection to the SPICE server platform.
- Data synchronization with associated services on the platform.

In the remaining part of this chapter we define the requirements of concepts and software, which are closely related to SPICE devices and terminals.

The Dynamic Desktop (DD) allows the users to retrieve, manage, update, remove services and adapt their presentation in a dynamic fashion. DD adapts itself to the user's context, by offering only services appropriate at the time or by notifying users about changes (e.g. new service available).

The Distributed Communication Sphere (DCS) provides updated information about the user's devices, terminals, networks, groups, and hosted services. The Communication Model is the set of symbolic data that describes the composition of the DCS of a user. The SPICE platform must provide the following functionalities:

- Discover the capabilities and available resources of the devices and the networks in the DCS.
- Dynamically discover the services that are running on the devices in a user's DCS, their interfaces, and the resources they require.
- Keep the Communication Model updated. This may be implemented by regularly probing the user's environment.
- Expose Communication Model through knowledge interfaces.

The Multimodal Service Delivery and Control System (MDCS) dynamically adapts the way in which the user interacts with the services, and select the mode of interaction which fits
best the user’s current situation (e.g. sound control in car). It adapts input and output modalities of the service, depending on the available devices in the user’s DCS.

The Terminal Manager synchronizes data stored locally on the user terminal (contacts, photos, mails) with the associated service on the platform (Network Address Book, Photo Service, Mail provider. The synchronization process may be initiated by context changes.

2.7 Content requirements

Content in SPICE can be generated by 3rd party content providers, by the platform, or by the SPICE users. Thus a scalable, trusted and efficient management of the content flow from these content sources (content generators) to the content sinks (content consumers) throughout the platform is needed. In this framework, publication, discovery, brokering and adaptation of the multimedia content shall also be supported. Unambiguous and enriched content description is mandatory, including the semantic content description, the multimedia properties of the content, and the required resources from the receiver.

In order to organize content flow through the SPICE platform, which may pass through different operator and/or network domains, there must be a Content Description Database (CDM) storing the content metadata descriptions separated from the content itself. This database shall be distributed over the content provider domains. Further, the CDM should provide an interface for content providers to update already provided content metadata.

From the legal perspective, in order to enforce content copyrights SPICE shall integrate a mechanism to enable Digital Rights Management (DRM).

From the end user perspective, who may take the role of content generator, the SPICE platform must provide easy to use content generation and publication tools. Also for the sake of usage experience, SPICE must be able to dynamically change the input and output modalities of a multimedia session when it flows from a sender to a receiver (content adaptation to e.g. different devices). Further, the SPICE platform must be able to decide when and how to adapt multimedia content: it should be able to execute these decisions automatically, but it may also delegate such decisions to the end-user.

2.8 Requirements towards a user-oriented platform

SPICE shall be a user-oriented platform so the user acceptance and reluctance to the new capacities and usage models are considered in the platform design. These constraints were mainly gathered through an iterative process of usage scenario creation and later exposure of these scenarios to focus groups in WP8, giving rise to a set of recommendations compiled in [4]. From these recommendations, a synthesized subset of user requirements has been extracted. The end-user sensibility expressed therein directs towards the following domains: privacy management, push behaviour of the services, service adaptation to the end-user’s situation, timely session adaptation and transfer among devices, user rating, fair recommendations and usage ergonomics.

The strong user reluctance to uncontrolled access to user profiles, which may contain sensible personal data, give rise to privacy management: the SPICE platform must allow the users to define access policies to their profile with respect to services, operators and
other users. As a particular instance of this statement, user’s location tracking is not permitted unless the user gives explicit consent. Further, user profiles must be respected across different devices, networks and domains.

The users will not trust the platform whenever they feel cheated or treated unfairly. Therefore, the sponsoring companies should not be allowed to bias the delivered service recommendations, otherwise becoming in practice advertisements. User rating was deemed a promising and trusted means (among others) to deliver fair recommendations.

The usage of SPICE platform will take place in a heterogeneous and multi device scenario, where end user will be able to interact with the platform through a plethora of devices and interfaces, on the move. Consequently, user interfaces should be intuitive and friendly, preferably on the user’s native language. Further, session adaptation among devices should be a smooth process allowing the user to control the session. Session, situation-based service adaptation and implicitly content adaptation on the move are direct consequences.

In [4] it has been claimed that the SPICE user experience might also be bothered by an excessive push-behaviour of the SPICE platform. Therefore the SPICE platform should keep the push-behaviour of services (push-advertisement, push-recommendation) at reasonable levels, and only allow them with the user’s explicit acknowledgement.

Finally, from the perspective of the professional users participating in the service creation and deployment process it was claimed that early feedback of a subset of end-users on deployed services would be useful; whereas it has also been claimed, that the SPICE platform shall provide a Copyright Management System and a distributed Revenue Sharing System, whenever dealing with creation of complex services, where conception, mock-up, prototyping and final deployment may be carried out by different parties.

2.9 Security requirements

SPICE users are expected to be allowed to use different services for each of which they may use multiple different identities. Thus, the SPICE platform must support a uniform identity management system, which shall be independent from the underlying access networks or the used services. All of these identities must be handled in a way that on the one hand the user’s privacy is guaranteed with respect to the different service providers and on the other hand single sign-on for a user friendly access to the services must be supported. Finally, the Identity Provider has to assure that the Service Providers can rely on the identity presented to them.

The authentication mechanism in SPICE shall be based upon the Generic Bootstrapping Architecture (GBA). The SPICE user must be an IMS subscriber, not necessarily registered in the IMS. When the user is not registered via the IMS session control layer, SPICE shall authenticate the user using IMS credentials (namely an ISIM). For the process of service creation, there must be a means to authenticate the service creator who is about to deploy the service in the SPICE platform.

The access to services by actors (users, services, 3rd parties, etc) involved in the SPICE platform is controlled by means of policies. Policies are declarations of conditions, preferences, etc. in a suitable language that can be enforced by a policy enforcement
mechanism. The Service Level Agreements (SLAs) needed during such service access is also expressed using policies. Digital Rights Management (DRM) defines policies on how to access protected digital content. On the top, the Policy Management System (PMS) must control the lifecycle of policies that enter the SPICE platform. The PMS must provide a framework within which the policies are managed securely and in a consistent manner.

Finally, from the perspective of end users, the privacy management is an important asset of SPICE. The SPICE platform should allow the users to define privacy rules and conditional access to their personal data. The users should be able to disclose their personal information in different ways to different watchers, applying privacy rules, which however may be overridden in emergency situations. The Policy Management System shall enforce privacy policies, as any other policy.

2.10 Charging, Billing and Contracting

Users want easy-to-use services, and an essential element hereof is the clarity and uniformity of the tariff structure(s). Users are inclined towards clear service structures with clear and uniform tariff plans. The SPICE platform should introduce a clear and to the point tariff structure in order to attract consumers to adopt services offered on the platform.

The Charging Component (CC) shall therefore provide the bill to the user for the consumption of the SPICE services, in a unified-fashion when charging composite services based on elementary ones; and support both offline and online charging methods. To support the storage of accounting records for composed and any other chargeable services in SPICE, there needs to be defined a concept on how to aggregate and store offline accounting records. The CC shall also consider that the users may purchase digital content at different levels of granularity (e.g. a music track or an entire album).

The Customer and Merchant Billing Profiles shall provide the payment method determination. Users can maintain billing relations with several providers (telecom, television, internet service provider, etc.) at the same time, which enables them to access services over the SPICE platform all the time. A procedure how to choose between different payment options should be provided. The Service Level Agreement Framework (SLA Framework) should provide an automatic contracting capability between SPICE users and services.

For the sake of usage experience, contracted licenses must be granted seamlessly, independently of end user’s terminal, on the move. If a user buys content and decides to use it on a given terminal, the license associated to that digital content should be backed-up and reused in case the content flow is redirected on another terminal, thus avoiding the need for a new license agreement process.

2.11 Open market and business requirements

The open market requirements identify a range of business constraints and objectives invoked by other providers who have access to the SPICE platform, such as (mobile) virtual network operators, (3rd party) content and service providers and other business
actors, and also addresses requirements related to multi-partnering in services provisioning.

The overall objective of the SPICE project is the enablement of large-scale service introduction through the support of multiple heterogeneous execution platforms, in order to facilitate the diffusion of new services across different operator domains, different countries and multiple terminals. SPICE platform shall facilitate easy and quick service creation, and dynamic service instantiation and deployment.

A further goal of the SPICE project is to allow a large variety of business models. To achieve this objective, seamless service and information roaming, continuity of service provisioning, opening up to 3rd parties, sharing of service components and automatic discovery of new services are relevant. Service provisioning increasingly requires cooperation between a large number of parties – telecom operators, content and service providers, third party network and service providers, end-users – who all need to collaborate to deliver a service.

Taking the above into account, the SPICE platform must facilitate:

- An open service creation and operation environment for a wide range of content and service providers (professional, semi-professional and individual).
- A managed service platform environment. This is not contradictory to the previous point, as long as the SPICE platform is accessible to any party that wishes to operate under the framework provided by the platform. For users, these requirements are fulfilled through a secure framework that provides identification, authentication and privacy management functionalities, whereas for content and service providers this is realized through service level agreement enforcement functionalities.
- A seamless user experience, with seamless information and service roaming, as well as service provisioning continuity and technology transparency.
- Clarity and trust, in order to create a positive acceptance environment for consumer adoption of innovative services.
- User control over the content and service provisioning, heavily related to the previous point.
- Billing and charging options for a wide range of situations and devices.
- Flexible operation, administration and management of the platform.
- Dynamic, real-time creation of business networks.

2.12 Regulatory requirements

General legal requirement-completeness and comprehensiveness of regulatory requirement cannot be achieved. Legal requirements are difficult to concretize on a European level, since the EC does not enact laws, but directives. Directives are used to harmonize law in the Member States, but they only set a minimum standard that the Member States must not fall short of. They leave room for interpretation for the Member State when transforming the directive into national law, and thus legal situation may vary in different Member States. The regulatory requirements will be oriented at basic principles derived from the respective EU directives. The legal provisions are difficult to summarize in a limited number of requirements. There are a number of other
requirements that could not be listed here. It is important to understand that the basic principles presented herein can only be seen as guidelines, and that the requirements presented are neither complete nor comprehensive.

SPICE regulatory requirements will be presented in the following topics: privacy, copyright, trade marks and lawful commercial communication.

All processing of personal data is generally prohibited and can only be legitimized by law or by the data subject's unambiguous declaration of consent.

Sensitive data is any "personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, trade-union membership and data concerning health or sex life." Since information about increased font size or preferred audio output because of bad sight must be considered health data, the rules for sensitive data are important for SPICE. To legitimize the processing of personal data the data subject must give explicit consent, which is an even higher standard than "unambiguous consent".

Key Principles of Data Processing - never collect more data than necessary for the specified purpose and keep the data subject in control of the data as far as possible. SPICE must be developed in a way that its End-Users will technically be able to make use of data subject rights. The data controller must take appropriate technical and organizational measures to ensure an appropriate level of confidentiality and security. Appropriateness must be defined by taking into account the state of the art and the costs of their implementation in relation to the nature of the data to be protected and the risk represented by the processing.

The transfer of personal data to third countries that do not ensure an adequate level of data protection is generally prohibited. Member States are considered to guarantee an adequate level of protection because of the directives on Privacy that had to be transformed by every Member State into national law. Outside the EC the Commission only recognizes Argentina, Canada and Switzerland to provide an adequate level of protection. The Commission is currently studying the level of data protection in New Zealand, Hong Kong and Australia.

Prior authorization of the right-holder is required in case of acts of reproduction (and adaptations) of works, phonograms, performances, films, and broadcast, other than temporary acts of reproduction. There is only one obligatory exception (temporary, transient and incidental acts of reproduction which are the integral part of technological process) and a number of facultative exceptions to the economic rights. In the latter case, the Member States are free to provide for such exceptions in their national law.

Extraction or reutilization of substantial parts of the content of the database requires the authorization of the right-holder.

Usage of the trade mark (or corporate name) in the course of trade (e.g. advertising) might require conformity check with the EU and national trade mark laws.

SPICE shall comply with the conditions for the lawfulness of commercial communication (i.e. it must protect SPICE users from SPAM).
3 Common SPICE scenario

3.1 Introduction

The scenario takes place in the future, about 2-5 years from now. 3G technology is widespread across Europe. The same goes for users’ access to broadband networks. Basic terminals are today’s high-end ones; cheap but very powerful with high-definition colour screens, Wireless broadband access (like HSPA), Wi-Fi, Bluetooth and long lifetime batteries.

The story includes several characters or personas, grouped in the table below.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Various business and technical professionals working at Sunrise Inc. and MobileSME, two Spanish companies, respectively a medium-size travel service business and a small application developer.</td>
</tr>
<tr>
<td></td>
<td>a. Jerry, an employee at Sunrise Inc.; Jerry is responsible for the requirement specification.</td>
</tr>
<tr>
<td></td>
<td>b. Tom, an employee at “MobileSME”; Tom is a developer</td>
</tr>
<tr>
<td>2.</td>
<td>Consuelo, a Spanish journalist based in Madrid but a frequent traveller used to remote work.</td>
</tr>
<tr>
<td>3.</td>
<td>A French family, the Dupont family, including Katherine, the mother, Philippe, her husband, and their two children, all living in Paris but now travelling in Europe.</td>
</tr>
</tbody>
</table>

Table 3: Scenario characters and settings

The story takes place in different settings and cities in Europe. Hence, in some cases the characters will be using the services in their home country, in other cases the services will be used when travelling abroad.

Furthermore, the scenario takes into account two different perspectives, even though it unfolds along a unique storyline: one is about the service providers’ point of the view (i.e. of the professionals involved in the service creation and management process), the other
is related to the end-users angle (i.e. individuals with no particular technical or business knowledge of the depicted services).

3.2 Mapping SPICE main features with the scenario/scenes

The SPICE project is aiming to define a unified Service Environment which supports all phases of the service life cycle, i.e. from the service creation, via the service deployment, service usage to the service deletion. To achieve this, SPICE combines several key technologies such as component enabling middleware, service brokering and mediation mechanisms, semantic enhancement and discovery of services, life-cycle management, context-awareness and multi-modality. This combination of the mentioned technologies will enable the provision of the so-called SPICE main features, which will be shortly described below:

Service Creation:

For the service creation phase, including the development, the testing and the deployment of services, SPICE developed several supporting tools. A high-level service description language, named SPATEL (SPICE Advanced Service Description Language for Telecommunication Services) was developed, which supports the whole process from the service idea to the executable service. Around this language a SPICE Service Development Studio, a service creation, a service emulation and service testing environment was developed. Special add-ons help the developers to browse the knowledge interfaces (e.g. context, location), and to design adaptation decisions. By designing and offering a special version of the SCE SPICE provides in addition to professional service designer also the end-users the possibility to design their own services, by combining existing services and service enablers.

Service Matching:

By the usage of semantic service descriptions, which is part of the service meta-data, stored at service repositories, different types of service matching (find the appropriate services, components and service enablers) are supported by SPICE. The service developer can search within the service repository for the available services, components and service enablers which he can use for the composition of his service. The SPICE platform is capable of creating automatic service compositions, and uses component matching algorithms to select the suitable components of the composed services. On the other side the stored semantic service description are used by SPICE platform to identify and announce available services to end-users which match the preferences and profile setting of the end-users.

Service Execution:

To enable the execution of services SPICE also developed appropriate service execution environments both at the server (SPICE platform) and the terminal (SPICE Dynamic Desktop). Beside this SPICE also offers by a so-defined Service Brokering architecture an innovative approach for the service composition. So-called service component networks (connections of service components) will be
created always online and are not fixed at the process of service design. Therefore the used instances of the components are not fixed bound to the services, they will be selected based on the actual context information/environment. According to this the SPICE enabled services are very flexible and can be automatically adapted to the users needs. The Terminal SEE is capable of dynamically adapting to the environment (e.g. available networks, available services), and it can provide session mobility for the multimedia services. (e.g. transferring movie session from the car LCD to the handheld device)

Service Adaptation:

To support the access to the SPICE services via different access technologies and from different types of terminals, service adaptation is also a main feature that is offered by SPICE. Service behaviour, content and modality will be adapted to the actual used environment within the Distributed Communication Sphere of the user. The adaptations parameters include terminal capabilities, user preferences and operator policies.

Service Roaming:

Due to that mobility is still an important feature of next generation communication networks, SPICE also provides service roaming. SPICE offers end users the possibility to access their home services, to be provided with information and access to locally available and suitable services at the visited domain and to combine locally available services/service components with services/service components from the home domain in order to compose new services.
Table 4 shows how the SPICE main features will be used in the different scenes of the SPICE common scenario. Figure 3 shows a graphical mapping of the same, illustrating that several scenes will apply many of the main SPICE features.

<table>
<thead>
<tr>
<th>SPICE Feature</th>
<th>Matching scenario scene #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Creation</td>
<td>1, 2, 3, 4, 10</td>
</tr>
<tr>
<td>Service Matching</td>
<td>5, 6, 8, (10)</td>
</tr>
<tr>
<td>Service Adaptation</td>
<td>5, 6, 7, 8, 9,10, 11, 13</td>
</tr>
<tr>
<td>Service Execution</td>
<td>7, 8, 9, 10, 11, 12, 13, 14</td>
</tr>
<tr>
<td>Service Roaming</td>
<td>5, 6, 10, 13, 14</td>
</tr>
</tbody>
</table>

Table 4: SPICE main features mapping with the scenario’s scenes

![Figure 3 SPICE main features mapping with the scenario’s scenes](image)

### 3.3 Description of the common SPICE scenario

Within the following subsection the common SPICE scenario will be described. The overall story covers the service creation and the service usage phase of SPICE services. At each scene the main features and functions offered by SPICE that will be used to provide the required functionality within the scene will be mentioned.
The scenario will go through a series of situations, shortly introduced here:

- Sunrise Inc. and MobileSME cooperate in the development, launch and management of a new travel service for Spain. Due to the America's Cup a special feature package addressed to the region of Valencia is also offered. Usage of the SPICE platform from a professional service view is presented, both from a business and technical point of view.
- The Dupont family is travelling to Valencia for a leisure trip and to attend to the America's Cup. They travel by car from Paris and as they go they have the opportunity to subscribe to a number of SPICE-enabled services.
- Consuelo is travelling from Madrid to Valencia, for the same reason – the America’s Cup - but on a work assignment from her newspaper. She is already a subscriber of some SPICE-enabled services, but she will get some new ones or update existing ones in relation to that specific situation.

3.3.1 Service Creation and Service Deployment

In the following set of scenes, a new service is created and introduced to the market; the story goes through these steps:

- Scene 1: Service idea, creating a mock-up and testing at Sunrise Inc. (travel guide service)
- Scene 2: Composition and Service Creation through the SPICE Service Creation Environment (SCE)
- Scene 3: Service Deployment, Registration and Activation to the SPICE platform
- Scene 4: Service announcement

Scene 1: Service idea, creating a mock-up and testing at Sunrise Inc. (travel guide service)

Sunrise Inc., a travel agency has the intention to offer a Spanish wide travel service with a special add-on for Valencia to cover the big upcoming event - the Americas Cup. The service shall include multi-language support to allow roamers within Spain to use the service with their national language.

Jerry at Sunrise Inc. is responsible for the requirement specification for the new travel service. Thanks to the SPICE platform, he and his team are able to express the service description and the desired functionalities in an agnostic high-level language. The service description is used as input to a Mock-up builder (Mock-up generator). The Mock-up builder is a graphical tool which enables Jerry and his team to put components together by drag and drop. In a couple of hours the mock-up is done. The mock-up is non-functional, but it can be displayed on any standard mobile terminal as well as on PC or TV-based interfaces (with access from e.g. Internet cafés or hotel rooms).
The SPICE platform offers also a “Service tester”, which enables Jerry to build a client that will use the new mock-up. Jerry delivers the mock-up to a range of selected external suppliers, which are asked to submit an early prototype with limited functionality, together with an economic proposal for the full implementation. As both the mock-ups and the prototypes might pose legal challenges like copyright issues, Sunrise Inc. and the external suppliers sign a legal contract specifying the property rights of the mock-up and of the prototypes.

Scene 2: Composition and Service Creation through the SPICE Service Creation Environment (SCE)

This scene represents the development (automatic composition, generation and publication) of the new service in the SPICE platform by the service developer company “Mobile SME”. This takes place in the context where numerous services are available in the service repository, and where Tom – a software developer at “MobileSME” – does not necessarily know all the features of these services. Tom is helped by entering in the Service Creation Environment user interface a “semantic request” describing the new service he wants to build. This request could be formalized in an appropriate semantic language, e.g. SPATEL, or it could be expressed in a given form of natural language (e.g. Travel Service). These two kinds of requests allow different profiles of people to compose services (e.g. professional IT people, non-technical professional or consumer users).

This includes:

- Analysis of the semantic request, in order to extract the “concepts” used, corresponding to the needs of service(s)
- Discovery, in the service repository, of the services whose semantic description matches with the precedent extracted concepts
- Composition of the discovered services (in the case where several services are discovered)
- Generation of the new service
- Publication of the semantic description of the new service

Scene 3: Service Deployment, Registration and Activation to the SPICE platform

Using the graphical user interface “MobileSME” on behalf of Sunrise Inc. imports the SW-package of the newly created Travel Service into the SPICE service provisioning environment. The environment is offering two possibilities for the import; either by a data media (e.g. CD) or by file transfer from a file server of the service provider.
After the service is **transferred to the SPICE platform**, it has to be **registered** in the SPICE service landscape.

This includes:

- **Publishing** of interfaces URI to several SPICE specific repositories (if necessary);
- **Publishing** of semantic service description (used e.g. for announcement texts);
- **Link** to software packages (version controlled);
- **Integration** of the service in the portal;
- **Trigger the contract** between SPICE platform operator and service provider for activation and integration of the application into Customer Care and Billing Centre.

Service providers willing to partake in service creation will have to pay the SPICE platform operator or a service provider a fee for the use of a range of functionalities and services. Such fee can be fixed or variable as well as recurring or one-off.

After the service is **registered**, the end-users may **activate (subscribe)** and **use** the service.

**Scene 4: Service announcement**

“Sunrise Inc.” is announcing the new service in order to make potential users aware that a certain service is available and may provide benefit to them. Further, **service announcements** may take place if substantial modifications or updated versions of existing services are available. The service announcement process is the first step within the service life cycle at which the user is involved.

In general, the service announcement process may be performed via so-called “push mechanisms” or “pull mechanisms”, still, encouraging as much as possible users’ pro-activity and respecting their privacy.

SPICE platform functionalities like contextual awareness and end users’ preferences enable notification (push) of new services or modifications in existing services in a tailored and customized way. Pull mechanisms are realized by including the service in the service repository and thereby making it searchable through a search engine.
3.3.2 Subscription to and Usage of SPICE Service when roaming

In the following set of scenes, a group of family travellers enjoy local, context-aware services while roaming; the story goes through these steps:

- Scene 5: In Touch with Local Services and adapting the subscribed home services on the way from Paris to Valencia
- Scene 6: Katharine’s family gets in touch with the local travel guide service (including download, installation, activation and subscription)
- Scene 7: Usage of the local travel guide service (incl. personalization and adaptation)
- Scene 8: Getting context-aware, personalized information and offers (information about tickets)
- Scene 9: Using ecommerce services for yourself and a group of friends (buying a ticket for the Americas cup)

Scene 5: In Touch with Local Services and adapting the subscribed home services on the way from Paris to Valencia

The Dupont family is travelling from France to Valencia for a leisure trip, and they are planning to attend to the America’s Cup. Katharine is a SPICE user and switches on her SPICE enabled terminal. After a successful authentication by the platform she is able to use her subscribed services, she may create her own ones and she can use in addition also other services offered by the SPICE platform, depending on her profile (Service matching). During the travel from Paris to Valencia, at all times Katharine can click on the SPICE personalized icon on her phone and access one of the SPICE services she has subscribed or created (e.g. a Petrol Station Search Engine that considers personal preferences like “likes to stop at children playgrounds”).

SPICE users can perform quite complex queries by using the very intuitive SPICE request language (e.g. “find restaurant at 8 pm” taking into account location and user’s gastronomic preferences, e.g. vegetarian, non smoking area, affordable, favourite food is Indian etc.).

Katherine is informed about services available at her current location, which might be of her interest (services that match her profile and context information collected by the SPICE operator). One SPICE service is the Restaurant Finder which she is already subscribed to. Katharine is using this service frequently in her home town. Thanks to the SPICE platform the service is adapted to the actual location and personalized according to the Katherine’s preferences. This is possible due to the agreement with the SPICE Operator which gives the service provider access to context information for a pre-defined fee.

SPICE operator also guarantees no malicious use of Katherine’s sensitive information since Katherine’s personal data is never matched with her context information. Before any
service can access sensitive information, the user's consent is always asked. This should be handled in a proper way to keep the balance between querying the user all the time and on the other hand to respect privacy rules.

**Scene 6: Katherine’s family gets in touch with the local travel guide service (including download, installation, activation and subscription)**

Due to the **service announcement** Katherine as a potential customer of “Sunrise Inc.” wants to use the newly created service. Therefore the service has to be **downloaded, installed and activated**.

Katherine is accepting the download on her screen and the download starts followed automatically by the installation process. After a successful download and **installation** of that particular application, Katherine has to **activate** the service in order to use it.

The main objective of the service activation process is to **create a specific account** (often called subscription) for Katherine. On one hand that allows the user to use the service in a personalized manner, according to her needs, and on the other hand allows the SPICE platform operator to allocate service usage to the user, mainly for charging purposes.

With the activation process she accepts the licence and billing agreements. “Sunrise Inc.” will take advantage of the SPICE platform which offers the charging and billing modules to charge the service to Katherine who has downloaded it and made use of it. These modules can be offered by the SPICE platform operator or a 3rd party.

**The fees that “Sunrise Inc.” will pay to the SPICE platform or to another service provider for these services is variable depending on a wide range of criteria (e.g. SLA agreements, contract, etc).**

Moreover, “Sunrise Inc.” can also be interested in using the service update / notification that the SPICE platform offers, to know when one of the components used to create the travel service has been updated in order to proceed with the upgrade.

The **service download and installation process** may also occur, if the version of the application installed at the user’s device is outdated or not compatible anymore with the service. In that case, an activation of the service is not necessary, if the service is already activated.

Note: After finishing using the service it has to be deactivated and Katherine subscription will be handled according to her profile/personal settings or Katherine can decide to uninstall the application manually, and provide service rating.

**Scene 7: Usage of the local travel guide service (incl. personalisation and adaptation)**

Katherine and her family are visiting Valencia. As they did not have time to get informed about Valencia before they left Paris, they have no idea on where to go. Thus, Katherine
selects the Guide Option on the Travel Service in order to receive an intelligent multimedia guide for the city of Valencia.

She buys a special offer for groups (SPICE knows her family’s accounts since she introduced them when creating her trusted group) so that her family can enjoy the guide too. As they walk around in the streets, new information and content pops up on their terminals. The content is adapted to their personal terminals, so that sound, images, and video can smoothly be heard and seen on each terminal and also the language used for the service is adapted to their native language, i.e. it is in French.

When they are close to the harbour the service alerts them with either a sound or a blinking icon, or even both of them depending on their service preferences. The service provides them with detailed information about what they are seeing and so improves their experience of Valencia.

Due to the long travel the family feels hungry. By typing in “Restaurant, Valencia, Italian” they get a list of Italian restaurant close to there place. They choose one out of the list, which is already adapted to Katherine’s preferences.

Scene 8: Getting context-aware, personalized information and offers (information about tickets)

After lunch, the Dupont family goes to the sailing event area. Once inside the area, the family’s terminals detect a local information service provided by a Spanish Mobile Operator. The family is notified by either a blinking display or sound, depending on their preference e.g. the alert will be given in their native language, i.e. in French.

The family is notified because they all selected this option in their service preferences. As they do not know much about Valencia, they value any information they can get. Moreover, they trust the SPICE platform because it is internationally well known for using fair recommendations based on users’ preferences and ratings.

While part of the family prefer going for a walk around in the harbour watching the boats, the others activate the information service they were just notified of. The information service provides sailing schedules, information about participants, sponsors, event’s history, and last minute events and news.

As this service information is pretty good and very useful, it has a lot of success in connecting a huge number of people to the local SPICE Platform Operator. For this reason, the Operator rewards the Service Provider in charge of the sailing information service with a discount.

Scene 9: Using ecommerce services for yourself and a group of friends (buying a ticket for the Americas cup)
Katherine requests the Valencia Travel Service to suggest detailed information about the America’s cup.

Katherine **buys tickets** for the whole family with her SPICE device (managed by the Home SPICE Operator). Based on the family group in Katherine’s device, the electronic tickets are sent to the personal devices of family members.

The amount for the tickets is deducted from Katherine’s balance. The electronic ticket contains a link to the web-based presentation of the American’s cup with relevant information such as address, map, contact, activities, buildings, start order, ranking etc.
3.3.3 Content Handling with the SPICE Distributed Communication Space

In the following set of scenes, a professional takes advantage of new services and devices for her work needs; the story goes through these steps:

- Scene 10: Service Update, e.g. download Valencia specific part (she is already subscribed to the Spanish travel guide service, but in Madrid)
- Scene 11: Consuelo gets a taxi at the airport of Valencia (using a taxi service)
- Scene 12: Finding each other at the Americas cup and taking an interview with Katherine
- Scene 13: Consuelo arrives at the hotel and uses the facilities of the hotel room for her work (discover resources, get access to company’s intranet as well as to the internet)
- Scene 14: Select a movie via Content Guide and transfer a video over different devices without losing it and use of different modalities

**Scene 10: Service Update, e.g. download Valencia specific part (she is already subscribed to the Spanish travel guide service, but in Madrid)**

Consuelo is a professional SPICE user and she has subscribed for several SPICE services. One of these services is the Travel Guide service from Sunrise Inc. which she uses on her trips within Spain.

As Consuelo arrives to Valencia and switches on her SPICE enabled terminal, she receives a notification of locally available services (Service Matching, Service Roaming). In addition to these new service offers she also will be informed that a Valencia specific update of her Travel Guide service is available.

Because she is visiting Valencia for the first time, she is interested in this update and accepts the offer. The necessary files will be downloaded from the SPICE to her terminal and the existing Travel Service will be updated. Her subscription information at the SPICE platform will be changed accordingly.

**Scene 11: Consuelo gets a taxi at the airport of Valencia (using a taxi service)**

After successful installation of the update Consuelo decides to use the Taxi Service included in the Travel Guide service.

Consuelo clicks the button “request a taxi” and according to her service preferences (e.g. “pick-up time in maximum 5 minutes”) the taxi service will automatically contact the taxi company that provides the quickest taxi to Consuelo, with respect to her position.

Consuelo receives a confirmation with the estimated time but unfortunately the taxi is running pretty late, eventually the taxi arrives and she gets in a bit furious. Then, Consuelo introduces her personal SPICE code in the taxi tactile screen and they get a special tariff due to the fact that SPICE punished the
taxi company. That offsets the time wasted, so she feels happy going to the America's Cup.

**Scene 12: Finding each other at the Americas cup and taking an interview with Katherine**

Consuelo arrives at the America's Cup and she tries to find her interview subjects, including Katherine, with whom she has already made appointments. In order to find Katherine at the America's area she uses the Person Finder service. Both Katherine and Consuelo have activated this service.

Thanks to this fact, Consuelo just has to select Katherine from the buddy list and click “Navigate to Katherine”. Consuelo receives a multimedia map (**adapted to her terminal** displaying Katherine’s location and audio instructions, how to get there. In order to respect and guarantee the user privacy, when Consuelo wants to find Katherine, Katherine must give her consent. At any time, she could withdraw her consent.

The Person Finder service makes it very easy for Consuelo to find Katherine and the interview begins.

**Scene 13: Consuelo arrives at the hotel and uses the facilities of the hotel room for her work (discover resources, get access to company's intranet as well as to the internet**

After taking all of her interviews Consuelo travels to her hotel via taxi and checks in. When she enters to the hotel room, her SPICE device discovers available local devices including their capabilities (i.e. Internet access, audio, and video). This information is displayed to Consuelo on the Dynamic Desktop of her SPICE mobile device. She establishes a connection to available hotel resources and so she has access to the hotel phone, the TV set and to the Internet via the DSL network. In addition, her device discovers free SPICE services offered by the hotel, like information about the leisure services and the hotel restaurant.

Through the TV monitor and the DSL backbone network in the hotel room, Consuelo is able to establish an access to the intranet of her company. Consuelo uses her SPICE mobile phone for authentication towards the SPICE system, due to that the hotel resources are not compliant with the SPICE authentication mechanisms. She uploads the data (report, photos, and videos) the interview she has taken today.

By checking her calendar she recognizes that she is invited for the editorial conference, which is scheduled in one hour. Because she has another interview at this time she decides not to attend the conference remotely and therefore she rejects the invitation.

During the waiting time she starts to synchronise her terminal by using the Dynamic Desktop with the SPICE Sharing Service. This service allows her to share the taken pictures (**Content Delivery and Content Adaptation**) of the monuments (incl. the America's Cup) she visited that day with other users of the SPICE Sharing Service. She adds audio comments to the photos (**Content Enrichment**) and uploads them together with her notes and own pictures (**Content Publishing**) to the "shared local folder" at the SPICE Sharing service. Due to this all sharing group members will be notified that new
pictures are available. Consuelo also receives information that new pictures from a colleague, Eric, are available, which she can download to her terminal.

**Scene 14: Select a movie via Content Guide and transfer a video over different devices without losing it and use of different modalities**

Consuelo wants to watch a video and therefore opens the **Content Guide** running on her Dynamic Desktop to look for available videos. The Content Guide finds "James Bond: Casino Royal" and Consuelo selects it. Based on the available resources at the hotel room Consuelo selects the TV and indicates that her phone should become the TV’s remote control, e.g. to pause the movie when she wants to go to the bathroom.

In the middle of movie, Consuelo realizes that she is late for her next interview. Therefore, she quickly orders a taxi. As she gets out of her room, she decides to keep watching "Casino Royal" via her mobile phone only. She uses a **voice command to transfer the media stream from the TV to the mobile phone**.

Before leaving the taxi, Consuelo puts the movie on pause on her phone with a voice command to quickly annotate the movie with a few words that will enable her to remember the movie’s story line once she gets back from her appointment.
4 Conclusion and outlook

Task 1.1 and Task 1.2 have jointly revised the SPICE requirements and scenarios so as to produce deliverable D1.5. When revising the work done earlier, a fresh approach was chosen for both the requirements and the scenarios. It was decided to focus on producing a document that would capture the main requirements for SPICE and to define a unified scenario for the project.

SPICE is aiming to define a unified Service Environment which supports all phases of the service life cycle, i.e. from the service creation, via the service deployment, service usage to the service deletion. To achieve this, SPICE combines several key technologies such as component enabling middleware, service brokering and mediation mechanisms, semantic enhancement and discovery of services, life-cycle management, context-awareness and multi-modality.

In order to emphasise the distinguishing features of SPICE we have identified the following 5 main features of SPICE:

- Service Creation
- Service Matching
- Service Adaptation
- Service Execution
- Service Roaming

The identification of these main features helped to structure the requirements and the scenario scenes into a manageable set of requirements and scenario scenes. Deliverable D1.5 thus contains the major requirements and as such clearly documents the distinguishing features of SPICE.

The scenarios were also processed in order to be more readable (shorter version), stick to SPICE main features and to be aligned with the work carried out by technical work packages, and finally to reflect what will be available as demonstrators. The new SPICE global storyline should be considered as a reference by the technical work packages in the future, in particular for demo purposes.

In producing this document, the working group has also discussed with the work packages how the unified scenario can be used to support the different probes and demonstrators that are expected from the project. The work on mapping the demonstrators and probes to the individual scenes in the scenario has started and a first draft mapping has been compiled. This work will be followed up by WP8 Task 8.3 in their work defining the global storyline for the SPICE project.
5 References

[1] SPICE Deliverable D1.1: User, enterprise, technical and open market business requirements

[2] SPICE Deliverable D1.2: SPICE Project: Scenarios for the representative next generation communication and information services

[3] SPICE Deliverable D8.1: Pioneering SPICE project, a view by focus groups from the fields of I-Portal, e-Tourism and e-Emergency Services


[6] SPICE D1.5 online requirements:
   http://www.ist-spice.org/documents/requirements/index.html