

# System Requirements on Digital Newspapers

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*Report CW484, March 2007*



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## **Abstract**

This document contains the requirements analysis for a next generation digital newspaper publishing system. It contains detailed requirements in the form of use cases for the following categories: Functional requirements, context awareness and extended services. Functional requirements define the operation of the system with respect to its stakeholders: media consumers, news desks, the business office, news sources and advertisers. Context awareness requirements allow a media consumer's newspaper to be adapted to the consumer's personal taste, reading behaviour and his current whereabouts. Extended services requirements extend newspapers with services from third party service providers (e.g. concert ticket offices, book stores, restaurants...) which can target consumers that match a particular profile. These requirements are illustrated using a number of real life scenarios. Example quality scenarios show how non-functional requirements should be addressed.

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## 1. Introduction

In this report, we offer a structured inventory of requirements for the DigiNews digital publishing platform. These requirements have been gathered starting from research that examined the user's needs, technological constraints and business models which expresses the business owner's point of view.

It should be well understood that these requirements are numerous. Also, it should be clear that the total set of requirements that has been gathered is in principle more than what a single instance or prototype of DigiNews can absorb. Hence this report is more like a superset, leaving quite some room for selection and refinement during the architecture definition phase of the DigiNews development process. This is indeed the main objective of the report: to gather and define a set of requirements that will be used to define the architecture. The system architecture of DigiNews will be composed of

- A publishing environment
- Specific services dealing with security, billing etc.
- A distribution channel
- An end-user terminal.

The additional outcome of this report is threefold. First of all, it will assist the DigiNews consortium in defining *families* of products for the digital newspaper market, by selecting and grouping requirements such that they create a cohesive set that can match a solution that can be delivered and that has a significant chance of being accepted. Secondly, it will help the consortium to define individual prototypes by selecting specific requirements and refining these such that they can be used to validate architectures and prototypes in the most objective way. Finally, the document is supposed to be a living source of ideas, requirements and extensions that can be added to the initial inventory, as further efforts during the DigiNews project will definitely generate lessons learned and drive new inspiration.

The report is structured as follows. In Section 2, we explain the organization of requirements we have adopted in the report. Section 3 contains the actual inventory

of requirements. Section 4 covers the extra requirements that have been identified when studying Diginews from the perspective of offering a broad range of services (beyond the limited scope of a newspaper). Section 5 illustrates the use of the rather generic use cases in a number of concrete usage scenarios and discusses how to add additional non-functional requirements that are not part of the research scope of the Diginews project but are nevertheless essential for a complete set of requirements. Section 6 concludes this document.

## **2. Organization of the requirements**

We have made a distinction between two dimensions of organization. First of all we make a distinction between functional requirements and various types of non-functional requirements. We base ourselves on the definitions from Sommerville [Som04, seventh edition]. These categories are further (yet briefly) defined in Section 2.1. Secondly, we indicate the scope and impact of specific requirements. Sometimes requirements will refer to the DigiNews systems as a whole, some requirements will directly refer to one specific subsystem. In Section 2.2, we indicate which subsystems we have identified in order to indicate the scope and impact of a requirement.

The main objective of Section 2 is to communicate and justify the overall structure of the inventory that is presented in Section 3.

### **2.1. Categories**

We briefly describe the categories of requirements that determine the main structure of Section 3. In order to define terms clearly, we base ourselves on [Som04] and summarize the key terms first

*“The functional requirements of a system describe what a system should do. These requirements depend on the type of software being developed, the expected users of the software and the general approach taken by the organization when writing requirements. Requirements are usually written in a fairly abstract way. However, functional system requirements describe the system function in detail, its inputs, outputs, exceptions etc.”*

*“Non-functional requirements, as the name suggests, are requirements that are not directly connected with the specific functions delivered by the system. They may relate*

*to emergent system properties such as reliability, response time, store occupancy... ..  
Therefore they may specify system performance, security, availability and other  
emergent properties.”*

It is clear that the distinction between “basic functionality” and “emergent, non-functional properties” is sometimes hard to make. We do not consider the distinction to be extremely critical, yet it gives us a widely accepted approach for classifying a broad range of requirements.

1. **Functionality**: the functional behavior of the system is expressed by means of use cases. Use cases define requirements. In the first place they cover functional (or behavioral) requirements what the system will do. Use cases can also be used for other types of requirements, especially when those other types strongly relate to a use case. In most modern software engineering methods (such as OMG’s Unified Process [JBR99, AN05]), use cases are the central mechanism that is recommended for the discovery and the definition of functional requirements. Hence use cases will be defining the specific functional requirements that the DigiNews architecture and prototypes must meet. We also try to map other types of requirements onto the formalism of use cases.
2. **Context awareness**: context awareness (or context-aware computing) requirements encompass use cases concerning the provision and the adaptation of the DigiNews services to user needs and preferences and to device and network characteristics as well as physical environment (ambient conditions and location). The personalization and user modelling requirements will be analyzed from two different perspectives: static profile and dynamic one (with behavioural and environmental information) and in each of three potential content distribution scenarios: broadcasting, narrowcasting and pointcasting.
3. **Security**: DigiNews security requirements address both the traditional security requirements, as well as specific needs emerging from the business of content distribution. The traditional security requirements can be characterised by the following four: confidentiality (to keep the content of information from all but those authorized to have it), data integrity (to avoid the unauthorized alteration of

data), authentication (to prevent false identification) and non-repudiation (to prevent an entity from denying previous commitments or actions). The ISO standard defines six categories of security services to enforce a high-level security policy: authentication, access control, confidentiality, integrity, non-repudiation and accountability.

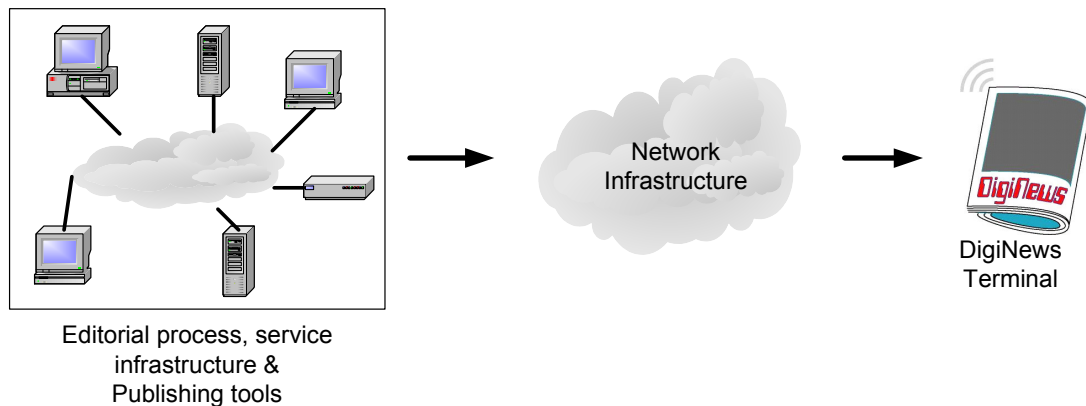
4. **Usability:** alongside the question of identifying specific functionalities that must be offered by DigiNews, these functionalities should be supported in a user-friendly way, to ensure acceptance of the result. A fourth category of requirements is therefore solely focusing in these matters. For instance, the DigiNews appliance should be easy to learn, easy to use, effective to use, efficient to use, provide a user experience strongly connected to the users earlier experiences of newspaper reading (both on paper and online). Further on the e-newspaper solution should be appealing, trustworthy, durable, reliable and offer new as well as existing values provided by newspaper solutions of today. All these properties can be addressed by focusing on specific questions related to usability features such as browsing, navigation, look and feel etc. All these matters will be discussed in a separate category.
5. **Communication Needs:** the requirements of the DigiNews platform towards the network infrastructure, both in terms of network functionality as well as in terms of concerns such as throughput, latency etc.
6. **Content Representation:** content representation requirements scrutinize the various formats available for contents representation in transport, process and storage. Each technology has its benefits and limitations, and choices made will have heavy impact on the other categories in this report. No technology has all the advantages without any drawbacks – either in usability, functionality, security, aesthetics or all of the above. Choices have to be made wisely when selecting the final candidates.
7. **Content Aggregation:** these requirements describe the state-of-the-art in content aggregation of a daily newspaper. The process is in part quite proprietary to the industry and document structure and hierarchy is traditionally not preserved in

make-ready, rather the structure lies in the graphical layout. We will investigate the possible hooks to the high-end systems in order to find the optimal manner to tap into these systems for the compilation of an e-paper newspaper edition. This category therefore (currently) lists a set of concerns (types of requirements) one may or may not consider to be part of the core of DigiNews.

8. ....Our actual list of categories is not necessarily exhaustive, but we believe that we have gathered the most important requirements.

## 2.2. Scope and impact

The following figure illustrates the various components of a complete end-to-end solution for basic e-newspaper services. Roughly speaking, this solution consists at least of three major subsystems: publishing infrastructure (possibly extended by specific servers dealing with security, billing etc.), communication (network) infrastructure and terminal.



When discussing each of the categories of requirements listed in Section 2.1, we explicitly indicate whether such requirements typically apply to the system as a whole, or the one of the obvious subsystems: publishing infrastructure, communication (network) infrastructure or terminal – should such a clarification be needed.

Defining requirements is to a certain extent a matter of making choices: one cannot decide to have an extremely fast car to race in Monza, and at the same time decide that it should be extremely reliable when crossing the desert. This is obvious. We have chosen not to eliminate potential variants of the digital newspaper too soon: only

when requirements would really cause a de-focus, they could be eliminated – in other words, the requirements gathering process has been delaying the making of choices to the maximum extent possible.

### 3. Inventory of requirements

This document describes only a subset of the requirement categories presented in Section 2.1: the functional requirements and context awareness requirements. Section 3.1 describes the functional requirements, Section 3.2 lists the context awareness requirements.

#### 3.1. Functional Requirements

##### 3.1.1. Introduction

The key requirements related to the DigiNews functionality have been classified according to three levels of sophistication. We distinguish between:

- Requirements that are typical for a broadcasted version of DigiNews; such a digital newspaper will *strongly resemble the traditional newspaper*, being a one-size-fits-all solution for a broad audience.
- Requirements that are typical for a narrowcast (multi-cast) version; the main difference being the possibility to deliver different (yet pre-packaged) bundles of content and services to *groups* (categories) of users.
- Requirements that are typical for a point-cast version of DigiNews, supporting the distribution of *personalized* content, most probably as an add-on to one of the levels mentioned above.

Table 1 gives an overview of the possible opportunities of personalization. The general idea behind the table and the part concerning service personalization will be explained in this section.

Audience Size	Service Personalization	Advertiser
Broadcast	Core Service	General Marketing
Narrowcast	Selective Service / GroupService	Group Marketing

	<ul style="list-style-type: none"> <li>▪ Profiling</li> </ul>	
Pointcast	Pointcast Service <ul style="list-style-type: none"> <li>• Profiling</li> <li>• Context-Aware</li> </ul>	Individual Marketing

Table 1: **Degrees of Personalization**

Table 1 identifies the three major levels of personalization: broadcast, narrowcast and pointcast. Each level represents the size of the audience receiving the content. The smaller the audience, the more personalization is possible. To make the step from groups (narrowcast) to individual media consumers (pointcast), a consumer-to-publisher channel is needed to collect information on the profile, preferences or context of a media consumer. This information is needed to send personalized content.

Traditionally, the publisher offered mostly core services which were **broadcasted** to media consumers as traditional printed newspapers, early web sites, TV or radio. Now, the publisher can offer a more wide variety of group services, specialized in certain topics. These **group services** (“basket” service in figure 1) are **narrowcasted** to the subscribers. A group is a specification of what type of content will be published for that service. Of course, such a group can be very general and this way every core service can be seen as a group. However, we tend to see group more fine-grained. Let us illustrate this with an example. The publisher can offer a very broad and general newspaper. We call this a core service because it can be read by a very broad public. The publisher can also offer a group service containing only stories and commercials related to sports. This service is more specialized than the core service, since it is specialized in sports and is targeted for sport fans. There is in principle no limit for defining groups, so every publisher can choose which group he wants to target.

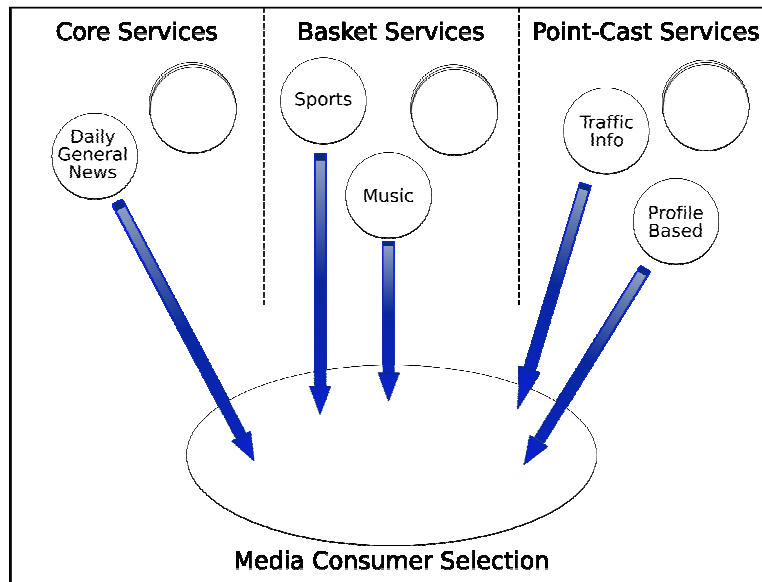


Figure 1: **Service Selection Example**

Ultimately, the publisher can offer **pointcast services**, tailored to one particular media consumer. These services can be based on the reading profile or context of the media consumer. To get this information to the publisher, a consumer-to-publisher channel is needed. Large pointcasted services are far out of reach at this point. It is not feasible for the publishers to make fully customized editions for every single media consumer. Though, small pointcast services like traffic information will probably be realistic now or in the near future.

Which services (broadcast, narrowcast and/or pointcast) are offered to the media consumers is of course up to the publisher. The media consumer can make a selection from all these services. This way, media consumers can combine a core service with several groups and pointcast services. Figure 1 presents an example. A media consumer can choose for a general core service to stay informed on a wide variety of important news. He can combine this with sports and music baskets for more inside information on these topics. In addition he can also choose for a traffic pointcast service, sending traffic information based on his location, and a profile service. This profile service can for example send the media consumer every story on his favorite soccer team.

If the publisher offers the possibilities to choose from a wide variety of services, the media consumer can so to speak compose his favorite news service. This will

increase the value of the services and offer a lot of possibilities to the publisher with regard of advertising. There are two possibilities how the publisher can offer combined services. Either all the editions of the different services can be sent individually or can be bundled as one edition with much more value. Although this edition is not fully based on the reading behavior of the media consumer, it will still look like a personalized edition to the consumer. All subscriptions and profile information must be administered. The publisher needs a very good back-end for billing (e.g. fixed fee or pay per view subscriptions) and customer relationship management (CRM) systems.

### **3.1.2. Requirements prerequisite: Stakeholders and Actors**

Before describing the requirements in full detail, we will briefly describe the roles of the various stakeholders. This helps to further classify the different requirements and use cases. For the publishing system, several stakeholders and actors can be identified. They are shown in Figure 2. The actors are the users who are interacting with the system and want to use the system to accomplish a certain goal.

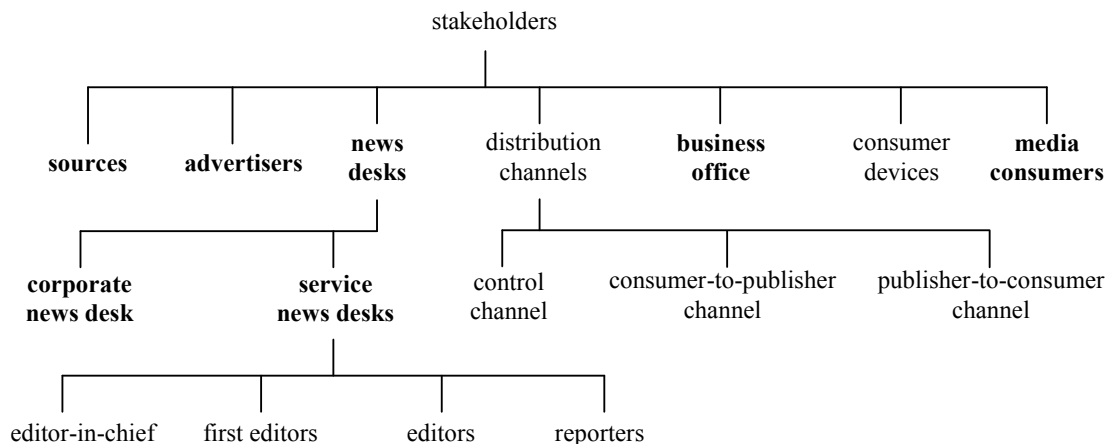


Figure 2: **Stakeholders and Actors**

Here is an explanation of the different stakeholders:

### **3.1.2.1. Sources**

The sources are the parties that deliver input (new news) to the news network. These sources can be subdivided in several possible taxonomies. Three possible taxonomies are defined below:

1. **Freelancers** People from a community or freelance journalists which can be hired or asked to write a story on a certain topic.  
**Suppliers** The suppliers are groups like press agencies, journalists, and community members who autonomously gather news and sell the gathered information to the publishers.  
**Other News Sources** Other publishers, webpages, newspapers, sportdabatase, ...
2. **Pushing Sources** The group of sources that autonomously provide the publisher with input: like press agencies, community and freelancers.  
**Pulling Sources** The group of sources where news information can be found or requested: WWW, Mediargus, sportsdatabases, journalists and community members.
3. **Structured Databases** Databases where the publisher has access to and where he can get content: Mediargus, culture- and sportsdatabase and databases with crossword puzzles.  
**Community** In the future, community will play a very important role in the gathering and writing of contributions. The publisher will moderate the input of the community.  
**Other News Sources** WWW, press agencies and journalists.

These taxonomies define roles, but are not a static distribution. Community members can autonomously write an article, but the publisher can also ask a community member to contribute.

### **3.1.2.2. Advertisers**

The advertisers want to use the services offered by the publisher for their marketing purposes. They want to place advertisements in the services in order to convince the media consumers to buy the advertisers products or services. The advertisers provide the major source of income for the publisher.

### **3.1.2.3. News Desk**

A publishing company will most likely incorporate two types of news desks: a corporate news desk and several service news desks. The corporate news desk defines the strategy of the publisher across the different services it offers. The corporate news desk also does the dispatching of new input to the different service news desks and defines for breaking news on which service it will be published.

A service news desk is responsible for one or more services. They make a concrete planning for the services to make sure they can be delivered on time. Their planning must of course be consistent with the overall planning defined by the corporate news desk. A product news desk consists out of several journalists with different responsibilities:

1. **editor-in-chief** The editor-in-chief does the major planning for the services for which the service news desk is responsible.
2. **first-editors** The first-editors are responsible for single or parts of services, typically on a specific type of content, like sports.
3. **editors** The editors are the journalists from the service news desk who are stationed in the publishing company. Their task is the creation and editing of stories from already existing content or newly incoming input. They will also try to pro-actively gather background information on certain topics. This is called journalist research.
4. **reporters** Reporters are journalists, employed by the publisher, which are mostly on the road to cover certain details or to gain more background information.

### **3.1.2.4. The business office of a publisher**

Very important for the publishing company is the department that exploits the services that are produced by the news desk. This department takes care of all operations related to sales and service delivery, including for instance the billing of the customer and the advertisers. The business department also maintains user profiles, advertiser and advertisement profiles. User profiles hold the customers' personal data and indicate what services the user is subscribed to. These subscriptions

can range from standard subscriptions that would exist mainly in a broadcast setup to subscriptions to services that are personalized and must be billed on a per use basis. Advertiser profiles are needed sending billing information to the advertiser. More important however are advertisement profiles. These profiles indicate for example the type of advertisement and how many times that advertisement has been published, which is obviously important for billing purposes.

### **3.1.2.5. Publisher-to-consumer channel**

The publisher-to-consumer channel is the medium or channel on which services can be offered or sent to the media consumers. Possible technologies include: radio waves, internet, telecom network or printing press.

### **3.1.2.6. Consumer-to-Publisher Channel**

The consumer-to-publisher channel is the medium or channel on which viewing or context information is sent from the media consumer to the publisher. It can also be used to send queries for the archive or to access a blog.

### **3.1.2.7. Control channel**

The control channel is a two-way communication channel that can be used for synchronous communication, for instance when registering for a service or pulling an edition.

### **3.1.2.8. Consumer device**

The consumer device is the device used by the media consumer to read, watch or hear the services to which he is subscribed. Possible examples are: GSM, desktop computer, PDA or foldable terminal.

### **3.1.2.9. Media Consumer**

The media consumers *consume* (read, hear, watch, feel) the content offered by the publisher. The media consumers subscribe to services offered by the publisher.

The stakeholders in bold in Figure 2 are the actors in the use cases defined below.

## **3.1.3. Informal set of requirements**

The detailed functional behavior of the system will be described as a number of use cases. However, we will first list the functional requirements as an informal list of

features, which we show in this subsection. The next subsections will detail the use cases that specify functional behavior in more detail. The requirements are divided in 5 categories according to stakeholders that interact directly with the system: media consumer requirements, source requirements, advertiser requirements, news desk requirements and businessoffice requirements.

### **3.1.3.1. Consumer requirements**

1. Customers must be able to subscribe to a publishing service
2. Customers must be able to unsubscribe from a service
3. Customers must be able to consume a newspaper edition
4. The terminal or the consumer may be able to send viewing information to the publishing system. (News desks must be able to receive viewing information)
5. The terminal or the consumer must be able to send context information (other than viewing) to the publishing system. (News desks must be able to receive context information)
6. The terminal or the consumer must be able to send feedback information to the publishing system. (News desks must be able to receive feedback information)

### **3.1.3.2. Source requirements**

1. News gathering sources must be able to submit input to the publishing system
2. Privileged users at the publisher site must be able to track the usage (consumption) of stories

### **3.1.3.3. Advertiser requirements**

1. Advertisers must be able to submit advertisements/commercials to the publishing system
2. Advertisers and privileged users should be able to retrieve the number of views of a commercial

### **3.1.3.4. News desk requirements**

1. News desks should be able to plan and re-plan services and editions, possibly triggered by unscheduled events and at a high frequency

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2. News desks should be able to verify input
3. News desks should be able to verify commercials
4. News desks should be able to add meta-data to content or change it.
5. News desk reporters should be able to build a story from verified content.
6. News desks should be able to build an edition from stories and commercials
7. News desk users should be able to create and improve the layout of an edition
8. The news desk must be able to distribute an edition, where an edition can range from a full news paper to a particular section (sports, politics, culture ...) to a single story or commercial

### **3.1.3.5. Business office requirements**

1. The business owner must be able to create new users
2. The media consumer must be able to update his/her profile
3. The media consumer must be able to consult his/her profile
4. The business owner must be able to consult a media consumer's profile
5. The business owner or advertiser must be able to consult profile for data mining purposes.
6. The business owner must be able to delete a user profile
7. The advertiser must be able to consult his/her profile
8. The business owner must be able to update an advertiser profile
9. The business owner must be able to delete an advertiser profile
10. The advertiser must be able to create a new advertisement
11. The advertiser must be able to update an advertisement's profile
12. The advertiser must be able to consult an advertisement's profile
13. The business owner must be able to delete an advertiser profile
14. The business owner must be able to generate a consumer invoice
15. The business owner must be able to generate an advertiser invoice

We will describe the requirements listed above in more detail in the next subsection.

### **3.1.4. Available Use Cases**

In this section all requirements are listed as more formal use cases. Section 3.1.4.1 first describes how the use cases are formatted. Sections 3.1.4.2 to 3.1.4.6 then list the use cases for every stakeholder (as in Section 3.1.3): Media consumers, Sources, Advertisers, News desks and Business office.

#### **3.1.4.1. Use Case template**

Use cases are a way to describe the functional requirements of the system. Use cases are in a way a collection of related success and failure scenarios that describe actors using the system to fulfill a goal. A use case is structured in six parts:

<b>Primary Actor</b>	The actor who initiates the scenario in order to fulfill some goal.
<b>Interested Parties</b>	All the stakeholders who are interested in or may be influenced by this scenario or the result (failure or success) of the scenario.
<b>Preconditions</b>	The necessary condition(s) that must hold before the scenario is allowed to be executed.
<b>Postconditions</b>	The resulting conditions(s) that will hold when the scenario is successfully completed.
<b>Main Scenario</b>	The main success scenario that will lead to the goal of the actor.
<b>Alternative Scenarios</b>	Alternative success or failure scenarios that can occur.

Depending on the personalization level of the service, a use case is applicable in a broadcast version, multicast version or point-to-point version of the publishing system. To indicate to what type of system the use case applies, the name of the use case is followed by a classification. This classification can be **B** for Broadcast, **M** for Multicast or **P** for Point-to-point. Most use cases can be applied to multiple system types.

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Use cases may augment the functionality introduced by other, earlier defined use cases. Use cases may be related to earlier defined use cases in 3 particular ways.

<b>Extends</b>	The new use case extends the existing use case. The altered scenario only describes the functionality that is added in the use case. The other functionality is typically taken from the use case that is being extended.
<b>Aggregates</b>	The new use case is a combination of the listed use cases. No new functionality is added. The altered scenario merely shows how the listed requirements are merged.
<b>Specializes</b>	The requirement has the same scenario as the existing use case. The altered scenario is the same but some steps have been narrowed down to more specialized characteristics.

If a use case augments a previously defined use case, the relation with the previously defined use case is made explicit in the new use case. A field with the name of the extension and the number of the use case that is augmented are added to the new use case.

The rest of this section will describe the different use cases for the functional specification of the system. As announced, these use cases will be ordered according to the type of actor initiating the scenario.

### **3.1.4.2. Media Consumer**

FR-CON01	<b>Subscribe to a service</b>	BMP
<b>Primary Actor</b>	Media Consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"><li>• Media Consumer: The media consumer wants a fast and easy way to register for a service.</li><li>• Publisher: The publisher is responsible for the content that the media consumer will read. The publisher wants to ensure the quality of the delivered content.</li></ul>	

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	<ul style="list-style-type: none"> <li>• Billing department: The billing department must bill the subscriptions.</li> <li>• Control channel: The control channel carries the registration information for the service.</li> <li>• Consumer device: The device used by the media consumer to consume the services.</li> </ul>
<b>Preconditions</b>	The media consumer has a customer profile. The media consumer's device should be connected to the publishing system in some way: website, subscription program,
<b>Postconditions</b>	The media consumer is subscribed to the service.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer indicates he want to subscribe to a service.</li> <li>2. The publishing system provides the media consumer with a list of possible subscriptions and payment schemes using the control channel.</li> <li>3. The media consumer chooses the options he wants and sends them to the publisher on the control channel.</li> <li>4. The publishing system subscribes the media consumer to the chosen service.</li> </ol>

FR-CON02	<b>Unsubscribe from a service</b>	MP
<b>Primary Actor</b>	Media Consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer wants to be able to unsubscribe from a service.</li> <li>▪ Publisher: The publisher must unsubscribe the media consumer.</li> </ul>	

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	<ul style="list-style-type: none"> <li>▪ Control channel: carries the media consumer's subscription options.</li> <li>▪ Billing department: The billing department must stop the billing of the subscription.</li> </ul>
<b>Preconditions</b>	The media consumer is subscribed to a service and should be connected to the publishing system in some way with his consumer device: website, subscription program, ...
<b>Postconditions</b>	The media consumer is unsubscribed from the service.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer indicates he wants to unsubscribe from a service.</li> <li>2. The publishing system shows a list of the media consumers' subscriptions.</li> <li>3. The media consumer chooses which subscription(s) he wants to cancel and sends this information to the publisher using the control channel.</li> <li>4. The publishing system unsubscribes the media consumer from the selected subscription(s).</li> </ol>

FR-CON03	<b>Pull an edition</b>	BMP
<b>Primary Actor</b>	Media Consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer wants to read the latest edition of the service(s) he is subscribed to.</li> <li>▪ Publisher: The publisher must send the latest edition of the service(s) to the media consumer through the desired publisher-to-consumer channel.</li> <li>▪ Publisher-to-consumer channel: The publisher-to-consumer channel must transfer the edition from the</li> </ul>	

## System requirements on digital newspapers

	publisher to the media consumer.
<b>Preconditions</b>	The media consumer has a customer profile and is subscribed to a service.
<b>Postconditions</b>	The edition will be transferred to the media consumer.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer indicates for which service(s) he wants to read the latest edition.</li> <li>2. The publishing system searches for the latest version of that service for the given consumer device.</li> <li>3. If the media consumer is subscribed for multiple editions, all editions are combined into one package.</li> <li>4. This package is sent to the media consumer with the help of the publisher-to-consumer channel.</li> <li>5. The media consumer can start reading.</li> </ol>
<b>Alternative scenarios</b>	<p>There is no edition available for the requested service(s).</p> <ol style="list-style-type: none"> <li>1. An internal message will be sent to the service news desk responsible for the requested service, indicating that an edition must be built as soon as possible.</li> <li>2. A message will be sent to the media consumer indicating that there is no edition available at the moment.</li> </ol>

FR-CON04	<b>Send viewing information</b>	P
<b>Primary Actor</b>	Media Consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer can deliberately or automatically send viewing information to the publisher.</li> <li>▪ Publisher: The publisher can use the viewing information</li> </ul>	

## System requirements on digital newspapers

	<p>to build a profile and send profile-based news to the media consumers.</p> <ul style="list-style-type: none"> <li>▪ Consumer-to-publisher channel: used to send the viewing information to the publisher.</li> </ul>
<b>Preconditions</b>	There is a publisher-to-consumer channel or consumer-to-publisher channel available that can be used to send viewing information from the media consumer to the publisher.
<b>Postconditions</b>	The viewing information is merged into the profile of the media consumer.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer reads an edition on his consumer device.</li> <li>2. Deliberately or automatically the viewing information is sent to the publisher on the consumer-to-publisher channel.</li> <li>3. The system receives the viewing information.</li> <li>4. Based on the received information, the profile of the media consumer is updated.</li> </ol>

FR-CON05	<b>Send context information</b>	P
<b>Primary Actor</b>	Media Consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer wants to send his context information to the publisher to receive context-aware services.</li> <li>▪ Publisher: The publisher needs the context information from the media consumers to offer context-aware services.</li> <li>▪ Consumer-to-publisher channel: used to send the context</li> </ul>	

## System requirements on digital newspapers

	information to the publisher.
<b>Preconditions</b>	There is a consumer-to-publisher channel available that can be used to send viewing information from the media consumer to the publisher.
<b>Postconditions</b>	The context information from the media consumer is stored.
<b>Main Scenario</b>	<ul style="list-style-type: none"> <li>▪ The media consumer indicates he wants to send his context information. This indication can be manually or automatically.</li> <li>▪ The media consumer sends his context information to the publisher on the consumer-to-publisher channel.</li> <li>▪ The system receives the context information.</li> <li>▪ The stored context information of the media consumer is updated with the new information.</li> </ul>

FR-CON06	<b>Send feedback information</b>	BMP
<b>Primary Actor</b>	Media Consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer might want to send feedback on a certain story, a response on a commercial or issue a micro payment to when buying a product or service.</li> <li>▪ Publisher: If the feedback is addressed to the publisher in general, he must incorporate the information and manage it as needed. If the feedback is addressed for a third party, the information must be sent to the concerning party.</li> <li>▪ Consumer-to-publisher channel: used to send the feedback information to the publisher.</li> <li>▪ Third party to which the feedback is addressed: Advertiser</li> </ul>	

## System requirements on digital newspapers

	(an order for a product or service of the advertiser, triggered by a commercial), vendor (micro payments) or source (response on a story written by a certain author/source).
<b>Preconditions</b>	There is a consumer-to-publisher channel available that can be used to send feedback from the media consumer to the publisher.
<b>Postconditions</b>	The feedback from the media consumer is stored or passed to the addressee.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer indicates he wants to send feedback to the publisher. This indication can be manually (website) or automatically (by pushing send on a mobile).</li> <li>2. The media consumer sends his feedback to the publisher on the consumer-to-publisher channel.</li> <li>3. The feedback is received on the publisher side.</li> <li>4. The feedback is stored.</li> <li>5. If needed, this feedback information will be forwarded to the addressees, which can be a third party.</li> </ol>

### 3.1.4.3. Sources

FR-SOU01	<b>Submit input to the publishing system</b>	BMP
<b>Primary Actor</b>	The sources that <i>push</i> information. ``Push" means they autonomously submit input to the publishing system. Examples of such sources can be freelance journalists or press agencies.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Sources: The sources want their input (photo, text,) to be published.</li> </ul>	

## System requirements on digital newspapers

	<ul style="list-style-type: none"> <li>▪ Publisher: The sources provide an important stream of input to the publisher, who uses this to build stories for its services.</li> <li>▪ Corporate News Desk: Not all submitted input can be published. The content needs to be verified, transformed into usable stories and pass other checks. The input might trigger a replanning for a certain service.</li> </ul>
<b>Preconditions</b>	The sources should be connected to the publishing system in some way, like a website or upload program
<b>Postconditions</b>	The input has been submitted to the publishing system.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The source indicates to the publishing system he wants to submit input.</li> <li>2. The system provides the sources with the possibility to give his input (the possibility to provide the input content, input classification, publication constraints ...).</li> <li>3. The source specifies the correct location of the input.</li> <li>4. The system uploads the input to the publishing system.</li> <li>5. The news desk(s) is (are) notified of the new item that came available.</li> <li>6. The submission of new input can result in an input verification task (<i>[Use Case: FR-NDK03 - Verify input]</i>).</li> <li>7. The new input might trigger a replanning (<i>Replanning triggered by input</i>).</li> </ol>

FR-SOU02	<b>Retrieve the number of views of the stories built from their input</b>	P
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## System requirements on digital newspapers

<p><b>Primary Actor</b></p>	<p>The sources that <i>push</i> information. ``Push" means they autonomously submit input to the publishing system. Examples of such sources can be freelance journalists or press agencies.</p>
<p><b>Interested parties</b></p>	<ul style="list-style-type: none"> <li>▪ Sources: The sources might want to know how much time the stories for which their input is used, are being viewed. This can be the basis for their payment.</li> <li>▪ Publisher: The publisher can receive viewing information from the media consumers. He can use this viewing information as measure for payment for the sources or just to motivate them to submit more content.</li> </ul>
<p><b>Preconditions</b></p>	<p>The publishing system keeps record of the viewing information they receive from the media consumers through a consumer-to-publisher channel.</p>
<p><b>Postconditions</b></p>	<p>The source will receive the number of times the stories based on his input was viewed by media consumers.</p>
<p><b>Main Scenario</b></p>	<ol style="list-style-type: none"> <li>1. The input source indicates that he wants to retrieve the number of views on one of his submissions.</li> <li>2. The system shows the list of advertisements to the input source.</li> <li>3. The input source indicates for which submitted input he wants to know the number of views.</li> <li>4. The publishing system searches for all stories that were built using that input.</li> <li>5. For all found stories, the publishing system calculates the sum of the individual views of the different stories.</li> <li>6. The publishing system prompts the total number of views to the source.</li> </ol>

**3.1.4.4. Advertiser**

FR-ADV01	<b>Submit input to the publishing system</b>	BMP
<b>Primary Actor</b>	Advertiser	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Advertiser: The advertiser wants to convince a media consumer to buy a service or product it offers.</li> <li>▪ Publisher: The advertisers provide a crucial income for the publisher.</li> <li>▪ Advertisement Department: The advertising department must manage the commercials and map them with reservations. They might also need to do some checks like verification on the commercials.</li> <li>▪ Billing Department: The billing department must arrange the billing for the commercials.</li> </ul>	
<b>Preconditions</b>	The advertiser should be connected to the publishing system in some way: website, upload program, ...	
<b>Postconditions</b>	The commercial has been submitted to the publishing system.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The advertiser indicates to the publishing system he wants to submit an advertisement.</li> <li>2. The system provides the advertiser with a list of outstanding reservations he has made.</li> <li>3. The advertiser indicates for which reservation he wants to upload a commercial, what the classification of the advertisement is and specifies the location of the commercial.</li> <li>4. The system uploads the commercial to the publishing system.</li> </ol>	

## System requirements on digital newspapers

	<p>5. The advertising department is notified of the new commercial that was uploaded.</p> <p>6. The submission of new commercials can result in the need to verify them [<i>Use Case: FR-NDK04 Verify commercials</i>].</p>
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FR-ADV02	<b>Retrieve the number of views of a commercial</b>	P
<b>Primary Actor</b>	Advertiser	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Advertiser: It is very interesting for an advertiser to know how many media consumers viewed their commercials.</li> <li>▪ Publisher: By providing the number of views to the advertiser, the publisher can prove to the advertisers that their services are a good medium for their marketing campaigns.</li> </ul>	
<b>Preconditions</b>	The publishing system keeps record of the number of views of the commercials.	
<b>Postconditions</b>	The advertiser will receive the number of times his commercial was viewed by the media consumers.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The advertiser indicates he wants to retrieve the number of views of one of his advertisements.</li> <li>2. The system shows the list of advertisements to the advertiser.</li> <li>3. The advertiser indicates for which submitted commercial he wants to know the number of views.</li> <li>4. The publishing system searches for the number of views of the commercial.</li> <li>5. The publishing system prompts number of views to the</li> </ol>	

	advertiser.
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**3.1.4.5. News desks (service news desks & corporate news desk)**

FR-NDK01	<b>Plan or adapt the overall business strategy</b>	BMP
<b>Primary Actor</b>	Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: The corporate news desk defines the overall strategy of the publisher. This includes how stories and commercials will be distributed or spread out on the different services offered by the publisher.</li> <li>▪ Service News Desks: The different service news desks define the concrete planning for services, conform the overall business strategy.</li> </ul>	
<b>Preconditions</b>	The corporate news desk has a means to access the planning system.	
<b>Postconditions</b>	The overall business strategy is defined or adapted.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk user indicates for what system he wants to add or adapt the planning.</li> <li>2. The system prompts the user with a view on the current strategy and planning. The overall business planning consists of: <ul style="list-style-type: none"> <li>▪ Which services will be offered to the media consumers?</li> <li>▪ Which kind of stories and commercials will be published on the different services, offered by the publisher?</li> <li>▪ How will breaking news be allocated to the different</li> </ul> </li> </ol>	

## System requirements on digital newspapers

	<p>services.</p> <ul style="list-style-type: none"> <li>▪ ...</li> </ul> <p>3. The corporate news desk user indicates how he wants the current planning to be changed (adapts the strategy) and sends this to the system.</p> <p>4. The system stores the planning.</p>
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FR-NDK02	<b>Plan and replan a service and their editions</b>	BMP
<b>Primary Actor</b>	Service News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Service News Desks: The product news desk defines the concrete planning for the services they are responsible for.</li> </ul>	
<b>Preconditions</b>		
<b>Postconditions</b>	The planning for the service and/or editions are created or updated.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The service news desk user indicates for what system he wants to add or adapt the planning.</li> <li>2. The system prompts the user with a view on the current strategy and planning. The planning made by the service news desk is influenced by: <ul style="list-style-type: none"> <li>▪ Zoning</li> <li>▪ The calendar</li> <li>▪ The publisher strategy</li> <li>▪ The service strategy</li> </ul> </li> <li>3. The service news desk user indicates how he wants the current planning to be changed (adapts the strategy) and sends this to the system.</li> </ol>	

## System requirements on digital newspapers

	4. The system stores the planning.
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FR-NDK03	<b>Verify input</b>	BMP
<b>Primary Actor</b>	Corporate News Desk, Service News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: Members of the news desk must verify the incoming input as a first line of checking tasks.</li> <li>▪ Service News Desk: Members of the news desk verify the incoming input from the media consumer as part of the moderation services.</li> <li>▪ Sources: The sources are the authors of the input that is reviewed.</li> </ul>	
<b>Preconditions</b>	New input is received.	
<b>Postconditions</b>	The newly received input is verified.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The appropriate news desk is notified when new input is submitted.</li> <li>2. An input verification task will be assigned to the input and a member of a news desk.</li> <li>3. This reviewer performs several checks on the input. The reviewer can be aided by automated processes. The input verification task can consist of any combination of subtasks, which can be:               <ol style="list-style-type: none"> <li>1. Source Authentication: Check if the input really came from the claimed source.</li> <li>2. Content verification: Verify if the contents of the input is correct and true.</li> <li>3. Input Selection: Remove the input if it is a duplicate or not useful.</li> </ol> </li> </ol>	

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	4. After the reviewer verified the input, the system tags the input, representing it successfully passed the tests.
<b>Alternative scenarios</b>	<ol style="list-style-type: none"> <li>1. One of the verification steps failed.             <ol style="list-style-type: none"> <li>1. The news item will not be approved and tagged accordingly.</li> </ol> </li> </ol>

FR-NDK04	<b>Verify commercials</b>	BMP
<b>Primary Actor</b>	Advertising Department	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Advertising Department: The advertising department only wants to publish the correct commercial for the correct reservation.</li> <li>• Advertisers: The advertiser is the source or creator of the commercial.</li> </ul>	
<b>Preconditions</b>	A new commercial is submitted by an advertiser.	
<b>Postconditions</b>	The commercial is verified.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The advertising department is notified when a new commercial is submitted.</li> <li>2. A commercial verification task will be assigned to the commercial and a member of an advertising department. The commercial verification task can consist of any combination of subtasks, which can be:             <ol style="list-style-type: none"> <li>1. Authentication of the source: Check if the advertisement really came from the claimed advertiser.</li> <li>2. Reservation conformity check: Is the commercial conforming to the rules of the reservation for which the commercial is submitted.</li> </ol> </li> </ol>	

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	<ol style="list-style-type: none"> <li>3. This reviewer performs several checks on the commercial. The reviewer can be aided by automated processes.</li> <li>4. After the reviewer verified the commercial, the system tags the commercial, representing it successfully passed the tests.</li> </ol>
<b>Alternative scenarios</b>	<ol style="list-style-type: none"> <li>1. One of the verification steps failed             <ol style="list-style-type: none"> <li>1. The commercial will not be approved and tagged accordingly.</li> </ol> </li> </ol>

FR-NDK05	<b>Replanning triggered by input</b>	BMP
<b>Primary Actor</b>	Service News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Source: The source is the author of the input causing the trigger.</li> <li>• Corporate News Desk: The corporate news desk dispatches the input to the relevant service news desks whose planning might be influenced by this input.</li> <li>• Service News Desk: The input potentially influences the planning made by the service news desks for certain services.</li> </ul>	
<b>Preconditions</b>	Input is submitted by a source.	
<b>Postconditions</b>	If needed, the planning for one or more services has been updated.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. New input, submitted by a source, or the ending of an input verification task, can trigger the attention of the corporate news desk.</li> <li>2. The corporate news desk checks whether this input can</li> </ol>	

## System requirements on digital newspapers

	<p>have an influence on the planning of one of their services.</p> <ol style="list-style-type: none"> <li>3. If a potential replanning is needed, the corporate news desk dispatches the input to the service news desk responsible for that service.</li> <li>4. If needed, the service news desk will do a replanning.</li> <li>5. The replanning can have effect on three positions: <ul style="list-style-type: none"> <li>• The calendar of the service news desk.</li> <li>• The planning of one or more editions or services.</li> <li>• The building of an edition.</li> </ul> </li> </ol>
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FR-NDK06	<b>Add meta-data to content or change it</b>	BMP
<b>Primary Actor</b>	News desks	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• News desks: The news desks can add meta-data to content. This meta-data can help in several stages to automate processes like checking tasks and article building.</li> </ul>	
<b>Preconditions</b>	Meta-data can only be added to existing content.	
<b>Postconditions</b>	Meta-data is added to the content or the meta-data is altered.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The news desk searches for the content he wants to add or change the meta-data from. The sky is the limit for examples of meta-data. Here are a few: <ol style="list-style-type: none"> <li>1. Time constraints: A time constraint can state that the content must be published before a certain deadline or after a certain embargo period has passed.</li> <li>2. Categorization: Content will probably be associated</li> </ol> </li> </ol>	

## System requirements on digital newspapers

	<p>with a category of ease of searching.</p> <ol style="list-style-type: none"> <li>3. Links: Content can be linked or be related with other content.</li> <li>4. Meta-information: All kinds of meta-information, like creation time, author name and time of last change.</li> </ol> <ol style="list-style-type: none"> <li>2. The publishing system prompts the current meta-data of the content and gives the possibility to add or change this meta-data.</li> <li>3. The news desk adds or changes the necessary meta-data.</li> <li>4. The publishing system updates the content to contain the updated meta-data.</li> </ol>
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FR-NDK07	<b>Build a story from usable content</b>	BMP
<b>Primary Actor</b>	Service News desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Service News desk: The news desk determines which usable content will be used to build a new story.</li> <li>• Sources: The sources can be the authors of the different parts that are used to build a new story.</li> </ul>	
<b>Preconditions</b>	Content must be available	
<b>Postconditions</b>	A story or story in progress is built from the specified usable content.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The news desk indicates he wants to start building a new story.</li> <li>2. If needed, he chooses for which publisher-to-consumer channel and/or consumer device he wants to build the story for. This choice can place constraints on the building process.</li> </ol>	

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	<ol style="list-style-type: none"> <li>3. The news desk indicates which usable content needs to be used to build the new story or story in progress.</li> <li>4. The news desk indicates how he wants to compose the selected content.</li> <li>5. The publishing system composes the selected news items into a new story conform the constraints of the publisher-to-consumer channel and/or consumer device.</li> </ol>
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FR-NDK08	<b>Build an edition from stories and commercials for a certain service</b>	BMP
<b>Primary Actor</b>	Service news desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Service news desk: The service news desk determines which finished stories will be selected to build an edition for a service.</li> <li>• Media Consumer: The built edition will be read by the media consumers that are subscribed to the service for which the edition is built.</li> </ul>	
<b>Preconditions</b>	Stories and/or commercials are available	
<b>Postconditions</b>	The edition is built.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The service news desk indicates he wants to build an edition for a certain service.</li> <li>2. The service news desk chooses for which publisher-to-consumer channel and/or consumer device he wants to build the service edition for.</li> <li>3. The service news desk queries the content management system for all stories and commercials that need to be included in the edition.</li> </ol>	

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	4. The publishing system builds an edition containing the selected stories and commercials.
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FR-NDK09	<b>Assist the publishing system in lay-outing and edition</b>	BMP
<b>Primary Actor</b>	Service news desk (stylist)	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Service news desk (stylist): Is responsible for a nice and clean lay-out for the editions.</li> <li>• Media Consumer: The media consumers want to read their service editions in an easy lay-out which is suited for the consumer device they received it on.</li> <li>• Publisher: A good lay-out attracts more media consumers and thus can give better revenue.</li> </ul>	
<b>Preconditions</b>	A product edition has been generated or is planned.	
<b>Postconditions</b>	The lay-out for the edition is created.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The stylist receives a task to make a lay-out for a given edition, which is either already created or planned for a certain consumer device.</li> <li>2. The stylist creates or adapts the lay-out of the edition manually or assists the publishing system to make a good lay-out.</li> <li>3. The lay-out will be associated with the edition or the planning of the edition.</li> </ol>	

FR-NDK10	<b>Push an edition</b>	BMP
<b>Primary Actor</b>	Service news desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Service news desk: The news desk wants to be able to</li> </ul>	

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	<p>push information towards the media consumers without them explicitly asking for it. This information can be for example: traffic information, news updates, ...</p> <ul style="list-style-type: none"> <li>• Media consumer: If the media consumer wants to be updated of some topic or event (traffic), he wants to get this information pushed towards him and be notified instead of constantly having to check for updates.</li> </ul>
<b>Preconditions</b>	An edition is ready to be sent out.
<b>Postconditions</b>	The edition is pushed towards the media consumers if their consumer device is reachable.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The service news desk signals the publishing system that a certain edition must be pushed to the subscribers.</li> <li>2. The publishing system queries the CRM for the list of media consumers to which the edition should be pushed.</li> <li>3. The edition is sent to those media consumers through the publisher-to-consumer channel.</li> <li>4. The media consumer is notified on his consumer device.</li> </ol>

FR-NDK11	<b>Create/update task assignment</b>	BMP
<b>Primary Actor</b>	Service news desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Service news desk: The service news desk issues tasks to fulfill the planning of the services.</li> <li>• Reporter: The reporter must fulfill the tasks.</li> </ul>	
<b>Preconditions</b>		
<b>Postconditions</b>	A task has been created and assigned or updated.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The news desk indicates that it wants to create or update</li> </ol>	

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	<p>a certain task.</p> <ol style="list-style-type: none"> <li>2. The task description is entered</li> <li>3. The task is assigned to an employee.</li> <li>4. The reporter responsible for the task is notified on the new or updated task.</li> </ol>
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### 3.1.4.6. Business office

FR-EXP01	<b>Create new user stated profile</b>	BMP
<b>Primary Actor</b>	Media consumer or Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: must have an intuitive way to subscribe to tomorrow's news service.</li> <li>▪ Publisher-to-consumer channel: used to send the subscription service to the consumer</li> <li>▪ Control channel: used to send the media consumer's subscription information to the publisher.</li> <li>▪ Corporate News desk: Gather relevant information about the consumer to be able to offer a range of services that is tailored to the new user.</li> </ul>	
<b>Preconditions</b>	The media consumer must have access to a device on which (s)he can enter the required information.	
<b>Postconditions</b>	The media consumer is validated and registered with the DigiNews system. The system contains personal media consumer information and stated preferences. The system also reserved the necessary resources to maintain transactional data that reflects the user's consumption behavior.	
<b>Main Scenario</b>	1. The media consumer accesses a general subscription	

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	<p>service on a DigiNews device using the publisher-to-consumer channel.</p> <ol style="list-style-type: none"> <li>2. The media consumer enters obligatory personal information: name, address, phone number, fax number, email address ...</li> <li>3. The media consumer can select its payment preferences (credit card, normal invoice with money transfer ...).</li> <li>4. The media consumer enters optional personal information: gender, annual income, marital status.</li> <li>5. The media consumer enters interests in particular product categories: politics (national, international), sports (soccer, football, baseball, formula 1), economy, entertainment (movies, music, books, adult, food, concerts ...).</li> <li>6. This information is sent to the publisher on the control channel.</li> <li>7. Validation is requested from the media consumer via a different channel. Upon response (using the consumer-to-publisher channel), the user profile is activated in the DigiNews system.</li> </ol>
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FR-EXP02	<b>Update user profile based on preferences (stated profile)</b>	BMP
<b>Primary Actor</b>	Media consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Media consumer: must have a way to change his/her personal parameters.</li> <li>• Publisher-to-consumer channel: used to send the subscription service to the consumer</li> <li>• Control channel: used to send the media consumer's</li> </ul>	

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	<p>subscription information to the publisher.</p> <ul style="list-style-type: none"> <li>• Corporate News Desk: wants to have valid user data and must therefore allow the user to change his or her parameters.</li> </ul>
<b>Preconditions</b>	The media consumer must have access to a device through which (s)he can enter the information that changed since the last alteration.
<b>Postconditions</b>	The media consumer's stated profile reflects the new parameters.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer accesses his/her stated profile system by means of a DigiNews device, using the publisher-to-consumer channel.</li> <li>2. The media consumer adapts the preferences that are changed.</li> <li>3. The media consumer can choose to enter optional data that was left empty before.</li> <li>4. The media consumer submits the changes using the control channel.</li> </ol>

FR-EXP03	<b>Consult user stated profile</b>	BMP
<b>Primary Actor</b>	Media consumer, Advertiser, News Desks	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media consumer: wishes to check his personal preferences.</li> <li>▪ News Desk: wishes to use the user's stated preferences for marketing purposes, billing purposes, ...</li> <li>▪ Advertiser: wishes to consult the user's stated preferences for personalized advertisement purposes.</li> </ul>	

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<b>Preconditions</b>	Access to the publishing system's customer database.
<b>Postconditions</b>	The interested party has the necessary customer information to realize its purpose (checking consumption behavior, data mining for marketing purposes ...).
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The main actor accesses the publishing system by means of a terminal (consumer) using the publisher-to-consumer channel or b2b technology (business partner such as service provider, advertiser, etc.).</li> <li>2. Depending on the rights and/or intent of the actor, the media consumer's personal stated information is consulted. Some information may be anonymous for reasons of protection of privacy.</li> </ol>

FR-EXP04	<b>Delete User Profile</b>	BMP
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Media consumer: his/her profile will be permanently removed.</li> <li>• Corporate News Desk: may want to delete a media consumer because its profile no longer has any marketing value (e.g. because it has not consumed for a longer time).</li> </ul>	
<b>Preconditions</b>	The media consumer is in the consumer list and has no longer any active subscriptions	
<b>Postconditions</b>	The media consumer is removed from the consumer list.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wishes to delete a user.</li> <li>2. The system shows a list of media consumers without subscriptions.</li> </ol>	

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	<ol style="list-style-type: none"> <li>3. The corporate news desk selects a user.</li> <li>4. The selected media consumer's profiles are removed from the database. The media consumer may be informed.</li> </ol>
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FR-EXP05	<b>Create Advertiser Profile</b>	BMP
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Media Consumer: if the media consumer has indicated to be interested in the type of products that the new advertiser offers, the media consumer may henceforth receive advertisements from the new advertiser.</li> <li>• Corporate News Desk: new advertisers are a source of income for the publisher.</li> <li>• News Desk: it can be interesting to publish the new advertiser's advertisements in the editions of a particular news desk. For example, the sports news desk may publish advertisements from the new golf club advertiser.</li> </ul>	
<b>Preconditions</b>	Advertiser must not be in the list of advertisers.	
<b>Postconditions</b>	A new advertiser is added to the system.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wants to add a new advertiser.</li> <li>2. The publishing system provides the corporate news desk with a form to add a new advertiser.</li> <li>3. The corporate news desk fills out obligatory information: advertiser name, address, phone number, fax number, email address, VAT number, business type, etc.</li> <li>4. The publishing system adds the advertiser to the list of the publisher's advertisers</li> </ol>	

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FR-EXP06	<b>Consult Advertiser Profile</b>	BMP
<b>Primary Actor</b>	Advertiser, Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Advertisers: the advertiser wants to check if the publishing system contains the correct coordinates of the advertiser.</li> <li>▪ Corporate News Desk: the corporate news desk uses the advertiser's profile for billing purposes.</li> </ul>	
<b>Preconditions</b>	The primary actor has access to the publishing system's advertiser database.	
<b>Postconditions</b>	The primary actor has obtained the required data about the advertiser.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The primary actor indicates that he wishes to consult the profile of an advertiser.</li> <li>2. Depending on the rights and/or intent of the actor, the advertiser's profile is extracted from the database.</li> </ol>	

FR-EXP07	<b>Update Advertiser Profile</b>	BMP
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: the corporate news desk needs correct and up to date information of the advertiser.</li> <li>▪ Advertiser: the advertiser must have valid parameters in the publishing system to be able to publish advertisements.</li> </ul>	
<b>Preconditions</b>	The advertiser's profile exists in the advertiser database.	
<b>Postconditions</b>	The profile in the advertiser database reflects the requested	

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	changes.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wishes to update the profile of an advertiser.</li> <li>2. The parameters of the advertiser are extracted from the advertiser database.</li> <li>3. The parameters can be adapted by the corporate news desk.</li> <li>4. The changed parameters are stored in the advertiser database.</li> </ol>

FR-EXP08	<b>Delete Advertiser Profile</b>	BMP
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Advertiser: the advertiser's profile will be permanently removed</li> <li>▪ Corporate News Desk: the advertiser will no long be a customer of the publisher.</li> </ul>	
<b>Preconditions</b>	The advertiser is in the publisher's list of advertisers. There exist no advertisements (no advertisement profiles) in the system.	
<b>Postconditions</b>	The advertiser is removed from the publisher's list of advertisers	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wishes to remove an advertiser</li> <li>2. The system shows a list of advertisers that have no advertisements with open reservations.</li> <li>3. The corporate news desks selects an advertiser from the list</li> </ol>	

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	4. The system deletes the advertiser's stated profile from the publisher's list of advertisers.
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FR-EXP09	<b>Create new advertisement stated and transactional profile</b>	BMP
<b>Specializes</b>	FR-ADV01 (Submit input to the publishing system)	
<b>Primary Actor</b>	Advertiser	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: (new) advertisements are a source of income.</li> <li>▪ Advertiser: wants to create a new advertisement that must be published in future editions and front pages.</li> </ul>	
<b>Preconditions</b>	The publisher has received all data concerning the new advertisement so it can be added to the publishing system. The advertiser has a profile in the publishing system.	
<b>Postconditions</b>	A stated and transactional profile for the new advertisement is created and added to the system.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. As FR-ADV01.</li> <li>2. As FR-ADV01.</li> <li>3. As FR-ADV01.</li> <li>4. The publisher adds all stated data of the profile (advertiser name, name of the advertisement, product name, product type, duration of the advertisement, advertisement type (front page, full page)).</li> <li>5. A new stated profile is created in which the entered data is stored.</li> <li>6. A new transactional profile is created and initialized to enable advertisement tracking (viewing and feedback</li> </ol>	

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	<p>behavior).</p> <ol style="list-style-type: none"> <li>7. As FR-ADV01, step 4.</li> <li>8. As FR-ADV01, step 5.</li> <li>9. As FR-ADV01, step 6.</li> </ol>
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FR-EXP10	<b>Update advertisement stated profile</b>	BMP
<b>Primary Actor</b>	Advertiser.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: The publisher must allow the advertiser to adapt its own advertisements.</li> <li>▪ Advertiser: the advertiser may want to change the profile of an advertisement to improve its publishing behavior (e.g. fine tune the product type, potential editions where the ad may be published ...).</li> </ul>	
<b>Preconditions</b>	The advertisement profile exists in the publisher's advertisement database and the advertiser has requested a change.	
<b>Postconditions</b>	The advertisement profile reflects the requested changes.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The advertiser indicates that an advertisement must be changed.</li> <li>2. The advertiser can modify the properties of the profile according to the data received from the advertiser.</li> <li>3. The modifications are stored in the advertisement's stated profile.</li> <li>4. If required, the transactional profile is reset, because the transactional profile may no longer be applicable to the modified advertisement.</li> </ol>	

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FR-EXP11	<b>Consult Advertisement Stated Profile</b>	BMP
<b>Primary Actor</b>	Advertiser, News Desks	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Advertiser: wants to check the properties it gave to the advertisement.</li> <li>▪ News Desks: uses the advertisement's properties to help the composition of an edition.</li> </ul>	
<b>Preconditions</b>	Access to the publishing system's advertisement database	
<b>Postconditions</b>	The primary actor has the necessary stated advertisement properties	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The primary actor indicates that it wants to consult the stated profile of a particular advertisement.</li> <li>2. The advertisement's stated profile is extracted from the advertisement database. The profile may be consulted completed or only partially, depending on the actor's rights and/or intent.</li> </ol>	

FR-EXP12	<b>Consult advertisement transactional profile</b>	BMP
<b>Primary Actor</b>	Advertiser, News Desks.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Advertiser: wants to check what the publishing statistics and the feedback statistics of the advertisements are.</li> <li>▪ News desk: uses the transactional advertisement data for billing purposes, data mining, etc.</li> </ul>	
<b>Preconditions</b>	Access to the publishing system's advertisement database.	
<b>Postconditions</b>	The primary actor has the necessary transactional advertisement properties.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The primary actor indicates that it wants to consult the</li> </ol>	

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	<p>transactional profile of a particular advertisement.</p> <p>2. The advertisement's transactional profile is extracted from the advertisement database. The profile may be consulted completed or only partially, depending on the actor's rights and/or intent.</p>
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FR-EXP13	<b>Consult Advertisement profile</b>	BMP
<b>Aggregates</b>	FR-EXP11 (Consult advertisement stated profile) and FR-EXP12 (Consult advertisement transactional profile).	
<b>Primary Actor</b>	Advertiser, Service News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Service News Desk: the service news desk uses the advertisement profile when creating a edition, to check if the advertisement has the correct type, has been paid for ...</li> <li>▪ Advertiser: The advertiser wants to consult the properties of the advertisement to evaluate the advertisement.</li> </ul>	
<b>Preconditions</b>	Access to the advertisement profiles database.	
<b>Postconditions</b>	The interested party obtained the required information from the advertisement's profile.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The primary actor indicates that it wants to consult the profile of a particular advertisement.</li> <li>2. Depending on the rights and/or intent of the actor, the advertisement's stated and transactional profile is extracted from the advertisement database (See requirement FR-EXP12 and FR-EXP13). The profiles may be consulted completed or only partially, again depending on the actor's rights.</li> </ol>	

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FR-EXP14	<b>Delete advertisement</b>	BMP
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: the corporate news desk wants to remove advertisements that are no longer valid and can no longer be used for statistics purposes.</li> <li>▪ Advertiser: the advertiser wants advertisements that no longer serve any purpose removed.</li> </ul>	
<b>Preconditions</b>	The advertisement is located in the advertisements database.	
<b>Postconditions</b>	The selected advertisement's stated and transactional profile is removed.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wants to remove a particular advertisement.</li> <li>2. The selected advertisement is located in the database.</li> <li>3. The advertisements profiles are erased from the database.</li> </ol>	

FR-EXP15	<b>Create User Invoice</b>	BM
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: the corporate news desk sends a standard invoice to media consumers that are subscribed to a normal broadcast news service.</li> <li>▪ Media Consumer: the media consumer receives the invoice for using the publisher's services.</li> </ul>	
<b>Preconditions</b>	The media consumer is in the user database.	
<b>Postconditions</b>	An invoice is sent to the media consumer which must be paid later by the consumer ( <i>asynchronous</i> payment)	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer's stated profile is extracted from the</li> </ol>	

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	<p>user database.</p> <ol style="list-style-type: none"> <li>2. For every edition that is in the media consumer's stated profile and that is relevant to the invoice being created, an invoice entry is created.</li> <li>3. All invoice entries are gathered in one invoice.</li> <li>4. The invoice is created (e-mail, credit card transaction, letter in the mail, etc.)</li> <li>5. The invoice is dispatched.</li> </ol>
<b>Alternative Scenario</b>	<p>The consumer has agreed to alternative, <i>synchronous</i> payment schemes: the user pays immediately, for example by means of micropayment schemes that use the consumer's cellphone credit or by means of a creditcard number.</p> <ol style="list-style-type: none"> <li>1. The media consumer's stated profile is extracted from the user database.</li> <li>2. For every edition that is in the media consumer's stated profile and that is relevant to the invoice being created, an invoice entry is created.</li> <li>3. All invoice entries are gathered in one invoice.</li> <li>4. The invoice amount is immediately charged to the paying scheme selected by the media consumer</li> </ol>

FR-EXP16	<b>Create Advertiser invoice</b>	BMP
<b>Primary Actor</b>	Corporate News desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: the corporate news desk sends an invoice to the advertiser for the published advertisements.</li> <li>▪ Advertiser: the advertiser receives the invoice for</li> </ul>	

	publishing its advertisements in the publisher's products.
<b>Preconditions</b>	The advertiser is in the user database, and the advertiser has one or more active advertisements in the advertisement database.
<b>Postconditions</b>	An invoice is sent to the advertiser.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The advertiser's profile is extracted from the advertiser database.</li> <li>2. The stated and transactional profiles from the active advertisements are extracted from the advertisement database.</li> <li>3. For every advertisement, an invoice entry is created. The price for the advertisement may depend a.o. on the number of appearances of that advertisement, the location, size, etc. of that advertisement.</li> <li>4. All the invoice entries are collected in one invoice.</li> <li>5. The invoice is created (e-mail, credit card transaction, letter in the mail, etc.).</li> <li>6. The invoice is dispatched to the advertiser using the data found in the advertiser's stated profile.</li> </ol>

## 3.2. Context Awareness Requirements

### 3.2.1. Introduction

Context awareness allows the adaptation of DigiNews services to the media consumer. The idea of context awareness is twofold. The first type of context is the user's behavior. This type of context is formed by the user's preferences which indicate what the user's interests are, and the user's DigiNews product consumption behavior. For example, one user may be interested in national politics and sports,

while the other user has indicated interest in international politics, economy. From his consumption behavior, the publisher can deduce that the last user is also particularly fond of the movie industry as well. The second type of context is the media consumer's current location. News about national politics can be made more fine grained depending on the region the user is currently residing.

Context aware adaptation covers two aspects of the publishing system: content and advertisements. The content of the service editions that are created by the publisher can be adapted to the media consumer's preferences and locations. Additionally, the advertisements that are present in the editions can be adapted to the user's preferences and current location. E.g. a user that is interested in wine may want to receive product offerings from the wine store behind the corner.

### **3.2.2. Informal set of requirements**

In short, a system may support any combination of the following features:

- No availability of context information. This may be the case in digital newspapers purely based on broadcasted information.
- The availability of context information that has been acquired/provided statically. Here we basically mean that context information is not supplied continuously and/or in real time. Users are asked about their preferences which are then stored in an online profile. A profile is created explicitly (this needs the explicit participation of the user). Such a profile is called "stated profile" in this document.
- The availability of context information that has been acquired/provided dynamically. Here we basically mean that context information is supplied continuously and/or in real time. When users interact with the terminal, they do so according to their interests and preferences. A profile for a user can be constructed so that future interactions will be optimized. This information is also useful for targeted advertisements and other commercial applications. A profile is created implicitly. Such a profile is called a "transaction profile" in the sequel of this document.

The use cases in this section mainly address the availability of context information that has been acquired both statically and dynamically. The CAW use cases fall into 4 categories:

- **User tracking:** the publishing system needs additional data structures to enable dynamic user tracking. Static user tracking is done in the stated user profile, which are listed in the business office use cases in the Section 3.1.3.5. The dynamic user tracking introduces a transactional profile, which is updated based on the media consumer's consumption behavior or the media consumer's current location. The location of the media consumer can be known if his terminal supports such context awareness features.
- **Business office:** because each user is tracked individually, services can be offered to the media consumer in a more personalized way. Therefore alternative billing methods are required that transcend the normal subscriptions that are only possible in a traditional broadcast setup.
- **Personalized and location aware content:** because of context awareness, services can now be personalized based on consumption behavior and location. Hence, the need for use cases that cope with personalization content creation arises. Editions can have a personalized opening page and personalized content, possibly dependent of the location where the user is currently located. Means to locate the user are needed. Additionally, the consumer's consumption behavior of the personalized service is be monitored.
- **Personalized and location aware advertisements:** Advertisements are added to the services that are sent to the media consumer's based on the content of the service, the media consumer's preferences and the media consumer's location. Therefore, there exists a need for functionality that deals with annotating the services with advertisements, while still keeping track of user behavior and service content.

As with the category of functional requirements, we have created an informal list of requirements, which is given below.

**3.2.2.1. User Tracking**

1. News desks must be able to create a profile that holds the user’s consumption behavior.
2. News desks must be able to create a new user with a consumption behavior profile.
3. News desks and advertisers must be able to consult a user profile.
4. Media consumers must be able to consult their profile.
5. News desks must be able to analyze content consumption.

**3.2.2.2. Business office**

1. The business owner must be able to create a personalized invoice

**3.2.2.3. Personalized and location aware content**

1. Compose a personalized edition for a user.
2. Compose a personalized edition – based on location.
3. Retrieve location based-information, based on technology.
4. Update User profile (based on usage).

**3.2.2.4. Personalized and location aware advertisements**

1. Personalize the advertisements on a user’s particular edition.
2. Personalize advertisements, location based.
3. Update User profile implicitly, based on how the user interacts with advertisements.
4. Generate feedback from the consumption of advertisements.

In the following subsection, we describe the informal list of requirements in further detail, by discussing the available use cases, structured in the 4 categories introduced above.

**3.2.3. Available use cases**

**3.2.3.1. User tracking**

CAW-PRF01	Create user transactional profile	P
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<b>Primary Actor</b>	Corporate News Desk
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: must have an intuitive way to subscribe to tomorrow's news service.</li> <li>▪ Corporate News desk: Gather relevant information about the consumer to be able to offer a range of services that is tailored to the new user.</li> </ul>
<b>Preconditions</b>	The media consumer must have an existing and active stated profile.
<b>Postconditions</b>	The publishing system reserved the necessary resources for the media consumer's transaction profile
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The Corporate News Desk indicates that the publishing system must maintain consumption behavior for the media consumer</li> <li>2. The publishing system reserves the necessary resources in the system to maintain customer tracking information.</li> </ol>

CAW-PRF02	<b>Create new user stated and transactional profile</b>	P
<b>Aggregates</b>	FR-EXP01 (Create new user stated profile) and CAW-PRF01 (Create user transactional profile)	
<b>Primary Actor</b>	Media consumer or Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: must have an intuitive way to subscribe to tomorrow's news service.</li> <li>▪ Publisher-to-consumer channel: used to send the subscription form to the consumer</li> <li>▪ Control channel: carries the consumer's subscription data</li> <li>▪ Corporate News desk: Gather relevant information about the consumer to be able to offer a range of services</li> </ul>	

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	that is tailored to the new user.
<b>Preconditions</b>	The media consumer must have access to a device on which (s)he can enter the required information.
<b>Postconditions</b>	The media consumer is validated and registered with the DigiNews system. The system contains personal media consumer information and stated preferences. The system also reserved the necessary resources to maintain transactional data that reflects the user's consumption behavior.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>8. The media consumer accesses a general subscription service on a DigiNews device using the publisher-to-consumer channel.</li> <li>9. The media consumer enters obligatory personal information: name, address, phone number, fax number, email address, ...</li> <li>10. The media consumer can select its payment preferences (credit card, normal invoice with money transfer ...).</li> <li>11. The media consumer enters optional personal information: gender, annual income, marital status.</li> <li>12. The media consumer enters interests in particular product categories: politics (national, international), sports (soccer, football, baseball, formula 1), economy, entertainment (movies, music, books, adult, food, concerts ...).</li> <li>13. This information is sent to the publisher on the control channel.</li> <li>14. Validation is requested from the media consumer via a different channel (e.g. by means of an email). Upon</li> </ol>

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	response, the user stated profile is activated in the DigiNews system, and the necessary data resources are set up for the transactional profile to track the user.
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CAW-PRF03	<b>Consult user stated and transactional profile</b>	P
<b>Aggregates</b>	FR-EXP03 (Consult User Stated Profile) and CAW-PRF04 (Consult User Transactional Profile)	
<b>Primary Actor</b>	Media consumer, Advertiser, News Desks.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media consumer: wishes to check his personal preferences, or his consumption behavior.</li> <li>▪ News Desk: wishes to use the media consumer's stated preferences or consumption behavior for marketing purposes, billing purposes, ...</li> <li>▪ Advertiser: wishes to consult the media consumer's stated preferences and product consumption behavior for personalized advertisement purposes.</li> </ul>	
<b>Preconditions</b>	Access to the publishing system customer tracking database.	
<b>Postconditions</b>	The interested party has the necessary media consumer information to realize its purpose (checking consumption behavior, data mining for marketing purposes, ...)	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The main actor accesses the publishing system by means of a terminal (consumer) using the publisher-to-consumer channel or b2b technology (business partner such as service provider, advertiser, etc.).</li> <li>2. Depending on the rights and/or intent of the actor, the media consumer's personal stated and/or transactional information can be consulted. (See requirements FR-EXP03 and CAW-PRF04). Some information may be</li> </ol>	

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	anonymous for reasons of protection of privacy.
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CAW-PRF04	<b>Consult user transactional profile</b>	P
<b>Primary Actor</b>	Media consumer, Advertiser, News Desks	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: wishes to check his consumption behavior.</li> <li>▪ News Desk: wishes to use the media consumer's consumption behavior for marketing purposes, billing purposes, ...</li> <li>▪ Advertiser: wishes to consult the media consumer's product consumption behavior for personalized advertisement purposes.</li> </ul>	
<b>Preconditions</b>	Access to the publishing system customer tracking database.	
<b>Postconditions</b>	The interested party has the necessary customer information to realize its purpose (checking consumption behavior, data mining for marketing purposes ...).	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The main actor accesses the publishing system by means of a terminal (consumer) or b2b technology (business partner such as service provider, advertiser, etc.).</li> <li>2. Depending on the rights and/or intent of the actor, the user's transactional information is consulted. Some information may be anonymous for reasons of protection of privacy.</li> </ol>	

CAW-PRF05	<b>Analysis of User Profile and Usage</b>	P
<b>Primary Actor</b>	Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Corporate News Desk: the corporate news desk wants</li> </ul>	

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	to know what the consumption trends are of its media consumers.
<b>Preconditions</b>	Access to the media consumers transactional profiles database.
<b>Postconditions</b>	The corporate news desk receives an indication of the general consumption behavior of its customers.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The Corporate News Desk indicates that a new analysis job needs to be started</li> <li>2. The system extracts all relevant data from the media consumers' stated and transactional profiles. Relevant data can be selected based on timing constraints (transactional data of the last 3 months), particular media consumer target groups (e.g. teenagers, women), etc.</li> <li>3. The data is offered as input to a data mining system.</li> <li>4. The data mining system calculates the requested information.</li> <li>5. The system sends these results back to the Corporate News Desk</li> <li>6. The Corporate News desk can examine the results.</li> </ol>

### **3.2.3.2. Business office**

CAW-INV01	<b>Create User Personalized Service Invoice</b>	P
<b>Primary Actor</b>	Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Corporate News Desk: the corporate news desk sends a standard invoice to media consumers that are subscribed to personalized publishing services.</li> <li>• Media Consumer: the media consumer receives the</li> </ul>	

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	invoice for using the publisher's services.
<b>Preconditions</b>	The media consumer is in the user database, is subscribed to at least one service and has a non-empty transactional profile.
<b>Postconditions</b>	A personalized service invoice is sent to the media consumer, that he must pay after reception ( <i>asynchronous</i> payment)
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer's stated and transactional profile is extracted from the user database.</li> <li>2. The media consumer's transactional profile is examined to make an inventory of the consumed services that must be billed on the current invoice.</li> <li>3. For every service consultation relevant to this invoice an invoice entry is created.</li> <li>4. All invoice entries are gathered in one invoice.</li> <li>5. The invoice is created (e-mail, credit card transaction, etc.)</li> <li>6. The invoice is dispatched.</li> </ol>
<b>Alternative Scenario</b>	<p>The consumer has agreed to alternative, <i>synchronous</i> payment schemes: the user pays immediately, for example by means of micropayment schemes that use the consumer's cellphone credit or by means of a creditcard number.</p> <ol style="list-style-type: none"> <li>1. The media consumer's stated and transactional profile is extracted from the user database.</li> <li>2. The media consumer's transactional profile is examined to make an inventory of the consumed services that must be billed on the current invoice.</li> <li>3. For every service consultation relevant to this invoice an invoice entry is created.</li> </ol>

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	<ol style="list-style-type: none"> <li>4. All invoice entries are gathered in one invoice.</li> <li>5. The total amount of the invoice is billed immediately using the payment scheme selected by the user.</li> </ol>
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### **3.2.3.3. Personalized and location aware content**

CAW-USR01	<b>Pull personalized edition</b>	P
<b>Extends</b>	Pull an edition (FR-CON03).	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: wants to receive a product that is personalized to his/her own interests.</li> <li>▪ Corporate News Desk: wants to offer the media consumer with a superior product that is tailored to the consumer's need and preferences.</li> </ul>	
<b>Preconditions</b>	The media consumer is subscribed to a service.	
<b>Postconditions</b>	The media consumer received a personalized newspaper.	
<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. As FR-CON03.</li> <li>2. The publishing system consults the media consumer's stated and transactional profile.</li> <li>3. The publishing system composes a personalized front page for the requested edition using the media consumer's preferences and consumption behavior.</li> <li>4. The publishing system composes a personalized edition using the media consumer's preferences and consumption behavior.</li> <li>5. As FR-CON03, step 3.</li> </ol>	

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	<p>6. As FR-CON03, step 4.</p> <p>7. As FR-CON03, step 5.</p>
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CAW-USR02	<b>Push personalized edition</b>	P
<b>Extends</b>	Push an edition (FR-NDK10).	
<b>Primary Actor</b>	News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ News desk: wants to be able to present the media consumer with a personalized edition (with personalized front page) of a particular service.</li> <li>▪ Media Consumer: the media consumer receives an edition of a subscribed service that is tailored to his or her interests and has a personalized front page containing headlines that are of particular interest to the media consumer.</li> </ul>	
<b>Preconditions</b>	The news desk has obtained sufficiently new material to push to the affected media consumers.	
<b>Postconditions</b>	A personalized edition with personalized front page is pushed towards the media consumers if their consumer device is reachable.	
<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. As FR-NDK10.</li> <li>2. As FR-NDK10.</li> <li>3. For every media consumer that resulted from the CRM query, the stated and transactional profile is obtained.</li> <li>4. For every media consumer, the content of the opening page (i.e. headlines) is composed based on the consumer's personal preferences and consumption behavior.</li> </ol>	

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	<p>5. For every media consumer, a unique edition is created based on the consumer's personal preferences and consumption behavior.</p> <p>6. As FR-NDK10, Step 3.</p> <p>7. As FR-NDK10, Step 4.</p>
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CAW-USR03	<b>Pull personalized edition, location dependent</b>	P
<b>Extends</b>	CAW-USR01 (Pull personalized edition).	
<b>Depends on</b>	Send context information (FR-CON05).	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: wants to receive a product that is personalized to his/her own interests and localized to his/her current location.</li> <li>▪ Corporate News Desk: wants to offer the media consumer with a superior product that is tailored to the consumer's need, preferences and current location.</li> </ul>	
<b>Preconditions</b>	The media consumer is subscribed to a service and has a means to acquire his/her current location.	
<b>Postconditions</b>	The media consumer received a personalized and also localized newspaper	
<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. As CAW-USR01.</li> <li>2. As CAW-USR01.</li> <li>3. Execute "Send Context Information" (FR-CON05)</li> <li>4. The publishing system composes a personalized front page for the requested edition based on the relevant (i.e. new and/or updated since the last edition pull) stories</li> </ol>	

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	<p>using the media consumer's preferences, consumption behavior and current location.</p> <p>5. The publishing system composes a personalized edition based on the relevant (i.e. new and/or updated since the last edition pull) stories using the media consumer's preferences, consumption behavior and current location.</p> <p>6. As CAW-USR01, step 5.</p> <p>7. As CAW-USR01, step 6.</p> <p>8. As CAW-USR01, step 7.</p>
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CAW-USR04	<b>Push personalized edition, location dependent</b>	P
<b>Extends</b>	CAW-USR02 (Push personalized edition)	
<b>Depends on</b>	Send context information (FR-CON05).	
<b>Primary Actor</b>	Media Consumer and Service News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: wants to receive a product that is personalized to his/her own interests and localized to his/her current location.</li> <li>▪ Service News Desk: wants to offer the media consumer with a superior product that is tailored to the consumer's need, preferences and current location.</li> </ul>	
<b>Preconditions</b>	The media consumer is subscribed to a service and has a means to acquire his/her current location.	
<b>Postconditions</b>	The media consumer received a personalized and also localized newspaper	
<b>Altered Scenario</b>	<p>1. The media consumer Executes "Send Context Information" (FR-CON05) from time to time. This can happen for example in a timely fashion (every 10</p>	

## System requirements on digital newspapers

	<p>minutes) or when the media consumer moves to another access point (hotspot)</p> <ol style="list-style-type: none"> <li>2. If something interesting is located in this area for this media consumer (e.g. a particular store, a particular event that is occurring at that time), the service news desk signals the publishing system that an edition must be pushed to the media consumer.</li> <li>3. The publishing system composes a personalized front page for the requested edition based on the relevant (i.e. new and/or updated since the last edition) stories using the media consumer's preferences, consumption behavior and current location.</li> <li>4. The publishing system composes a personalized edition based on the relevant (i.e. new and/or updated since the last edition pull) stories using the media consumer's preferences, consumption behavior and current location.</li> <li>5. As CAW-USR02, step 6.</li> <li>6. As CAW-USR02, step 7.</li> </ol>
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CAW-USR05	<b>Location awareness</b>	P
<b>Specializes</b>	Send context information (FR-CON05).	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: the media consumer wants to send his location information to the publisher to receive location aware services.</li> <li>▪ Publisher: the publisher needs the location information from the media consumers to offer location aware services.</li> </ul>	

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	<ul style="list-style-type: none"> <li>▪ Advertiser: Advertisers in the vicinity of the media consumer may show an increased interested to send advertisements to the media consumer.</li> </ul>
<b>Preconditions</b>	There is a consumer-to-publisher channel available that can be used to send viewing information from the media consumer to the publisher. The media consumer must possess a DAB-based terminal.
<b>Postconditions</b>	The location information is deduced from the location of the DAB terminal and is stored.
<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer indicates he wants to send his location information. This indication can be manually or automatically.</li> <li>2. The location information is determined – for example by using a GPS module or determining the GSM antenna the user is using, etc. – and is sent to the publisher using the consumer-to-publisher channel.</li> <li>3. The system receives the location information</li> <li>4. The stored location information is updated with the new information.</li> </ol>

CAW-USR06	<b>Update User Profile based on Usage (Transactional Profile)</b>	P
<b>Specializes</b>	FR-CON04 (Send viewing information).	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer can deliberately or automatically send viewing information to the publisher.</li> </ul>	

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	<ul style="list-style-type: none"> <li>▪ Publisher: the publisher creates a transactional profile from the viewing information received from the media consumer.</li> </ul>
<b>Preconditions</b>	There is a consumer-to-publisher channel available that can be used to send viewing information from the media consumer to the publisher.
<b>Postconditions</b>	The viewing information is added to the media consumer's transactional profile.
<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. As FR-CON04.</li> <li>2. As FR-CON04.</li> <li>3. As FR-CON04.</li> <li>4. The received information is registered in the media consumer's transactional profile.</li> </ol>

### 3.2.3.4. Personalized and location aware advertisements

CAW-ADV01	<b>Pull personalized edition advertisements</b>	P
<b>Extends</b>	CAW-USR01 (Pull personalized edition).	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media consumer: the media consumer wants to receive advertisements that lie within his field of interest.</li> <li>▪ Advertiser: the advertiser wants to place advertisements that are aimed at potential customers.</li> </ul>	
<b>Preconditions</b>	The media consumer is subscribed to a service.	
<b>Postconditions</b>	The media consumer received a personal edition with tailored advertisements.	

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<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. As CAW-USR01.</li> <li>2. As CAW-USR01.</li> <li>3. As CAW-USR01.</li> <li>4. The current edition is examined, and advertisements are added or updated based on the content of the edition and using the media consumer's stated and transactional profile.</li> <li>5. As CAW-USR01, step 4.</li> <li>6. As CAW-USR01, step 5.</li> <li>7. As CAW-USR01, step 6.</li> </ol>
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CAW-ADV02	<b>Push personalized edition advertisements</b>	P
<b>Extends</b>	CAW-USR02 (Push personalized edition)]	
<b>Primary Actor</b>	Service News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Service News desk: wants to be able to present the media consumer with a personalized edition of a particular service.</li> <li>▪ Advertiser: advertisers want to place advertisements to media consumers that show interest in their products.</li> <li>▪ Media Consumer: the media consumer receives an edition of a subscribed service containing stories and advertisements that are adapted to his or her interests</li> </ul>	
<b>Preconditions</b>	The service news desk has obtained sufficiently new material to push a new edition to the affected media consumers.	
<b>Postconditions</b>	A edition that is composed out of personalized stories and advertisements is sent to the media consumers if their consumer device is reachable	

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<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. As CAW-USR02.</li> <li>2. As CAW-USR02.</li> <li>3. As CAW-USR02.</li> <li>4. As CAW-USR02.</li> <li>5. The media consumers tailored edition is examined, and advertisements are added or updated based on the content of the edition and using the media consumer's stated and transactional profile.</li> <li>6. As CAW-USR02, step 5</li> <li>7. As CAW-USR02, step 6</li> </ol>
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CAW-ADV03	<b>Pull personalized edition advertisements, location dependent</b>	BMP
<b>Extends</b>	CAW-USR03 (Pull personalized edition, location dependent)	
<b>Depends on</b>	FR-CON05 (Send context information)	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: wants to receive an edition that is personalized to his/her own interests and contains stories and advertisements that are relevant to the place the consumer is located.</li> <li>▪ Corporate News Desk: offer and improved and localized service to the media consumer.</li> <li>▪ Advertiser: Advertiser: the advertiser wants to place advertisements that are aimed at potential customers.</li> </ul>	
<b>Preconditions</b>	The media consumer is subscribed to a service and has a means to acquire his/her current location.	

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<b>Postconditions</b>	The media consumer received a personalized and also localized edition, containing localized advertisements
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. As CAW-USR03.</li> <li>2. As CAW-USR03.</li> <li>3. Execute “Send Context Information” (FR-CON05).</li> <li>4. As CAW-USR03, step 4.</li> <li>5. The current edition is examined, and advertisements are added or updated based on the content of the edition, the media consumer’s stated and transactional profile and the current location of the media consumer.</li> <li>6. As CAW-USR03, step 5.</li> <li>7. As CAW-USR03, step 6.</li> <li>8. As CAW-USR03, step 7.</li> </ol>

CAW-ADV04	<b>Push personalized edition advertisements, location dependent</b>	BMP
<b>Extends</b>	CAW-USR04 (Push personalized edition, location dependent)	
<b>Depends on</b>	FR-CON05 (Send context information)	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: wants to receive an edition that is personalized to his/her own interests and contains stories and advertisements that are relevant to the place the consumer is located.</li> <li>▪ Corporate News Desk: offer and improved and localized service to the media consumer.</li> </ul>	

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	<ul style="list-style-type: none"> <li>▪ Advertiser: Advertiser: the advertiser wants to place advertisements that are aimed at potential customers.</li> </ul>
<b>Preconditions</b>	The media consumer is subscribed to a service and has a means to acquire his/her current location.
<b>Postconditions</b>	The media consumer received a personalized and also localized edition, containing localized advertisements
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer Executes “Send Context Information” (FR-CON05) from time to time. This can happen for example in a timely fashion (every 10 minutes) or when the media consumer moves to another access point (hotspot).</li> <li>2. As CAW-USR04, step 2.</li> <li>3. As CAW-USR04, step 3.</li> <li>4. The current edition is examined, and advertisements are added or updated based on the content of the edition, the media consumer’s stated and transactional profile and the current location of the media consumer.</li> <li>5. As CAW-USR04, step 4.</li> <li>6. As CAW-USR04, step 5.</li> </ol>

CAW-ADV05	<b>Update advertisement transactional profile</b>	P
<b>Specializes</b>	FR-CON04 (Send viewing information)	
<b>Primary Actor</b>	Media consumer	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer can deliberately or automatically send advertisement viewing information to the publisher.</li> <li>▪ Advertiser: the advertiser wants to know how well the</li> </ul>	

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	advertisements are published by the publisher and viewed and acted upon by the media consumers.
<b>Preconditions</b>	There is a consumer-to-publisher channel available that can be used to send advertisement viewing information from the media consumer to the publisher.
<b>Postconditions</b>	The viewing information is added to the advertisement's transactional profile.
<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. As FR-CON04.</li> <li>2. Deliberately or automatically, the advertisement viewing information is sent to the publisher on the publisher-to-consumer channel.</li> <li>3. As FR-CON04.</li> <li>4. Using the received information, the transactional profile of the advertisement is updated.</li> </ol>

CAW-ADV06	<b>Feedback from advertisement</b>	BMP
<b>Specializes</b>	FR-CON06 (Send feedback information)	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Media Consumer: The media consumer might want to send feedback or respond to an advertisement.</li> <li>▪ Advertiser: an advertiser is obviously interested in the media consumer that wishes to respond to the advertisement.</li> </ul>	
<b>Preconditions</b>	There is a consumer-to-publisher channel available that can be used to send feedback from the media consumer to the publisher.	
<b>Postconditions</b>	The feedback from the media consumer is stored or passed to	

	the advertiser.
<b>Altered Scenario</b>	<ol style="list-style-type: none"> <li>1. The media consumer indicates that he wants to react to an advertisement.</li> <li>2. As FR-CON06.</li> <li>3. As FR-CON06.</li> <li>4. As FR-CON06.</li> <li>5. If needed this feedback information will be forwarded to the advertiser.</li> </ol>

## 4. Extended services requirements

### 4.1. Introduction

The DigiNews publishing system aims to support extended services. The goal of extended services is to offer a broader spectrum of services to the media consumer than a newspaper that consists of (personalized) stories and advertisements. This is obtained by integrating the services of third party service providers into the newspaper editions of the publisher. For example, a ticket service may allow a media consumer to buy tickets to a particular concert. Such a service could be included in the culture section of the newspaper that reviews the band's new CD. Other service examples are restaurant guides, restaurant reservation services, yellow pages, e-mail notification services, auction services.

The additional requirements to support extended services are described in this section. These requirements all assume that the publisher functions as the intermediary between the extended service providers and the media consumers. That way, the publisher can charge the extended service provider each time it sends a service offering to the publisher's customer base. When the media consumer consumes an extended service, the publisher can charge a commission. Additionally, the publisher maintains a certain degree of control over the use of its infrastructure, consumer database, etc.

## **4.2. Informal set of requirements**

The requirements to support extended services fit in the functional requirements (Section 3.1) category and the context awareness requirements (Section 3.2) category. In the context of extended services, a new stakeholder is needed: the extended service provider. The extended service provider generates revenue by offering its services to the media consumers. Extended service providers are another source of income for the publisher.

Functional requirements affect the business office of the publisher, media consumer and the extended service provider stakeholders. The additional context awareness requirements are mainly needed to be able to offer context aware extended services.

### **4.2.1. Business office**

1. The business owner must be able to add an extended service provider.
2. The business owner must be able to consult an extended service provider profile.
3. The business owner must be able to update an extended service provider profile.
4. The business owner must be able to delete an extended service provider profile.
5. The business owner must be able to add a new extended service.
6. The business owner must be able to update an extended service's profile.
7. The business owner must be able to consult an extended service's profile.
8. The business owner must be able to delete an extended service.
9. The business owner must be able to generate an extended service provider invoice.
10. The extended service provider must be able to send a media consumer invoice to the business owner.

### **4.2.2. Extended service provider**

1. The news desks must be able to pull an edition of an extended service.
2. The extended service provider must be able to push an edition of an extended service.
3. The news desks must be able to send feedback to the extended service provider.

**4.2.3. Context awareness**

1. The news desks must be able to send/forward context information to the extended service provider.
2. The extended service provider must be able to consult a media consumer’s profile.

We will describe the requirements listed above in more detail in the next subsection.

**4.3. Available use cases**

**4.3.1. Business office**

FR-EXP-ES01	<b>Create Extended Service Provider profile</b>	BMP
<b>Primary Actor</b>	Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Media Consumer: if the media consumer has indicated to be interested in the type of services of the extended service provider, the media consumer may henceforth receive service offers from the new extended service provider.</li> <li>• Corporate News Desk: new extended service providers are a source of income for the publisher.</li> <li>• News Desk: it can be interesting to publish the new extended service provider’s services in the editions of a particular news desk. For example, the culture news desk may publish services from the concert ticket office.</li> </ul>	
<b>Preconditions</b>	Extended service provider must not have a profile yet.	
<b>Postconditions</b>	A new extended service provider is added to the system.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wants to add a new extended service provider.</li> <li>2. The publishing system provides the corporate news desk with a form to add a new extended service provider.</li> <li>3. The corporate news desk fills out obligatory information:</li> </ol>	

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	<p>service provider name, address, phone number, fax number, email address, VAT number, business type, etc.</p> <p>4. The publishing system adds the extended service provider to the list of the publisher's service providers.</p>
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FR-EXP-ES02	<b>Consult Extended Service Provider profile</b>	BMP
<b>Primary Actor</b>	Extended service provider, Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>Extended service provider: the extended service provider wants to check if the publishing system contains the correct coordinates of the extended service provider.</li> <li>Corporate news desk: the corporate news desk uses the extended service provider's profile for billing purposes.</li> </ul>	
<b>Preconditions</b>	The primary actor has access to the publisher's database.	
<b>Postconditions</b>	The primary actor has obtained the required information about the extended service provider.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>The primary actor indicates that he wishes to consult the profile of an extended service provider.</li> <li>Depending on the rights and/or intent of the actor, the extended service provider's profile is extracted from the database.</li> </ol>	

FR-EXP-ES03	<b>Update Extended Service Provider profile</b>	BMP
<b>Primary Actor</b>	Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>Corporate News Desk: the corporate news desk needs correct and up to date information of the service provider.</li> <li>Extended service provider: the service provider must have valid parameters in the publishing system to be able to offer services.</li> </ul>	

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<b>Preconditions</b>	The extended service provider's profile exists in the database.
<b>Postconditions</b>	The profile in the database reflects the requested changes.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wishes to update the profile of an extended service provider.</li> <li>2. The parameters of the extended service provider are extracted from the extended service provider's database.</li> <li>3. The parameters can be modified by the corporate news desk.</li> <li>4. The changed parameters are stored in the extended service provider database.</li> </ol>

FR-EXP-ES04	<b>Delete extended service provider</b>	BMP
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Extended service providers: the service provider's profile will be permanently removed.</li> <li>• Corporate News Desk: the extended service provider will no longer be a customer of the publisher.</li> </ul>	
<b>Preconditions</b>	The extended service provider is in the publisher's list of extended service providers. There exist no active extended services (no extended service profiles) registered in the system.	
<b>Postconditions</b>	The extended service provider is removed from the publisher's list of extended service providers.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wishes to remove an extended service provider.</li> <li>2. The system shows a list of extended service providers that have no active extended services registered in the</li> </ol>	

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	<p>publisher's system.</p> <p>3. The corporate news desk selects an extended service provider.</p> <p>4. The system deletes the extended service provider's profile from the list.</p>
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FR-EXP-ES05	<b>Create new extended service stated and transactional profile</b>	BMP
<b>Specializes</b>	FR-ADV01 (Submit input to the publishing system)	
<b>Primary Actor</b>	Extended service provider	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: (new) extended services are a source of income.</li> <li>▪ Extended service provider: wants to create a new extended service that must be published in future editions and front pages.</li> </ul>	
<b>Preconditions</b>	<p>The publisher has received all data concerning the new extended service so it can be added to the publishing system.</p> <p>The extended service provider has a profile in the publishing system.</p>	
<b>Postconditions</b>	A stated and transactional profile for the new extended service is created and added to the system.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. As FR-ADV01.</li> <li>2. As FR-ADV01.</li> <li>3. As FR-ADV01.</li> <li>4. The publisher adds all stated data of the profile (service provider name, name of the extended service, product name, product type, duration or amount of times the</li> </ol>	

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	<p>extended service may be published, extended service type, technical specifications of the extended service (how the service must be used, what input data is needed for the service to function correctly, what output can be expected, etc.).</p> <ol style="list-style-type: none"> <li>5. A new stated profile is created in which the entered data is stored.</li> <li>6. A new transactional profile is created and initialized to enable extended service usage tracking (viewing and feedback behavior).</li> <li>7. As FR-ADV01, step 4.</li> <li>8. As FR-ADV01, step 5.</li> <li>9. As FR-ADV01, step 6.</li> </ol>
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FR-EXP-ES06	<b>Update extended service stated profile</b>	BMP
<b>Primary Actor</b>	Extended service provider.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: The publisher must allow the extended service provider to adapt its own services.</li> <li>▪ Extended service provider: the extended service provider may want to change the profile of an extended service to improve its publishing behavior (e.g. fine tune the product type, potential editions where the extended service may be published ...).</li> </ul>	
<b>Preconditions</b>	The extended service's profile exists in the publisher's extended services database and the extended service provider has requested a change.	
<b>Postconditions</b>	The extended service profile reflects the requested changes.	

## System requirements on digital newspapers

<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The extended service provider indicates that the extended service stated profile must be changed.</li> <li>2. The extended service provider can modify the properties of the profile using a form offered by the system.</li> <li>3. The modifications are stored in the extended service's stated profile.</li> <li>4. If required, the transactional profile is reset, because the transactional profile may no longer be applicable to the modified extended service.</li> </ol>
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FR-EXP-ES07	<b>Update extended service transactional profile</b>	BMP
<b>Specializes</b>	FR-CON04 (Send viewing information) and FR-CON06 (Send feedback information)	
<b>Primary Actor</b>	Media Consumer.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: The extended services transactional profile contains information about how many times the service was offered to the media consumer, the usage of the service and the commissions that the publisher can charge the extended service provider.</li> <li>▪ Extended service provider: the extended service provider may want to know the usage statistics of the service. The extended service provider may also have to pay commissions in case a media consumer consulted the extended service.</li> </ul>	
<b>Preconditions</b>	The extended service's profile exists in the publisher's extended services database.	

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<b>Postconditions</b>	The extended service profile reflects the requested changes.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. Deliberately or automatically the media consumer sends viewing information to the publisher using the consumer to publisher channel. In case of feedback, the media consumer always sends the feedback information deliberately.</li> <li>2. The viewing information and/or feedback information is stored in the extended service's transactional profile.</li> <li>3. In case of extended service feedback, the information will be forwarded to the extended service provider to further handle the extended service. (Send Service Feedback, FR-ESP03).</li> </ol>

FR-EXP-ES08	<b>Consult Extended Service Stated Profile</b>	BMP
<b>Primary Actor</b>	Extended service provider, News Desks	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Extended service provider: wants to check the properties it gave to the extended service.</li> <li>▪ News Desks: uses the extended service's properties to help the composition of an edition.</li> </ul>	
<b>Preconditions</b>	Access to the publishing system's extended services database	
<b>Postconditions</b>	The primary actor has the necessary stated properties of the extended service.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The primary actor indicates that it wants to consult the stated profile of a particular extended service.</li> <li>2. The extended service's stated profile is extracted from the extended services database. The profile may be consulted completely or only partially, depending on the actor's</li> </ol>	

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	rights and/or intent.
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FR-EXP-ES09	<b>Consult extended service transactional profile</b>	BMP
<b>Primary Actor</b>	Extended service provider, News Desks.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Extended service provider: wants to check what the publishing statistics and the feedback statistics of the extended services are.</li> <li>▪ News desk: uses the transactional data for billing purposes, data mining, etc.</li> </ul>	
<b>Preconditions</b>	Access to the publishing system's extended services database.	
<b>Postconditions</b>	The primary actor has the necessary transactional properties of the extended service.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The primary actor indicates that it wants to consult the transactional profile of a particular extended service.</li> <li>2. The extended service's transactional profile is extracted from the extended services database. The profile may be consulted completed or only partially, depending on the actor's rights and/or intent.</li> </ol>	

FR-EXP-ES10	<b>Consult extended service's profile</b>	BMP
<b>Aggregates</b>	FR-EXP-ES08 (Consult extended service's stated profile) and FR-EXP-ES09 (Consult extended service's transactional profile).	
<b>Primary Actor</b>	Extended service provider, Service News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Service News Desk: the service news desk uses the extended service's profile when creating a edition, to check if the extended service has the correct type, has</li> </ul>	

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	<p>been paid for ...</p> <ul style="list-style-type: none"> <li>▪ Extended service provider: The extended service provider wants to consult the properties of the extended service for evaluation purposes.</li> </ul>
<b>Preconditions</b>	Access to the extended services profiles databases.
<b>Postconditions</b>	The interested party obtained the required information from the extended service's profile.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The primary actor indicates that it wants to consult the profile of a particular extended service.</li> <li>2. Depending on the rights and/or intent of the actor, the extended service's stated and transactional profile is extracted from the extended services database (See requirement FR-EXP-ES08 and FR-EXP09). The profiles may be consulted completed or only partially, depending on the actor's rights.</li> </ol>

FR-EXP-ES11	<b>Delete extended service</b>	BMP
<b>Primary Actor</b>	Corporate News Desk.	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>▪ Corporate News Desk: the corporate news desk wants to remove extended services that are no longer valid and can no longer be used for statistics purposes.</li> <li>▪ Extended service provider: the extended service provider wants extended services that no longer serve any purpose removed.</li> </ul>	
<b>Preconditions</b>	The extended service is located in the extended services database.	
<b>Postconditions</b>	The selected extended service's stated and transactional profile	

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	is removed.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk indicates that it wants to remove a particular extended service.</li> <li>2. The selected extended service is located in the database.</li> <li>3. The extended service's profiles are erased from the database.</li> </ol>

FR-EXP-ES12	<b>Create invoice for extended service provider.</b>	BMP
<b>Primary Actor</b>	Corporate News Desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Corporate News Desk: the corporate news desk sends an invoice to the extended service provider to obtain the commission for the used extended services.</li> <li>• Extended service provider: the service provider receives the invoice that charges the commission for service usage.</li> </ul>	
<b>Preconditions</b>	The extended service provider is in the user database and the extended service provider has at least one active extended service in the database.	
<b>Postconditions</b>	An invoice is sent to the service provider.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The extended service provider's profile is extracted from the extended service provider database.</li> <li>2. The stated and transactional profiles from the active extended services are extracted from the extended services database.</li> <li>3. For every service, an invoice entry is created. The price for the extended service depends on how many times a media consumer consulted the service.</li> <li>4. All the invoice entries are collected in one invoice.</li> </ol>	

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	<p>5. The invoice is created (e-mail, credit card transaction, letter in the mail, etc.).</p> <p>6. The invoice is dispatched to the extended service provider using the data found in the extended service provider's stated profile.</p>
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FR-EXP-ES13	<b>Extended service provider sends user invoice to corporate news desk</b>	BMP
<b>Primary Actor</b>	Extended service provider	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Corporate News Desk: the corporate news desk may receive a commission of all the extended service provider's sales.</li> <li>• Extended service provider: the service provider charges the media consumer for the consumed service.</li> <li>• Media consumer: must pay for the delivered service.</li> </ul>	
<b>Preconditions</b>	The media consumer and extended service provider both have a profile in the publisher's database. The extended service provider has at least one active extended service in the database.	
<b>Postconditions</b>	The publisher has received the necessary information to charge the user for the consumed extended services at a later moment in time (asynchronous payment) and charge the extended service provider a commission.	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The extended service provider determines the cost of the service it provided to the media consumer.</li> <li>2. The extended service provider creates an invoice for the media consumer that consumed that particular service.</li> </ol>	

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	<ol style="list-style-type: none"> <li>3. The extended service provider dispatches the invoice to the publisher.</li> <li>4. The publisher adds the extended service provider's invoice to the media consumer's transactional profile so it can be added later to the media consumer's invoice. (See CAW-INV01, asynchronous payment).</li> <li>5. The publisher adds its commission to the extended service provider's invoice (See FR-EXP-ES12).</li> </ol>
<b>Alternative scenario</b>	<p>The consumer has agreed to alternative, <i>synchronous</i> payment schemes: the user pays immediately, for example by means of micropayment schemes that use the consumer's cellphone credit or by means of a creditcard number.</p> <ol style="list-style-type: none"> <li>1. The extended service provider determines the cost of the service it provided to the media consumer.</li> <li>2. The extended service provider creates an invoice for the media consumer that consumed that particular service.</li> <li>3. The extended service provider dispatches the invoice to the publisher.</li> <li>4. The publisher adds the extended service provider's invoice to the media consumer's transactional profile.</li> <li>5. The publisher executes "Create User Personalized Service Invoice" (CAW-INV01), Alternative scenario to realize synchronous payment.</li> </ol>

### 4.3.2. Extended service provider

FR-ESP01	<b>Pull an edition from an extended service</b>	BMP
<b>Primary Actor</b>	Service News Desk	

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<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Service News Desk: the service news desk wants to add a service to an edition because the service complements the stories and/or advertisements in the edition, the extended service fits the media consumer's profile or the media consumer explicitly requested the extended service.</li> <li>• Extended service provider: publishing an extended service potentially results in revenue.</li> </ul>
<b>Preconditions</b>	The extended service's profile must exist in the publisher database. The publisher must be able to contact the extended service provider's infrastructure.
<b>Postconditions</b>	The service news desk has obtained an instance of an extended service that can be added to an edition.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The service news desk selects a particular extended service from the list of extended services.</li> <li>2. The service news desk contacts the extended service provider using the mechanisms defined in the extended services database.</li> <li>3. The service news desks requests an instance of the selected extended service (service offer). The service offer can possibly be configured with a number of parameters (discounts, ...)</li> <li>4. The extended service provider handles the request and creates a service offering.</li> <li>5. The extended service provider returns the result to the service news desk.</li> </ol>

FR-ESP02	<b>Push an edition from an extended service</b>	BMP
<b>Primary Actor</b>	Extended service provider	

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<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Extended service provider: the extended service provider wants to send an extended offer to one customers or a group of customers. The customers may want to use the service, which results in revenue for the service provider</li> <li>• Business office: is an intermediary to offer extended services to its customer base (at a certain price). Additionally, it can charge a commission if media consumers respond the pushed extended service.</li> <li>• Media consumer: may receive an interesting service offering</li> </ul>
<b>Preconditions</b>	The extended service provider must be present in the publisher's list of service providers. The extended service must be present in the publisher's list of extended services.
<b>Postconditions</b>	The publisher is in the possession of a service offering that must be pushed to its consumers as a news paper edition.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The extended service provider creates an extended service, configured with the necessary parameters: discounts, target audience (group of users or single user)</li> <li>2. The extended service provider sends the service to the publisher.</li> <li>3. The publisher checks if the service adheres to the service agreements made with the extended service provider. If this is the case the publisher accepts the service for further processing.</li> </ol>

FR-ESP03	<b>Send service feedback</b>	P
<b>Primary Actor</b>	Corporate/Service news desk	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Media consumer: the media consumer has responded to a</li> </ul>	

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	<p>service by sending feedback to the publisher. The media consumer wishes to see the service request processed</p> <ul style="list-style-type: none"> <li>• Corporate news desk: the corporate news desk may receive a commission of a media consumer uses an extended service.</li> <li>• Extended service provider: the extended service provider's earns money when its services are used.</li> </ul>
<b>Preconditions</b>	Media consumer must have sent feedback to an extended service using "Send feedback information" (FR-CON06).
<b>Postconditions</b>	The publisher has notified the extended service provider that a particular user responded to an extended service. The extended service provider possesses the needed details to handle the service request.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk consults the extended service's stated profile to retrieve technical information (communication protocols, data formatting requirements, ...) on how to contact the service.</li> <li>2. The corporate news desk contacts the extended service provider adhering to the protocols found in the extended service's stated profile.</li> <li>3. The information received from the media consumer is forwarded to the extended service provider.</li> <li>4. The extended service provider receives the data.</li> <li>5. The extended service provider processes the data.</li> </ol>

### 4.3.3. Context awareness

FR-ESP-CAW01	<b>Send/forward context information to an extended service</b>	P
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<b>Primary Actor</b>	Corporate News Desk
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Media consumer: the media consumer may wish to receive extended services that are specific to his current context.</li> <li>• Publisher: the publisher wants to notify extended service providers of context changes of its media consumers in order to trigger extended service offerings.</li> <li>• Extended service provider: the extended service provider wants to send context specific extended services to the media consumer.</li> </ul>
<b>Preconditions</b>	Media consumer must have executed “Send Context Information” (FR-CON05). The corporate news desk has a means to communicate context changes to the extended service provider.
<b>Postconditions</b>	The extended service provider is notified of the user’s current context.
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The corporate news desk consults the extended service’s stated profile to retrieve technical information (communication protocols, data formatting requirements, ...) on how to communicate context information to the extended service provider.</li> <li>2. The corporate news desk contacts the extended service provider adhering to the protocols found in the extended service’s stated profile.</li> <li>3. The media consumer’s context is transmitted to the extended service provider.</li> <li>4. The extended service provider receives the context information.</li> </ol>

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	5. The extended service provider processes the context information.	
FR-ESP-CAW02	<b>Consult customer profile</b>	P
<b>Specializes</b>	Consult user stated and transactional profile (CAW-PRF03)	
<b>Primary Actor</b>	Extended service provider, Media consumer, Advertiser, News desks	
<b>Interested parties</b>	<ul style="list-style-type: none"> <li>• Media consumer: wishes to check his personal preferences, or his consumption behavior.</li> <li>• News Desk: wishes to use the media consumer's stated preferences or consumption behavior for marketing purposes, billing purposes, ...</li> <li>• Advertiser: wishes to consult the media consumer's stated preferences and product consumption behavior for personalized advertisement purposes.</li> <li>• Extended service provider: wishes to consult the media consumer's stated preferences and product consumption behavior for personalized extended service purposes.</li> </ul>	
<b>Preconditions</b>	Access to the publishing system customer tracking database.	
<b>Postconditions</b>	The interested party has the necessary media consumer information to realize its purpose (checking consumption behavior, data mining for marketing purposes.)	
<b>Main Scenario</b>	<ol style="list-style-type: none"> <li>1. The main actor accesses the publishing system by means of a terminal (consumer) using the publisher-to-consumer channel or b2b technology (business partner such as service provider, advertiser, extended service provider, etc.)</li> <li>2. Depending on the rights and/or intent of the actor, the</li> </ol>	

	media consumer's personal stated and/or transactional information can be consulted. (See requirements FR-EXP03 and CAW-PRF04). Some information may be anonymous for reasons of protection of privacy.
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## 5. Discussion

This section covers two topics. First, it describes some examples that show how the requirements, and the use cases in particular, must be interpreted. Secondly, we show that next to these requirements, there exists also the need for service quality. We motivate these two aspects before we describe them in greater detail.

First, this document lists a large number of requirements, formatted as use cases, that describe the operation of the DigiNews publishing system. These use cases have been developed in a generic way to cover all aspects of such a complex system.

Consequently, it may not always be clear how these use cases should be interpreted. Section 5.1 describes a number of concrete scenarios that reflect the expectations of the DigiNews publishing system and relates the actions in these scenarios to the use cases listed in this document.

Secondly, requirements that describe the operation of the system concerning publishing functionality, context awareness, security, user interface, content aggregation, ... do not define any constraints concerning the quality of operation of the Diginews publishing system. Section 5.2 describes a number of example scenarios concerning service availability during normal operation and some scenarios on system response when the publishing system is modified during operation. Both elements show how the generic set of specifications in section 5 can be concretized and completed in case a specific system needs to be detailed.

### 5.1. Concretization of requirements

Some more concrete usage scenarios are presented to illustrate the application of the very generic use cases presented before. They are executed in a concrete situation. Of course the scope of these use cases is not limited to the particular environment and

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scenarios presented here, and this is only meant to clarify and make their application more specific.

The situation:

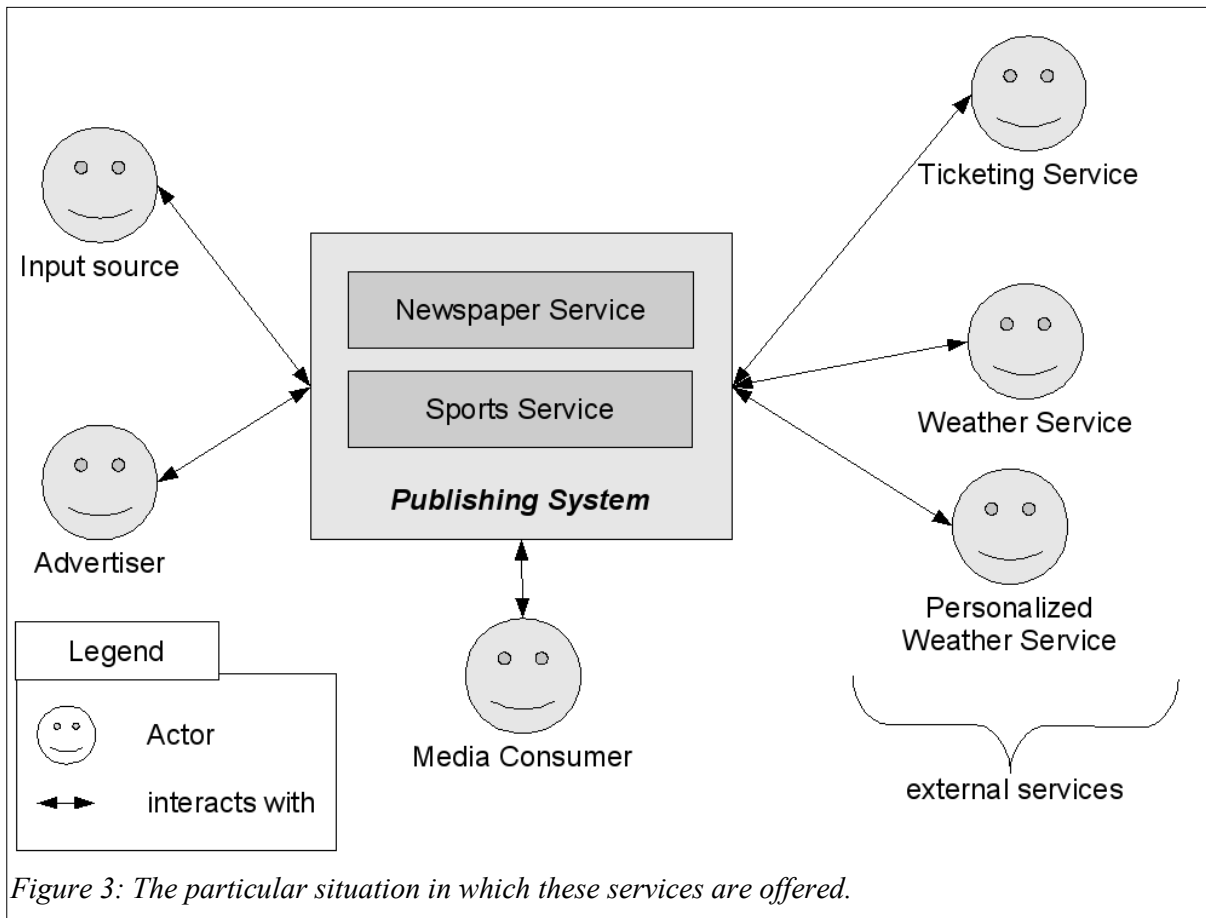
- A publisher is offering a **digital newspaper** as a full product (containing sections for sport, science and world news) and also offers these news items in targeted services for sport, science.
- Furthermore, a personalized internal service is offered for **weather** which bases itself on the current location of the media consumer.
- An external service called the **ticketing service** (TicketMaster) is offered as a personalized extended service, to which the user can subscribe. By doing so he will receive offers for upcoming events, close to where he stays at the moment. Also, this service bases itself on the dynamic (transactional) of the user to determine his taste in music and events. The third-party corporation that has made an agreement with the publisher for access to its user base and will pay the publisher a commission for each sold ticket.

To summarize, the following services are offered by the publisher:

- **Newspaper service:** this is a service offering static editions, based on the classical newspaper. It contains general-interest sections for sport, science and world news.
- **Sport news service:** this is a service that offers sport news, in a static way just like in the regular newspaper. It aims at people who are interested in sports but do not want to subscribe to the entire newspaper because it costs more. It offers the same sport content as the newspaper service, but goes more into detail in the way that it contains longer articles.
- **Personalized weather service:** this service is a dynamic and personalized service, that offers the weather forecast based on the media consumer's current location. It is updated independently four times per day: at eight o'clock, at 12 o'clock, at 16 o'clock and at midnight.
- **Weather service:** this is the same service, but offered as a standalone service.

It allows a user to query the weather forecasts of any region in the world.

- **Ticketing service:** this service is an external service, offered by an external corporation. It is dynamic and personalized, in the way that it sends information to the user based on his location and context, and on his transactional profile (his reading behavior, etc).



The remainder of this section will present usage scenarios as a sequence of use cases applied by an actor in this particular situation. It is represented in Figure 3.

### 5.1.1. Scenario: personalized advertisement through external services

1. A media consumer named Andrew living in Belgium has recently bought himself a reader device that is enabled to access the system offered by the publisher.
2. He opens up the packaging of the device and turns it on. By doing so, he starts the use case *create new user stated profile*. He enters his details and chooses a

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user name and password (~security).

3. Afterwards, he starts the use case ***subscribe to a service*** by clicking on the list of offered services and adding a new subscription. Following and executing this use case makes him subscribe to the *newspaper service*, the *sport news service* and the *ticketing service*.
  - During the execution of this use case, he selects a micro-payment scheme via his cell phone credit instead of a subscription scheme because he feels it will be less expensive since he does not intend to read the newspaper every day (~billing of media consumers).
    - Since he didn't include these details at the moment that his profile was created, he has to enter and validate his cell phone number. His profile is updated.
4. He immediately invokes the ***pull edition*** use case for the *newspaper service*, and receives the newspaper edition for that day.
  - The phone credit on his cellphone is automatically decreased with the price of edition (use case ***create user personalized service invoice***, Alternative scenario).
5. In the world news section he reads a concert review of U2 last weekend. While doing this, he automatically invokes the use case ***send viewing information***, and more specifically the specialized use case ***update transactional profile***.
  - The user tracking capabilities of the publishing system derive automatically that he is interested in music, and more specifically in rock music.
6. The *ticketing service* is notified about the fact that he is currently reading about U2 and prepares an offer for the U2 concert in Belgium (***push an edition of an extended service*** use case). This offer is pushed to the reader by the publisher by invoking the ***push an edition*** use case. Consequently, the offer for the U2 concert pops up. As a customer of the publisher he gets a 20% discount.

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- The invoice of the company behind the ticketing service gets updated, because they were able to show a personalized advertisement through the publisher. (use case ***update extended service transactional profile***, ~billing of external service providers)
- 7. Interested as he is in U2, he selects the offer, by clicking on it. This is the use case ***send feedback information***. The publisher forwards this information to the *ticketing service* (***send service feedback*** use case).
  - For payment, he selects VISA, because his phone credit would not suffice (use case ***Extended service provider sends user invoice to corporate news desk*** (alternative scenario), which triggers ***Create user personalized service invoice*** (alternative scenario), ~billing of media consumer)
    - Again, he has to enter his VISA data (use case ***send service feedback***), and his profile is updated after validation of these data. (~billing of media consumer)
  - An electronic ticket is sent to his device by the *ticketing service*. The ticketing service executes the push extended service use case. The publisher forwards the ticket by executing ***push personalized edition***. This edition is only sent to him, evidently. By showing this electronic ticket at the entrance, he will be able to enter the concert arena.

### 5.1.2. Scenario: personalized weather information

1. Andy lives in Belgium, but is on holiday in Spain. Automatically, his device sends localization information to the publisher. (use case: ***send context information***).
2. The *personalized weather service* receives this information (use case ***send/forward context information to an extended service***) and prepares a small edition with the weather forecasts of Spain.
3. This small edition is sent to the publisher (***push an edition of an extended service***) and forwarded by the publisher (use case ***push edition***) to Andy.

### 5.1.3. Scenario: feedback

1. At the day of the concert, he is very excited and since the concert arena is in the other part of the country, he checks the weather service for the weather forecasts of that area. (*pull edition* from the publisher, who *pulled an edition of an extended service* from *weather service*).
2. On the train to the concert he wonders what the results of his favorite soccer team yesterday were. He doesn't have time to read an entire newspaper, and so he only requests the sport news. (*pull personalized newspaper* from *sport news service*).
  - He pays less than the cost of an entire newspaper as he only receives the sports part. His phone credit is charged automatically (*create user personalized service invoice*, alternative scenario).
3. The day after the concert, he still has some headache and leaves the radio off. Instead, he reads the newspaper in complete silence. He does this by executing the *pull edition* use case on the *newspaper service*.
4. He reads the review of the U2 concert and notices they have the play list wrong. He corrects it by giving additional feedback by executing the *send feedback* use case to the *newspaper service*.
  - As the original journalist checks the corrected play list, he notices he was indeed wrong. To reward Andrew for the correction, he will receive a free newspaper the next day (use case *update user profile based on Usage*). (~billing)

### 5.1.4. Scenario: breaking news

1. John is a journalist working at the news desk responsible for the newspaper, and more specifically the sports section.
2. A press agency sends in a newsflash automatically about the very unexpected death of a soccer player. Metadata is added automatically so it would arrive at the sports news desk. This triggers the creation of a new verification task for John. He is notified automatically (use case *submit input to the publishing system*)

3. John verifies the information by placing a call to a family member of the soccer player on the spot. He marks the news item as verified (use case *verify input*) and starts building a story (use case *build a story*).
4. He delegates the task of creating a short biography of the player to one of his colleagues. (use case *create task*)
5. Since this unexpected news is rather important for the sports desk, John will have to re-plan the next sport edition (use case *replanning triggered by input*).
6. He finished the story about the player's death and marks it as being finished. (use case *add meta-data to content or change it*).
7. He builds a special edition with the newsflash and the biography (use cases *assist publishing system with layouting* and *create edition*) and pushes it to all people who are subscribed to the *sport news service*. (use case *push edition*).

#### **5.1.5. Scenario: advertising**

1. The publisher is negotiating with a potential advertiser. The advertiser would like to do direct marketing to people who like sports.
2. The publisher's owner executes the use case *consult profiles for data mining purposes* to present this to the advertiser. By average, 30 % of the users subscribed to the general newspaper reads the sports section thoroughly. This number is much higher for the subscribers to the *sport news service*.
3. The advertiser is very interested and requests the publisher to create an advertiser profile (use case *create an advertiser profile*).
4. The advertiser makes a reservation for an advertisement that is to be shown during two days to 60% of the readers that are subscribed to the *sports news service*. (*Create new advertisement stated and transactional profile*, followed by *update advertisement stated profile*) and during three days to 20 % of the readers that are subscribed to the *newspaper service*. This way, he targets a specific sport audience, but he also reaches the broad audience of the newspaper.
  - The price for this reservation is calculated based on these factors.

5. After half a day, the advertiser finished preparing the commercial and uploads it to the publishing system (use case *submit input to the publishing system*). Automatically a verification task is created (use case *create task assignment*)
6. The commercial and its reservation are verified by the service news desks (use case *verify commercial*), and the planning for these services is updated (use case *replanning triggered by input*).
7. Each time a user sees the advertisement, this viewing information is sent back to the system and recorded (use case *send viewing information*)
8. After the first day of the advertisement being shown, the advertiser checks the viewing information to see what audience he has reached up to then. (use case *retrieve number of views of a commercial*).
9. After the second day he wants checks these statistics again. (use case *retrieve number of views of a commercial*). They are shown in real-time.
10. At the end of the month, the business owner sends out the invoice for the advertiser. This could be based on the reservation specifics, but also on the number of views the advertisement has had eventually. (use case *Create advertiser invoice*).

#### **5.1.6. Scenario: extended services**

1. The publisher is negotiating a deal with an external service provider who provides restaurant guides and restaurant reviews. This service provider is interested to offer their service to the customers of the publisher in the way that some advertisements for nearby restaurants are offered to the customer.
2. After finishing the legal part of the deal, the external service provider provides information about itself (use case *Create extended service provider profile*) and about the service (where to find it, which kind of events the service is interested in, etc). The *restaurant system* is registered into the system. (*Create new extended service stated and transactional profile* use case)
3. Andrew, our favorite media consumer, is on the train to Paris for a city-trip and arrives after a few hours. As soon as he arrives, he automatically sends in

- information about where he is at the moment. (use case *send context information*).
4. This event is propagated by the publishing system to the *restaurant service* (*send/forward context information to the extended service provider*).
    - The *restaurant service* only has access to the part of the profile of Andrew that is related to location and gastronomic taste (use case *consult (partial) user profile*). Other parts of his profile are not communicated for reasons of privacy (~security).
  5. The restaurant system internally generates an advertisement for a restaurant near to his current location. A 20% discount is offered to Andrew.
  6. The *restaurant service* performs a push of this personalized edition to the publisher (use case *Push an edition of an extended service*).
  7. The publishing system registers the service offer (use case *update extended service transactional profile*) for billing purposes, pushes this edition directly to Andrew (use case *push an edition*), and the advertisement pops-up.
  8. Andrew is interested in the discount and clicks on it to make a reservation. (use case *send feedback information*).
  9. The publishing system forwards this event to the *restaurant service* (use case *send service feedback*).
    - The fact that the *restaurant service* has done business through the publisher is recorded in the publishing system (use case *update extended service transactional profile*), as later billing (use case *create an extended service provider invoice*) for the external service provider will depend on this. (~billing)

## 5.2. Quality Scenarios

Quality scenarios concern service availability during normal operation (Section 5.2.1) and system response in case the publishing system is adapted (Section 5.2.2). Note that *only a couple of examples* are listed to illustrate these types of non-functional requirements. The list of non-functional requirements is by no means complete.

**5.2.1. Availability Scenarios**

**5.2.1.1. Scenario 1: a physical data server suffers from a hardware fault**

Source	Internal to the system (on a lower level than the application layer)
Stimulus	Faulting hardware, causing a crash of the physical server holding the <i>content management system</i>
Artifact	Persistent Storage
Environment	Normal Operation
Response	<ul style="list-style-type: none"> <li>• System should detect the crash of the content management system.</li> <li>• At least one replica should exist to allow business continuity, since the content management system forms the core of the publisher’s business activities.</li> <li>• Pending operations should be canceled on this physical server and when possible these operations should be completed by the replica, allowing the fault to be transparent for the end user that started the operation.</li> <li>• A consistent state of the data must be guaranteed.</li> <li>• Technical staff should be contacted (or e.g. the hardware supplier for this physical server) to repair the hardware.</li> </ul>
Response Measure	<ul style="list-style-type: none"> <li>• Repair time &lt; 1/2 day</li> <li>• Global availability of the content management system should be above 98%</li> </ul>

**5.2.1.2. Scenario 2: bad connectivity of the consumer device**

A media consumer with wireless device (e.g. WiFi device, mobile phone) can not connect because of low coverage in the area.

Source	External to the System
Stimulus	Fault: the area in which the media consumer resides has low coverage and no

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	connection to the publishing platform can be made.
Artifact	communication channels
Environment	Normal Operation
Response	<ul style="list-style-type: none"> <li>• The publishing system can/should not detect this as a failure, because this situation is exactly the same as if the device is turned off at a specific moment (unless of course, coverage is lost during operation of the device).</li> <li>• The device should fail gracefully, informing the media consumer about the situation (related quality attribute: usability).</li> <li>• Depending on the SLA with the telecommunication operators, and the business opportunities in the area (low population/low demand vs. high population/high demand), investments in better communication channels should be considered ...</li> <li>• I.e. the publisher should be informed by their telecommunication partners about low coverage areas, and has the information about general residence of their customers, or market research, to base this decision on: this probably leads to some (new) functional requirements.</li> </ul>
Response Measure	Functionality returns when the media consumer moves to different location with better coverage, no strict metrics are imposed.

### **5.2.1.3. Scenario 3: an external service becomes unavailable.**

Source	External to the system
Stimulus	<p>An extended external service becomes unavailable. This can be due to two reasons:</p> <ul style="list-style-type: none"> <li>• The external service goes off-line due to software crashes, maintenance, power surge,...</li> <li>• The communication link between the external service provider and the publishing system is broken.</li> </ul>

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Artifact	communication channels, external system that interoperates with publishing system
Environment	Normal Operation
Response	<ul style="list-style-type: none"> <li>• System should detect the sudden unavailability of the external service.</li> <li>• It could react by not allowing new subscriptions to that service (if it is a stand-alone service), by not offering the service to its subscribers, until it becomes available again.</li> <li>• Media consumers that were using the service at the moment it became unavailable should be informed of the situation. (strong link with usability).</li> <li>• A service level agreement (SLA) is made between the external service provider and the publisher.</li> <li>• The concrete terms in these SLAs are depending highly on factors such as importance of the service for the business of the publisher, number and importance of other services that may be affected/depend on this service, ...             <ol style="list-style-type: none"> <li>1. For example, the restaurant service going off-line for half an hour may be acceptable, because the restaurant service is not critical.</li> <li>2. The newspaper service going off-line for half an hour would however be unacceptable because this service forms the core of the publisher's business.</li> </ol> </li> <li>• Similarly, a SLA with the telecommunication operator responsible for the communication channel between the external service and the publisher is made.</li> <li>• In case of unexpected unavailability, the external service provider or the telecommunication operator should be contacted and made aware of the situation.</li> </ul>

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	<ul style="list-style-type: none"> <li>Usage statistics should be analysed to see how availability of the service is affected by recent consumer usage. If the recent usage of the service or the network link has increased unexpectedly, the factors on which the SLAs were built could have changed (e.g. recent increase in importance for the service), and a possible revision of these SLAs may be triggered.</li> </ul>
Response Measure	<ul style="list-style-type: none"> <li>Detection of unavailability should be &lt; 1 minute.</li> <li>If this becoming unavailable gets systematic (rate &gt; 1/month), usage analysis and revision of SLA should be done within one month.</li> </ul>

### 5.2.2. Modifiability scenarios

#### 5.2.2.1. Scenario 1: adding a new service

A new third-party service provider is interested in the consumer base of the publisher and wants to offer an additional service (e.g. Restaurant Reservation System that integrates with the regular newspaper to offer extended service, or some kind of advertiser).

Source	The third party service provider develops a new service.
Stimulus	The third party service provider wants to offer a new service, linked to the general newspaper service. This service will integrate into the news service.
Artifact	The publishing platform will undergo no changes as a new service must be plugged in. Possible modifications must be done to the news service (if such an addition of a service was not foreseen in the actual original implementation of the service). A system with which the platform interacts is added.
Environment	<ul style="list-style-type: none"> <li>Can be done (should be done) at run-time.</li> <li>Plugging a new service into the system must not harm availability of other unrelated services currently deployed.</li> <li>Possibly the service that is extended must be changed, leading to an off-</li> </ul>

	line modification, which impacts the availability of this service.
Response	<ul style="list-style-type: none"> <li>• This type of addition to the system must be supported.</li> <li>• Since third party services can be a source of income (e.g. a restaurant reservation system, a book ordering system) this type of modification should be intended and encouraged. This type of modification is not exceptional; it is a main business operation.</li> <li>• A dedicated service exploitation department should be available to aid the addition of the new services. This department supports the deployment and integration of new services into the platform, and also offers the third-party service provider support for implementing a service. It also handles the communication and agreement with the external service provider. Elements such as billing should obviously be specified (e.g. who pays who).</li> <li>• Once a new service is added, the media consumer must be provided with means to access this new service, this can be either by integrating the new service into the existing services, or by offering it as a stand-alone service.</li> <li>• The latter has an impact on a service directory.</li> <li>• This may affect security as a quality attribute because third party code will be used and deployed.</li> <li>• It may also affect the availability of service that is extended (depending on how much was originally foreseen).</li> </ul>
Response Measure	<i>Zero effect on availability:</i> this should not affect availability of the other services, nor of the entire platform.

**5.2.2.2. Scenario 2: adding a new device**

A new type of device (e.g. new type of E-Reader) or a new kind of communication technology (e.g. 3G) has been developed and the publishing system should be able to deliver information services onto the new kind of device and using the new kind of

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communication channel. (Device together with communication channel can be seen as a package, so only “device” will be used from now on).

Source	The business owner of the publishing system, together with telecommunication operators/device builders.
Stimulus	Decision to offer services, delivered on a new kind of device.
Artifact	<p>The publishing platform. Modifications to the publishing platform should be limited.</p> <ul style="list-style-type: none"> <li>• Existing services should have a fairly easy way to deliver their content onto the new device (depending on the resemblance to the types of devices that were already supported). Abstraction should be made from the specifics of the device.</li> <li>• The actual creation of content should thus be device-independent, allowing automatic content conversions to be done to support more specific devices.</li> <li>• Since a new type of device implies a new type of logical delivery type, this should be incorporated and reflected in the planning functionality of the overall publishing system. (For example when a policy states that certain content must always be sent first through a certain type of delivery channel, for example: send breaking news first through GSM, and then – later – through web servers.).</li> </ul>
Environment	Modification should be done at run-time. This modification should not affect the running publishing system, neither the other types of devices being used.
Response	<ul style="list-style-type: none"> <li>• This type of modification must be relatively easy: it must be a planned scenario. With the constant innovations made in the field of for example mobile devices, it can be foreseen that in the future newer devices types/communication technologies will be used (e.g. a shift towards 3G mobile phone networks). Since supporting different technologies opens up different markets for the publisher, this type of modification is essential for</li> </ul>

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	<p>the publisher to evolve in line with changing technologies.</p> <ul style="list-style-type: none"> <li>• The delivery policy (which is based a.o. on content and on delivery channel) should be adapted while the platform is running.</li> <li>• The planning model and information should be adapted while the platform is running.</li> </ul>
Response Measure	<ul style="list-style-type: none"> <li>• This change should not affect performance or availability for other device types (zero impact).</li> <li>• Policy changes: &lt; 1 minute</li> <li>• Planning changes &lt; 1 hour</li> <li>• Overall timing (total time of development and deployment in production system) for this modification depends highly on the channel and/or device and on the agreements with telecommunication operators offering the new types of communication channels (no metric available).</li> </ul>

### 5.2.2.3. Scenario 3: *business model changes*

The owners of a free service decide to change their business model. More specifically they want to change the payment policy. For example, a forum service decides to change the policy in the way that reading the forum posts remains free, but posting into the forum requires micro-payments to be done.

Source	The third party service provider/developers
Stimulus	Functionality should be changed to use the new payment policy for the specific service.
Artifact	The third-party service; and not the entire platform. This modification for the third-party service should be minimal.
Environment	At design time. The actual third party service provider changes the implementation This typically must be done by changing code, recompiling, testing and ultimately re-deploying.

Response	The modification changes the third-party service, but not the publishing platform.
Response Measure	This modification affects the availability quality attribute for the affected service. During redeployment, the service is allowed to be unavailable for a short time, less than five minutes! (< 5min).

## 6. Conclusion

The main objective of the report is to gather and define a set of requirements that will be used to define the DigiNews architecture. This report offers an integrated version of system requirements for the DigiNews platform. It starts from concern specific viewpoints such as functionality, context awareness, user-friendliness, security etc. It discusses the functional requirements, context awareness details and extended services requirements in greater detail. The ultimate goal is that one should be able to define families of solutions by selecting levels of sophistication for each of the concerns.

The requirements are illustrated by means of a set of use cases. Additionally this deliverable shows how to concretize these generic use cases into more concrete specifications, and shows how add more non-functional requirements which are essential for a complete set of requirements.

## Annex A Glossary

The goal of this glossary is to explain the different terms used in this report and in a publishing system. All terms that are not part of the publishing system itself, like software engineering concepts, are marked in italic bold.

**Actor.** The actors are the users interacting with the system. They want to use the system to accomplish a certain goal. The scenario leading to such a goal is described in a *use case*. For example, the *media consumer* is an actor which can have the goal to *subscribe* to a certain *service*.

**Advertiser.** Advertisers are one of the *stakeholders* in the *publishing system*. Advertisers also form an important source of income for the *publisher*, because the advertisers use the *services* of the publisher to reach potential customers with their *commercials*.

**Advertising Calendar.** The advertising calendar is an *advertising planning* mechanism used by the *advertising department*. The calendar consists of a list of all *events* that are planned in the future and that will likely have effect on the *advertising planning*. If a certain *event* typically will result in a boost of *commercials*, this can be taken into consideration in advance.

**Advertising Department.** The advertising department is the department in the publishing company that sells space in the *editions* of the *services* to the *advertisers*. They work with a *reservation system*. The *advertiser* can make a *reservation* with some criteria like: size of the *commercial*, type of *service* the *commercial* must appear in or visibility properties (front page or centerfold).

**Advertising Planning.** The advertising planning contains the whole planning of the *advertising department* for the different *services* offered by the *publisher*. This planning is influenced by the *advertising calendar* with the upcoming *events*, the *reservations* in the *reservation system* and synergy with the *planning* of the *service news desks*.

**Archive (Service).** The archive is the collection of all published *content*, hence all the *finished publications*. The *publisher* might offer an archive service to the

*media consumers*. The *media consumers* can browse through or query the archive.

**Group Service.** A group service is a *packaged service* with a clear profile and focuses on certain topics. It is not as general as a *core service*, which offers a very broad variety of content on different topics. A group service is more focussed on certain topics, like sports or music. All the *media consumers subscribed* to a group service receive the same *edition*, unlike *pointcast services*, where the *edition* sent out to the *media consumer* can depend on the *reading profile* or *context information* of the *media consumer*.

**Blog.** A blog is basically some kind of journal, log or series of *stories*, available on the web. Most blogs are open to the public or a *community* to read and to give comments or reactions.

**Broadcast.** Broadcast is a way to send data to a large group of people. Radio signals are a common example. Everybody within the range of the signals will receive the same data. It is possible to use broadcast to send *editions* of a *service* to all the *media consumers*, but *publishers* will need security like *Digital Rights Management (DRM)* to make sure that only the *subscribers* who have paid for the *service* are allowed to read it.

**Calendar.** The calendar is a tool used by a *news desk* to make a *planning*. Every *news desk* has its own calendar. The calendar of a certain *news desk* only contains information and *events* that are relevant within the strategy or scope of the *services* of the *news desk*. So it is not a global calendar with all *events* around the globe. The calendar contains two kinds of *events*: the *events* triggered or initiated by the *publisher* (like baby specials and extra *editions*) and the external *events* which happen without interference of the *publisher* (like sport *events* and earthquakes). The calendar gives the *news desk* an overview of all relevant *events* in the next hours or months. The *news desk* uses this information to make a *planning* for the *services*.

**Commercial (Static or Dynamic).** Commercials are made by or for *advertisers*. Commercials are typically an important source of income for the *publisher*. The

goal of the commercials is to convince the *media consumers* to buy the *advertisers* products or services. *Publishing systems* which support digital, *multi-media content* can offer commercials in different forms. The commercials can vary from static images and text without any possible interaction to very fancy and dynamic commercials that interact with the *media consumers*. Interaction requires a *consumer-to-publisher channel* if its one way communication or a *control channel* if there is a need for two way communication.

**Commercial in Progress.** A commercial in progress is a *commercial* which is in the progress of being developed, but which is not yet finished.

**Commercial Item.** Commercial items are specific *content items*. They are the building blocks of *commercials*. A commercial item is itself atomic and cannot be subdivided further. Every commercial item has a *media type* and *meta-data* associated with it.

**Commercial Verification Task.** A commercial verification task will perform several checks on *commercials*. Possible subtasks are to verify whether the *commercial* is actually submitted by the claimed *advertiser* or to verify whether the *commercial* is conform to the specification of the *reservation* for which the *commercial* is submitted.

**Community.** A community is the name for a group of people sharing a common interest. There is not one community, but there are many. Some *services* offered by *publisher* might extensively benefit from *input* and work from a community. Even today there are already complete *content* websites online, whose *stories* are almost fully written by people from a community. A *publisher* can perform the role of *moderator* in community written *stories*, hence ensuring quality and credibility.

**Consumer Device.** The consumer device is the device or equipment on which the *edition* of a *service* will be visualised. Possible examples are: GSM, desktop computer, PDA or foldable terminal. The different consumer devices can place different constraints on the *editions* in size or lay-out.

**Consumer-to-Publisher Channel.** The consumer-to-publisher channel is a logical communication channel representing a one way communication from the media consumer to the publisher. This channel can be used to send viewing or context information from the media consumer to the publisher, but can also be used to send queries for the archive or to access a blog.

**Content.** Content can be any form of media, singular or composed. Content can be either *input* from the *sources, publications* (finished or in progress) from the *publisher* or *atomic content items*. Content contains *meta-data*.

**Content Checking.** Content checking is the collection of any verification task that needs to be performed on content. Possible examples are: *source authentication, content verification, input selection, profile checking, privacy checking, usage rights checking* and *publication approval*.

**Content Item.** Content items are a special kind of *content* which are atomic. These content items are the building blocks for composed *content*, like *input* and *publications*. Content items have a *media type* associated with it.

**Content Management System (CMS).** The content management system is the collection of all *content* in possession of the *publisher*.

**Content Verification.** Content Verification is the task of check if the *content*, whether that be text, image or video, contains correct information. Of course the verification of a sound file is harder than the verification of text. This task might also include the verification of the *meta-data* attached to the *content*. For example for a photograph it might be needed to check whether the creation timestamp in the *meta-data* is correct.

**Context-Aware Service.** A *service* is context-aware if it is adapted to the *context information* that is available of the *media consumer*. This *context information* can include his location and situation. In order for the *publisher* to know *context information* about the *media consumer*, there is a need for a *consumer-to-publisher channel*. This channel can for example be used by the *consumer device* of the *media consumer* to send its GPS-coordinates (Global Positioning

System) to the *publisher*. The *publisher* can then use this information when building an *edition* for the *service*.

**Context Information.** Context Information is all kinds of information that describe the context of a *media consumer*. This context can include his location and situation. The context information can be used by *context-aware services*.

**Contribution.** A contribution is a specific term, used in *moderation*, for the *content* that *community* members submit for a certain *meeting place*. When a contribution is submitted, it is an *unmoderated contribution*. After it is checked by a *moderator* in a *moderation task*, it becomes a *moderated contribution*.

**Control Channel.** A control channel is a logic communication channel representing two way communication between the publisher and the media consumer. This channel can be used for synchronous communication, for instance when registering for a service or pulling an edition.

**Core Service.** A core service is a very general *packaged service* offered by the *publisher*. A core service offers *stories* and *commercials* on a wide variety of topics, unlike *group services* which address only specific topics like for example sports.

**Corporate News Desk.** See: *news desk*

**Customized Edition.** A customized edition is the result of combining all the *editions* of the *packaged services* where a *media consumer* is *subscribed* for. So, if a *media consumer* is *subscribed* for a *core service* and two *group services*, he can receive one customized edition, containing the three regular *editions* bundled together.

**Delivery.** The delivery of an *edition* consists of sending the *edition* on the *publisher-to-consumer channel* to the *media consumers* that are *subscribed* for it.

**Digital Rights Management (DRM).** DRM stands for Digital Rights Management and is an umbrella term for techniques allowing the owner or vendor of digital material, such as media, documents or applications, to restrict the distribution

and control the usage of this material by end-users. A possible use is the technological enforcement of copyrights.

**Domain Model.** A domain model is a software engineering concept and is part of the analysis phase. A domain model models the reality. It represents all the entities that are important for the system and the relationships between these entities.

**Edition.** An edition is an ordered and structured (lay-out) collection of *stories* and *commercials*. This collection is static and can be uniquely referenced. The ordering and structure is tailored to the *content*.

**Edition Building Task.** The edition building task is the process of assembling an *edition* for a certain *service* with the available created *stories* and *commercials*. This *edition* must be built in accordance to the *planning* of the *publisher* and the *advertising department*.

**Edition Planning.** See: *planning*

**Editor.** An editor is a member of the *service news desk* who is stationed in the publishing company. The editor has several *tasks*. One *task* is to build *stories* from already existing *content* and/or incoming *input* from the *sources* or *reporters*. Another *task* is to pro-actively search for new information on certain *story topics*, for example by contacting specialists. This is what we call *journalist research*.

**Editor-in-chief.** The editor-in-chief is the leader of a *service news desk*. He will be responsible for the long-term management of the *services* his *service news desk* is responsible for. He will further define the strategy of the *services*, constrained by the *publisher strategy* defined by the *corporate news desk*.

**Event.** An event is something that takes place at a given place and time. The occurrence of events or the *planning* of them can trigger the writing of *stories* about it. Possible events are a soccer cup or an accident.

**Feedback.** Feedback includes any information sent from the *media consumer* back to the *publisher*. Possible examples of feedback include: *viewing information*,

*context information*, comments on *stories*, orders triggered by *commercials* or crossword puzzle solutions.

**Finished Publication.** A finished publication is either a *story* or a *commercial* that is published in a certain *service*. The *archive* of all published *content* will contain only finished publications.

**First-editor.** The first-editors are members of a *service news desk* and are responsible for a specific section of *stories*. An example of a section where a first-editor may be responsible for is the sports section.

**Input.** The terms input or raw input are used to specify the *multi-media content* coming from the *sources*. Input can be verified by an *input verification task*. Verification is important to ensure quality and credibility.

**Input Selection.** Input selection is the process of defining which incoming *input* can be used and which *input* is duplicate or useless and can thus be thrown away.

**Input Trigger.** Incoming *input* will generate an input trigger to attract the attention of the *corporate news desk*. This *corporate news desk* will judge if the *input* will cause an *input triggered replanning*.

**Input Triggered Replanning.** Input triggered replanning happens when an *input trigger* influences the *planning* in such a way that it needs to be changed. An example can be when *input* arrives with the information of a very large accident. This can cause the *planning* to be adapted to allow more *stories* on that sudden *event*.

**Input Verification Task.** The input verification task is the process of performing several checks on *input*. This can be seen as a first line of checking *tasks*, performed on incoming *input*. The input verification task can consist out of several subtasks. Which subtasks are needed depends on the *source type* and the *media type* of the *input* that needs verification. Possible subtasks include *input selection*, *source authentication* and *content verification*.

**Journalist.** A journalist is very general term to identify persons that are covering news *events*, building *stories*, gathering information or planning *services* and *editions*.

**Journalist Research.** Journalist research is the process where a *journalist* is pro-actively trying to gather inside information and link different content to each other in the hope to get an exclusive story.

**Marketing.** Marketing includes everything that is involved with selling a product or service. From the perspective of a *publisher*, the marketing of its *advertisers* is mostly with *commercials*. Depending on the type of *service* in which the *commercials* appear, ranging from full *broadcast*, via *narrowcast* to *pointcast*, we can identify several types of marketing. **Mass Marketing:** *commercials* are sent to a very broad set of *media consumers* who does not necessarily share a common interest. **Group Marketing:** *commercials* are sent to groups of *media consumers* who share some common interest like for example sports.

**Individual Marketing:** based on the *reading profile* of the *media consumer*, very specific *commercials* can be sent to that *media consumer*. **Context-dependent Marketing:** *commercials* can be linked to *context information* of the *media consumer*, like his location or situation.

**Media Consumer.** The media consumer is the private or business consumer that can *subscribe* to a certain *service* from the *publisher*. He consumes the *content* in the sense that he can read, view or listen to the *multi-media services* he is *subscribed* to. The business consumer can ultimately edit and republish parts of the *stories* and *commercials* he received.

**Media Type.** The media type indicates the type of the *content*. Possible types are image, sound, video and text.

**Meeting Place.** A meeting place is a central point where *media consumers* can gather to read or write *contributions*. Such meeting places can be *moderated* by the *publisher*. Every meeting place has a *meeting place state*.

**Meeting Place State.** The meeting place state indicates whether the *meeting place* is open for *contributions*, is locked or closed.

**Meta-data.** Meta-data is any kind of extra information on something like *content* or *media consumers*. Meta-data can be attached to for example *content*. A very wide variety of meta-data is possible. The meta-data can be about the *content* itself, like a summary or the type of *content*. The meta-data can for example also be extra information added to the *content* by the *publisher* to be able to use *zoning* or to send *media consumers content* based on its *reading profile*.

**Moderated Contribution.** A moderated contribution is a *contribution* that passed the *moderation task*, performed by the *moderator* of the *meeting place*.

**Moderation (Service).** Moderation is the process of administering *meeting places* to ensure the *contributions* stay on topic and to block cursing if necessary. *Community* participation is growing very fast. The rise of *blogs* and forums prove this. Many people want to *contribute* or share information. The *publisher* can use this evolution as a *moderator* to get *media consumers* in contact with their *services*.

**Moderation Task.** The moderation task is performed by a *moderator* to ensure the correctness of the *meeting place*. The *moderator* will be able to block *contributions* if they are inappropriate. Another part of the moderation task can be to cross-reference the *contribution* with references to *stories* and *commercials* from the *archive*. This can be to convince the *media consumers* to read and optionally pay for those *publications*.

**Moderator.** The moderator is the administrator for one or more *meeting places*. He will judge on *contributions* in the *moderation task*. The moderator can also decide when to open, lock or close *meeting places*.

**Multi-Channel.** Multi-channel publishing means that the *publisher* will send his *publications* out on several *publisher-to-consumer channels* to optionally different *consumer devices*. While in the past, the *publishers* were focussed on one *publisher-to-consumer channel* and *consumer device*: the printed version of a newspaper, today and in the future multi-channel publishing will gain importance. Every *publisher-to-consumer channel* and *consumer device* can have its specific demands on size or readability.

**Multi-Media.** Multi-media means that the publisher can send all sorts of *content* to the *media consumers*, whether that be images, text, sound or video.

**Narrowcast.** While *broadcast* sends information to all people within the range of the *broadcast*, narrowcast sends information to only a subset of those people. This allows the publisher to contact *media consumers* with the same interest and allows the possibility of *group marketing*. When it is possible to contact every *media consumer* personally, it is called *pointcast*.

**News desk (Corporate or Service).** We have identified two kinds of news desks in a publishing company: a corporate news desk and a product news desk. A publishing company will most likely have one corporate news desk which will define the *publisher strategy* with a *cross-product* strategy. This corporate news desk will also do the dispatching of new *input* to the different service news desks and defines the strategy for publishing breaking news. A service news desk is responsible for one or more *services*. They will further define the *service strategy* and must make the concrete *planning* for the *services* to get the *editions* ready on time. Their *service planning* and *edition planning* are constrained by the *publisher strategy* and *service strategy*. A service news desk consists out of several employees: *editor-in-chief*, *first-editors*, *editors* and *reporters*.

**Packaged Service.** A packaged service is a *planned service* where *stories* and *commercials* are packaged in an *edition* and offered to *media consumers*.

**Page Planning.** The page planning defines how the lay-out and structure of a page of an edition will look like and with which content it will be filled.

**Planning.** The planning for the different *products* is mostly *pro-active*. First a **publisher strategy** is defined by the *corporate news desk*. This will include the business goals of the *publisher* and a coarse-grained strategy for publishing on multiple *services*. Next, the *service news desks* define the strategy for their *services*. When the strategies are defined, the concrete *service planning* and *edition planning* are worked out by the *service news desks*.

**Pointcast.** Pointcast is the opposite of *broadcast*. While with *broadcast* everyone within the reach can receive the data, with pointcast only one specific person,

the recipient can receive the data. The advantage of pointcast publishing is that the *editions* can be customized with the help of the *reading profile* and *context information* of the *media consumer*.

**Pointcast Service.** A pointcast service is a *packaged service* that will *deliver editions* tailored to the *media consumer*. This *edition* can be based on the *media consumers reading profile* (profile-based service) or on his *context information* (context-aware service).

**Privacy Checking.** Privacy checking is the *task* of verifying whether the publication of certain *content* will violate the privacy of any persons connected to the *content*.

**Pro-active publishing.** A *publishing system* is largely pro-active and partly *re-active*. The *publisher* cannot wait for *input* to come in from the *sources* and decide on that *input* how he is going to build his *editions*. The *service news desks* will rather pro-actively *plan* the *editions*. They send out *reporters* to investigate certain events and they will monitor the *calendar*. With that *planning* in mind, they check *input* from the *sources* to enrich their *stories*. If needed, because of some unanticipated event, there can be a need for replanning caused by new *input*.

**Profile-Based Service.** A profile-based service is a *pointcast service* where the *editions* that are sent to one *media consumer* depend on the *reading profile* of the *media consumer*. It is possible that all *media consumers* that are *subscribed* to the same profile-based service receive a different *edition*, since they can have a different *reading profile*.

**Profile Checking.** Profile checking is a checking *task* which goal is to verify whether the publication of certain *content* will be according to the profile and strategy of the *publisher* and/or the *services*. For example, gossip *stories* can be no problem for the profile of a tabloid, but can be unacceptable for a *publisher* that wants to *deliver* credible *stories*.

**Profiling.** Profiling means that the *publisher* tries to build a *reading profile* from the *viewing information* it receives from the *media consumer*. The *reading profile* can be used to build *editions* for a *profile-based service*.

**Publication.** A publication is content which the *publisher* has published or wants to publish in the future. A publication can be either a *finished publication* or in *publication in progress*. Publications are built from atomic elements, named *content items*.

**Publication Approval.** Publication Approval is the task of verifying whether a certain *publication* is allowed to be published at a certain point in time for a certain *service*. This is needed to check whether no *time constraints* are violated or that a *story* is not published on an inappropriate time or *service*.

**Publication Building Task.** The publication building task is the process of building *publications* from usable *content*. The *publication* will first be a *publication in progress* and become a *finished publication* when the publication building task is completed. During the publication building task several *publication building subtasks* can be performed.

**Publication Building Subtask.** Publication building subtasks can be any sort modification tasks one publications in progress. For example adding, removing or editing content.

**Publication Checking Task.** Publication checking tasks form the last line of verification *tasks* before the *publications* are published in an *edition*. The publication checking tasks are associated with an *edition building task* and can include all sorts of verification *tasks* like for example: *profile checking*, *usage rights checking*, *privacy checking* and *publication approval*.

**Publication In Progress.** A publication in progress is either a *story in progress* or a *commercial in progress* on which the *publisher* is working.

**Publishing System.** The publishing system is a general term for the whole of infrastructure and software used in by the *publisher* to support their *services*.

**Publisher.** The publisher is the company that offers *services* to *media consumers*.

**Publisher Strategy.** See: *planning*

**Publisher-to-Consumer Channel.** The publisher-to-consumer channel is a logical communication channel representing a one way communication from the publisher to the media consumer. This channel can be used by the publisher to send editions to the media consumer, but also to send billing information.

**Pull.** Pulling information means that someone deliberately asks for information. Pull is the opposite of *push*. A *media consumer* can pull his *edition*. The *publisher* can pull *input* from *sources*.

**Push.** Pushing information means that someone sends information to another party who didn't explicitly request the information. Push is the opposite of *pull*. The *publisher* can push an *edition* to the *media consumers*. The *sources* can push their *input* to the *publisher*.

**Quality Scenario.** Quality scenarios describe the non-functional requirements (like security and availability) of a system. They describe different situations which can happen in or on the system and define the expected behavior of the system. The functional requirements are described in *use cases*.

**Re-active publishing.** A *publishing system* is largely *pro-active* and partly re-active. The re-active part consists of viewing incoming *input* and the process of *input verification tasks*. When the *input* is verified and considered important for the upcoming *editions* of certain *services*, a replanning might be triggered.

**Reading Profile.** A reading profile represents the reading behaviour of a *media consumer* which is built from the *viewing information* that is received from the *media consumer*. This reading profile can be used by the *publisher* to offer the *media consumers profile-based services*.

**Reporter.** A reporter is a *journalist* that is on the road to cover certain *events* or to gain more information on the *events*. They send their *stories* or *content* to the *publishing system* where it can further be edited and published in an *edition*.

**Reservation.** A reservation is a form of contract between the *advertising department* and the *advertiser*. The contract states what *commercials* will be published in

what *services*. The reservation can have several constraints, like the size of the *commercial* or visibility (front page or centerfold).

**Reservation System.** The *advertising department* of the publishing company uses a reservation system. This means that an *advertiser* can make a *reservation* to publish a certain *commercial* in one or more *services* of the *publisher*.

**Service.** A service provides *media consumers* with *stories* and *commercials*. This can be either *pulled* by the *media consumer* or *pushed* by the *publisher*. We identify two types of services, namely *packaged services* and *unpackaged services*.

**Service News Desk.** See: *news desk*

**Service Planning.** See: *planning*

**Service Strategy.** See: *planning*

**Source.** Sources deliver *input* to the *publishing system*. Every source has a *source type*.

**Source Authentication.** Source authentication is a subtask of the *input verification task*. Its goal is to make sure that the *source* of the *input* is the actual origin of the *input*. This is needed to make sure that a malicious individual cannot send *input* to the *publisher* as if he were a trusted news agency.

**Source Type.** Every *source* has a source type indicating what kind of *source* it is. This source type can define the trust level of the *source* and have an influence on the strictness of the *input verification task* for *input* coming from that *source*.

**Stakeholder.** The stakeholders are all the parties which are directly or indirectly influenced by the *publishing system*.

**Story.** A story is a *finished publication* which can be incorporated in *editions*. A story is built from *story items* and can be a combination of *media types*. All *versions* of a story, for example a *version* for SMS and a *version* for an e-paper, are considered to be distinct stories. All these different *versions* are grouped in a *story folder*. All stories in the *story folder* report on a common *story subject*.

**Story In Progress.** A story in progress is an incomplete *story* that is not yet finished and cannot yet be used in an *edition*. Once the story in progress is finished, a *story* will be created.

**Story Item.** Story items are a special kind of *content items*, namely the atomic building blocks of a *story*. Story items cannot be divided further. A story item has one *media type*.

**Story Folder.** A story folder can be seen as a logical collection of all *stories* covering on a certain *story subject*. These different *stories* in the folder are in fact the different *versions* of the *story*. A story folder can be seen as *meta-data* of the *stories*.

**Story Subject.** The story subject is the common subject that all *stories* in the *story folder* are reporting on. This can be seen as *meta-data* for the *stories*.

**Subscriber.** A subscriber is a *media consumer* with a *subscription* for a certain *service*.

**Subscription.** A subscription is some form of contract between the *publisher* and the *media consumer* which states that the *media consumer* would like to receive consecutive *editions* of a *service* for a give period of time.

**Task.** A task is a piece of work assigned to an employee of the publishing company. There can be tasks for gathering *content*, modifying *content* or verifying *content*.

**Terminal.** A terminal is some kind of electronic device on which an electronic *edition* of a *service* can be viewed on. The device can so to speak be reused to view another page or part of the *edition*.

**Time Constraints.** Time constraints can indicate that a *story* must be published before a certain deadline or that it cannot be published after a certain embargo period has passed. These time constraints will be stored in the *meta-data* of the *content*.

**Time Zoning.** Time zoning is a special case of the general *zoning* concept and specifically maps *content* on *zoning rules* about time. These special *zoning rules*

define the *media consumers* behaviour on which content they want to read in various moments of time, ranging from fine grained to coarse grained: from zones in a day (like morning, noon and night), to weekdays, seasons and years. These zones can influence the *planning* and strategy of the *services*.

**Unmoderated Contribution.** An unmoderated contribution is a *contribution* that has not yet passed the *moderation task*, performed by the *moderator* of the *meeting places*.

**Unpackaged Service.** An unpackaged service offers a dynamic and on demand snapshot on a collection of *stories* and *commercials*. The ordering and structure is uniformly defined for that specific *service*.

**Usage Rights Checking.** Usage rights checking is the *task* of verifying whether the *publication* of certain *content* will not violate any usage rights. The *publisher* might not have the right to publish certain *content*.

**Use Case.** Use cases describe the functional requirements of a system. A use case is a scenario describing one sequence of actions started by an *actor* to reach a certain goal. The non-functional requirements are described in *quality scenarios*.

**Version.** During time, multiple versions of a *story* on a certain *story subject* can exist. There can be multiple versions because the *story* gets more mature during time, but there will also be multiple versions for the different *publisher-to-consumer channels* and/or *consumer devices*. Every version of a *story* is a *story* on itself. All these versions are bundled in a *story folder*.

**Viewing Information.** The viewing information of a certain *media consumer* could include which pages and *stories* the he has read and how long he has read them. This viewing information is sent from the *media consumer* to the *publisher* on the *consumer-to-publisher channel*. This information is used to build a *reading profile* of the *media consumer*.

**Working Set.** The working set is a dynamic view on the *content management system* and contains all the *content* which either are being created or being used to

create new *stories*. The working set can thus comprise both unfinished as finished content.

**Zoning.** Zoning is the process of mapping *content* with the help of its *meta-data* on the *zoning rules* that are applicable for a certain *edition*.

**Zoning Rules.** Zoning rules define a strategy, based in media consumer behaviour, that describes various publishing decisions, i.e. when, in which service and on which publisher-to-consumer channel or consumer device can certain content best be published.

(From Ibermatica, on context awareness):

<i>Content</i>	Digital item.
<i>Delivering</i>	The process of sending the selected multimedia content to the user terminal to be displayed.
<i>Stated Profile</i>	The stated or factual profile contains end-user information such as name, gender, address that is obtained from the end-user. This profile also can contain information derived from the transactional data. This is called also explicit profile.
<i>Terminal Capabilities</i>	Parameters that describe the capabilities of the device like browser type, language support, OS, screen size, colour support, graphic and audio capabilities, etc.
<i>Transactional Profile</i>	This profile contains behavioural information. It may contain historic information regarding last end-user selections. This is called also implicit or usage profile.
<i>User Profile</i>	A complete end-user profile has two parts: factual (stated profile) and behavioural (transactional profile).

## **Annex B References**

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