

## ForgetIT

### Concise Preservation by Combining Managed Forgetting and Contextualized Remembering

Grant Agreement No. 600826

#### Deliverable D9.2

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## Executive summary

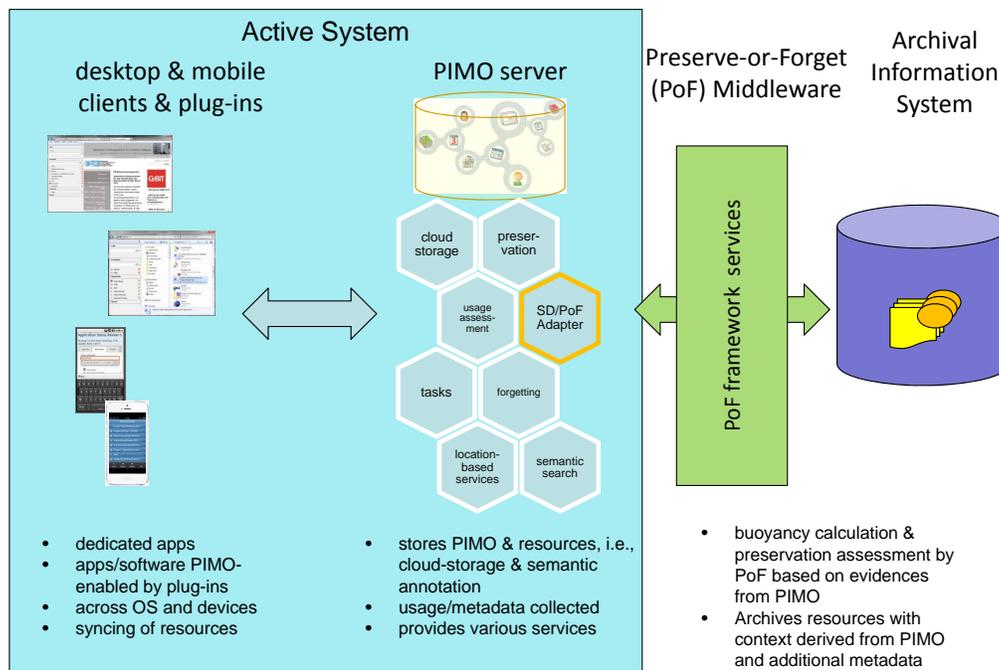
This deliverable describes selected use cases derived from the Personal Preservation scenarios presented in deliverable D9.1 [1] and presents mock-ups and prototypes addressing these use cases in ForgetIT.

The use cases derived from the Personal Preservation scenarios are listed and described in detail together with a prioritization to be addressed in ForgetIT. The mock-ups and prototypes are presented in detail in an accompanying presentation (see file named `ForgetIT_WP9_D9_2_Annex_Mockups.pdf`). The second part of this document provides an overview and description on these slides for the reader.

# 1 Introduction

This deliverable describes selected use cases derived from the Personal Preservation scenarios explained in deliverable D9.1 [1] and presents first mock-ups and prototypes addressing these use cases in ForgetIT.

Considering the approach ForgetIT takes for Personal Preservation, we can distinguish two groups of use cases: the ones which make use of the preserved material, the forgetting and the remembering, and the ones which contribute to actually enable the preservation and provide insights to allow assessment for triggering forgetting and remembering.



**Figure 1: Semantic Desktop infrastructure in the PoF architecture**

In order to give an impression of the setting in Personal Preservation, Figure 1 depicts the Semantic Desktop infrastructure as the Active System<sup>1</sup> in the Preserve-or-Forget (PoF) middleware architecture. It can be seen that the Semantic Desktop as Active System is a client/server architecture, where the server hosts the user's PIMO (Personal Information Model) and offers various services, among them, services from the Preserve-or-Forget-framework. The user connects to the PIMO on the desktop and on mobile devices.

<sup>1</sup>For the term *Active Systems* see also the overall architecture in Deliverable D8.1 where the PoF middleware interfaces with the Active Systems providing the resources to be preserved. In ForgetIT the Active Systems are the Semantic Desktop in WP9 and Typo3 in WP10.

The remainder of the document is organized as follows: First, we identify use cases from the application scenarios chosen in WP 9 Personal Preservation in Section 2 and then describe selected mock-ups and prototypes in Section 3 addressing Personal Preservation use cases in ForgetIT. The actual mock-ups and prototypes are presented in detail in a separate presentation accompanying this deliverable (see file named `ForgetIT_WP9_D9_2_Annex_Mockups.pdf`).

## 1.1 A remark on naming convention

In the Semantic Desktop area, the concepts in the mental model of the user are formally represented as instances of classes in the PIMO (Personal Information Model, for more details see [2]).

These instances are commonly referred to as ‘things’. Although calling them instances would be formally correct, we like to use the term ‘thing’ for these instances especially in Personal Preservation and throughout this document.

This naming convention is one step closer to an end-user when explaining that all their things are represented in the PIMO instead of talking about instances of classes. However, where required, we make the formal part more explicit.

## 2 Use Cases

In the following, we will revisit the application scenarios and sub-scenarios presented in D9.1 in order to identify use cases which shall be covered in the Personal Preservation work package.

The approach is as follows: First, we identify use cases of interest which occur in the scenarios in tables. As some of the use cases reoccur in different scenarios, we show new use cases in bold. In the second part, we list the use cases and give a short explanation, how we want to address them, and provide a prioritization for implementing in ForgetIT. The use cases (UC) are listed and described as follows:

**UC.<id>** <use case name> <short description>  
<use case explanation>  
Priority: {**high**, **medium**, **low**}

Furthermore, as we especially deal with preservation, forgetting, and remembering in ForgetIT, we focus on such use cases which contribute to these topics. Others, mainly motivated from our Semantic Desktop approach, are not specifically addressed if they are not contributing to one of these topics.

### 2.1 Use Cases derived from the ForgetIT approach

In this section we start with use cases derived from the general approach taken in ForgetIT, mainly addressing managed forgetting and synergetic preservation, because the main actor – in contrast to the application scenarios – is not the user. These use cases are listed first due to their importance and because their effects influence several other use cases from the application scenarios.

**UC.1 preserving resources** *The Semantic Desktop automatically preserves valuable resources.*

This is the first and main use case in ForgetIT. The main actors are the Semantic Desktop in cooperation with the Preserve-or-Forget (PoF) Framework. Usually the user is not directly involved as the synergetic preservation shall be done automatically based on a system internal assessment. If a resource is 'valuable' to be preserved it is identified by its *preservation value* (PV) which is described in deliverable D3.1 [3].

Based on evidences derived from the PIMO and usage of resources, as well as explicit statements from the user (e.g., indicating a picture as favourite or triggering preservation explicitly, see also separate use cases), an assessment for the PV is done in the PoF-framework. Exceeding some threshold for the PV, a preservation

trigger from the PoF is sent to the Semantic Desktop (as described in [4]<sup>2</sup>) to preserve a resource. In this case, the Semantic Desktop retrieves the resource and hands it over to the PoF preservation workflow.

Besides the aforementioned usage statistics, the preservation decision also takes into account a preservation policy (preservation value thresholds, i.e., what to preserve (in a spectrum of everything to only resources explicitly indicated), amount of space to consume, etc.). Depending on that policy the preservation value threshold is set.

*Priority: high*

**UC.2 forgetting resources** *The Semantic Desktop hides resources from the user similar to a human forgetting.*

In this use case the effect of forgetting in the Semantic Desktop is addressed. As described in [3], memory buoyancy (MB) is applied to indicate how important a resource for a user is. Again, this MB value is computed by the Forgettor component in the PoF-framework based on a variety of evidences delivered by the Semantic Desktop (see also [5]).

The effect of the MB in the Semantic Desktop is that users only ‘see’ those things which are active in the daily access situation, i.e., the MB gives a possibility to hide concepts and resources from the PIMO and only show those which the user deals with regularly (according to the MB value). Thus – similar to the human memory – those things which we dealt with recently or permanently are more likely to be on direct access in the human memory than details of a last year’s event.

The Semantic Desktop will use the MB value of resources in several escalation stages: First, to show or hide them when browsing or searching the PIMO according to specific thresholds. Nevertheless, resources have to stay retrievable and accessible if the user wishes to retrieve them anyway. Goal is to reduce the cognitive workload of seeing everything everytime on a casual access.

Second, depending the preservation policy chosen, resources might be condensed, i.e., the resources on direct access get condensed and the originals get preserved or even deleted.

Third, resources might get removed from a client computer and are only available from the PIMO server, or, depending on the preservation policy, only available from the archive.

*Priority: high*

**UC.3 a landmark concept represents a set of connected concepts** *The PIMO uses landmark concepts for condensing a set of connected concepts. The set of concepts can then be hidden, and the landmark is then the representative of the set.*

The Semantic Desktop will use *landmark concepts* (or *landmark* for short) to have a representative for a larger set of connected concepts. These concepts can then be hidden from the immediate view of the user, e.g., during casual browsing of the

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<sup>2</sup>in Section 4.2.1 Workflow 1: Basic Synergetic Preservation

PIMO, instead of just representing the landmark. This will also allow to identify PIMO concepts as landmarks to be shown on a top-down timeline view showing several years of the PIMO instead of crowding that view with all concepts.

Candidates for such landmarks would be life situations such as vacations or anniversaries, finished projects ('my PhD', 'Buying a house', 'EU Project Nepomuk'), or hype topics such as 'Year 2000 problem', 'iPhone 3', etc. Connected concepts and resources would get preserved and forgotten over time but if they were important then a landmark should survive.

*Priority: high*

It is important to note, that several use cases we will list in the following, contribute either to evidences for assessing the memory buoyancy and/or the preservation value. However, this occurs mainly because the user is interested in doing it, e.g., to collect information for a trip. If the system supports this, the user has a benefit from using the system. In turn, ForgetIT gets hold of the resources and various evidences for assessment. Furthermore, a smooth transitions between various states such as non-preserved/preserved or new/forgotten/remembered are possible.

## 2.2 Use Cases – Scenario Events

We start with investigating the scenario 'Events' (S.E) with its two sub-scenarios addressed in the following sections.

### 2.2.1 S.E.1 Trips

event	before	during	after	in X years
use cases	collect information	access information	organize photos	reminisce event
	tasks/checklist	take photos	add contextual information	
	schedule	take notes		
		share photos	share photos	

**Table 1: Selected use cases for S.E.1 Trips**

**UC.4 collect information** *The user shall be able to collect & organize information for an event, i.e., during a recherche. The resources range from webpages, emails, notes, and files.*

The Semantic Desktop (SD) provides various user interfaces which allow to collect information, e.g., by annotating webpages or emails with topics. First, the PIMO server will store and provide access to this information later on.

The usefulness of the resources varies over time (e.g., after an event, lots of these are not useful anymore because they are too detailed or not used). The SD infrastructure will provide evidences for the calculation of the memory buoyancy and preservation values for each resource. For the use case *collect information* and further UC mentioned below, usage statistics such as creating, modifying, viewing, or annotating resources are kept by the PIMO server.

*Priority: medium*

**UC.5 tasks/checklist** *The user can keep a list of tasks or a checklist with relation to the event.*

This UC serves several purposes. First, it is PIM (Personal Information Management) which we want to embed in the ForgetIT approach in order to get information and evidences from various sources.

Furthermore, tasks, checklist, and reminders are common and there is a multitude of relevant apps for smartphones. Therefore, second, we want to show how already existing efforts of users can contribute to the ForgetIT approach.

*Priority: medium*

**UC.6 schedule** *The user keeps a calendar with events.*

Again, this is a PIM UC, here calendars are the source for ForgetIT, e.g., contextualization by using the event as explanation. Providing evidences for resources if they are annotated with events, etc.

*Priority: medium*

**UC.7 access information** *During the event, the user accesses relevant information on mobile.*

This UC will show the effects of forgetting and remembering on mobile where it is assumed that relevant information is on direct access on the mobile. Furthermore, accessing the information during an event provides further evidences for preservation assessment.

*Priority: medium*

**UC.8 take photos** *The user takes photos.*

This UC covers the normal user behaviour of producing an amount of photos in varying quality, several redundant shots, e.g., of the same scenery, boring ones, and ones with high emotional value. Taking photos will happen with various devices: e.g., a camera with no additional sensors, a smartphone with sensors providing location, and a dedicated PIMO-enabled app that allows to combine further use cases such as annotate a photo or take notes.

*Priority: medium*

**UC.9 take notes** *The user takes notes.*

The note-taking is again part of PIM. Depending on user styles, note-taking happens if at all in varying depth ranging from some remarks up to full diaries. During an event, it again will provide evidences for preservation value and contextualization, especially if connected to a photo which shall also be possible.

*Priority: medium*

**UC.10 share photos** *The user shares photos with others.*

This covers the behaviour seen nowadays of sharing and commenting photos in social platforms such as Instagram. This will be a further source of evidence for the preservation value and for contextualization by using the comments.

*Priority: low*

**UC.11 organize photos** *The user will inspect and organize their photo collection.*

In this UC, we cover activities of users which keep a photo collection. Again, depending on user styles this ranges from just dumping photos on a hard disk (if at all) to organizing a collection using a dedicated photo app or even producing a print album. We will show that even without explicit effort, the ForgetIT approach already provides several services to users such as contextualizing photos, providing a quality assessment, automatically preserving photos, allow to easily remove bad quality photos from the hard disk, etc. A more detailed view on this UC is given in Section 2.3.1 with more detailed use cases.

*Priority: high*

**UC.12 add contextual information** *After the event, the user adds additional information with relation to the event.*

Such information can be contacts of persons met at the trip, web pages dealing with locations visited, etc. Again, depending on user types, this could also be arranging memories of a holidays trip or adding assembling a photo album. Such efforts can be used to support the preservation process.

*Priority: medium*

**UC.13 reminisce event** *After several years, the user reminisces an event.*

In this UC, the features of the ForgetIT approach will allow to find an event for reminiscing. Here, the managed forgetting combined with the condensation will provide an overview on the event with a subset of the pictures and contextual information. The user is able to dig deeper to retrieve certain information such as the hotel or the visit of a cozy pub. Depending on the time, the representation of the event differs in detail and in available photos on direct access on the user's machine as the managed forgetting approach will remove photos from the local machine. That means getting all photos would need a download from the PIMO server or even retrieving them from the archive.

*Priority: high*

## 2.2.2 S.E.2 Events

As trips are a special kind of events, we see that these use cases (with relevance to ForgetIT) are the same as identified for trips. In the next specific event, we get two more specific use cases for a recurring event.

**UC.14 reuse details from last event** *The user wants to recall booking details to reuse for this year's event.*

event	before	during	after	in X years
use cases	collect information	access information	organize photos	reminisce
	tasks/checklist	take photos	add contextual information	
	schedule	share photos		

**Table 2: Selected use cases for S.E.2 Events**

event	before	during	after	in X years
use cases	<b>reminisce last year's Fringe</b>	access information	organize photos	reminisce
	<b>reuse details from last event</b>	take photos	add contextual information	
	tasks/checklist		share photos	
	schedule			

**Table 3: Selected use cases for S.E.2.2 Taking part in an event, e.g., Fringe Festival**

This UC complements the one before to show ForgetIT's approach: Here, the user wants to see details which were not shown before as they clutter the view. The challenge here is to allow the user to access this information w/o showing everything in the first place as would happen if the user did nothing to the material of last year's fringe. Here, approaches such as forgetting, remembering, and preservation will come into play.

*Priority: medium*

## 2.3 Use Cases – Scenario Reminiscence

### 2.3.1 S.R.1 Organizing family photos

This sub-scenario specifically takes care of a use case already identified above, i.e., *organizing photos*. 'Organizing family photos' is a sub-scenario where personal preservation can be explained and shown to users. Therefore, we want to divide it further as listed in Table 4.

organize photos	now	in X years
use cases	<b>annotate photos</b>	<b>view a photo collection in the archive</b>
	<b>evaluate photos</b>	delete photos
	<b>delete photos</b>	<b>retrieve a specific photo</b>
		<b>reminisce based on a photo</b>

**Table 4: Selected use cases from S.R.1 Organizing family photos**

**UC.15 annotate photos** *The user adds tags and descriptions to photos, organizes them together as events.*

Various photo tools or web-services (such as Flickr) allow to annotate photos with keywords, locations, persons, textual descriptions, etc. Using the PIMO, we will foster this with apps that allow to use the PIMO as tag vocabulary, the collected information as context such as the web page of the hotel, offering textual descriptions which are not lost in the photo collection. Personal Preservation will use PoF services to propose concepts based on the picture's content, scenery, or persons.

*Priority: high*

**UC.16 evaluate photos** *The user evaluates the quality and content of the photos.*

Not every photo is a good shot, especially with the of availability of smartphone cameras, their ease of use and availability of space. ForgetIT will support them in this evaluation by a quality assessment of their photo collections. Although direct user support is given, this already contributes to the preservation phase to get an explicit feedback from the user for good quality photos, identify a proxy for a set of same scene photos, or identifying the bad quality photo where the user likes the content, etc. Personal Preservation will use the PoF services for image quality assessment.

*Priority: medium*

**UC.17 delete photos** *The user deletes unwanted photos.*

After evaluation, the user also might want to delete photos. Different variants of deleting shall be considered: deleting with keeping a preserved version vs. deleting a photo w/o keeping any backup somewhere, e.g., the archive. This could be due to privacy reasons or the photo is really 'crap'.

*Priority: high*

**UC.18 view a photo collection in the archive** *The user wants to see a photo collection in the archive to get an overview before accessing single photos.*

In this UC, the user wants to access archived photo collections in the archive w/o restoring them in order to get an overview to select a specific photo. Therefore, a UI in the archive will provide a tile consisting of many reduced-size thumbnail photos. The thumbnails are used to select specific photos to be extracted in full-size. The tile is produced by an image processing storlet.

*Priority: medium*

**UC.19 retrieve a specific photo** *The user wants to retrieve a specific photo.*

This situation could occur, if the user was asked to provide a certain photo by a relative or similar. The retrieval involves actually identifying the photo and then accessing it. In ForgetIT, different possibilities of searching and retrieving a photo can occur, depending on its stage in the forgetting and preservation process. We will consider search & retrieval using the PIMO as well as only using the archive. Involving the archive allows to use specialized storlets: the user will be able to select photos by specifying features provided by the image feature extraction storlet.

*Priority: high*

**UC.20 reminisce based on a photo** *The user starts to reminisce based on a photo.*

This UC complements the retrieval of a photo as the user then wants to reminisce the situation when the photo was taken. This will show the features of contextual remembering using the PIMO as well as the preserved information in the archive only.

*Priority: high*

**2.3.2 S.R.2 Archiving family photos**

In previous use cases, the photos were taken by the users themselves. In this use case, we want to specifically address the situation that a user gets a photo collection from a relative and is supposed to archive it for the family.

archiving family photos	now	in X years
use cases	<b>import photos</b>	covered by S.P.3
	<b>preserve situation</b>	
	add contextual information	
	<b>decide for preservation</b>	

**Table 5: Selected use cases from S.R.2 Archiving family photos**

**UC.21 import photos** *The user introduces new photos to their collection.*

In this UC, we expect photos without metadata such as location or date taken which will occur, if the photos were generated from scanning paper photos. It is not intended to support the scanning process, we want to focus on the tasks of preserving the photos

*Priority: high*

**UC.22 preserve situation** *The user preserves the situation for later generations.*

In this UC, possibilities of adding contextual information to such a photo set are provided such as allowing to write a text, adding locations, dates, or depicted persons to the photos or even adding further details from external sources.

*Priority: high*

**UC.23 decide for preservation** *The user explicitly decides to preserve a set of photos.*

Here, the user explicitly wants to preserve a set of photos. This user triggered preservation should also be possible and complement the synergetic preservation of ForgetIT.

*Priority: high*

Reminisce a person	now
use cases	<b>browse a person</b>
	<b>timeline view</b>
	<b>view a condensed resource</b>
	<b>investigate details</b>
	<b>access locally unavailable material</b>
	<b>restore material from archive</b>
	<b>discard restored material again</b>
	<b>contribute new information to archive</b>

**Table 6: Selected use cases from S.R.3 Telling the children about their grandmother**

### 2.3.3 S.R.3 Telling the children about their grandmother

**UC.24 browse a person** *The user browses a person's connections in the PIMO.*

In order to reminisce a person, the user browses the PIMO starting from the person and visits various resources such as photos. According to the ForgetIT approach, effects of forgetting and remembering will be seen, i.e., there will be condensed information and not all details will be seen, further information can be retrieved to remember, e.g., events the person was attending. The next use cases will detail further possibilities.

*Priority: high*

**UC.25 view a condensed resource** *The user inspects a resource which was already condensed.*

The user views a resource which was condensed before. The UI has to indicate this fact and – if still possible – allow to retrieve the original version(s).

*Priority: high*

**UC.26 timeline view** *The user wants to see a timeline with things (i.e., events or life situations) with relation to the person.*

In order to get an overview, a timeline shall offer the user a way to see the landmarks in the PIMO related to the person. Such landmarks can be either prominent events such as a wedding or anniversary or identified by algorithms to be important PIMO things and related to the person in question<sup>3</sup>.

*Priority: high*

**UC.27 investigate details** *The user will investigate, e.g., an event in more detail, there-*

<sup>3</sup>Why this restriction to 'personal importance' in the PIMO? The ForgetIT approaches will collect and evaluate the user's interaction with things and resources as well as the preservation value of things with respect to the user's view. That means, that the view of a different person's life in the PIMO is a subjective view of the PIMO's owner. Although a view from the other person's point of view would be tempting, this goes beyond the actual goal in ForgetIT of personal preservation, forgetting, and remembering.

*fore will retrieve details.*

The managed forgetting will lead to things which cover or represent a set of information objects which were either condensed or already forgotten.

For instance, a vacation consisting of 1000 photos (such as the Costa Rica vacation 2013 in the Stainer data set) will be condensed in several years on the user's computer to only - say 25 photos representing that event. Furthermore, material such as several pages of diary entries might be condensed to one or moved to the archive, details such as booking emails or bus timetables would be deleted.

Seeing the event by the condensed overview and material still available, the user now wants to reminisce the event in more depth, starting to investigate details. This would mean, the UI has to provide a view to show material still available in the various stages of the preservation process and provide the possibility to access them if wished.

*Priority: medium*

**UC.28 access locally unavailable material** *The user accesses forgotten resources which were removed from the local computer.*

The first escalation step in forgetting resources is to hide the PIMO thing<sup>4</sup> from the user.

For instance, each photo of the Costa Rica vacation has a thing (i.e., a semantic representation stating that the file is an instance of the class `pimo:Image`, belonging to the *Costa Rica vacation 2013* which in turn is an instance of the class `pimo:Vacation`. Furthermore, the photo might have further annotations such as topics, persons, or a text. Now, if the PoF decides to forget the photo (i.e., its memory buoyancy (MB) drops under a certain threshold), first, the thing will be hidden from immediate view of the user (i.e., browsing the vacation will not show the photo directly).

Second, after a further drop of the MB, the file is removed from the computer, but is still available on the server or at least in the archive (also depending on the preservation policy selected). Now, in that situation, the user wants to access the photo again, that would mean, the Semantic Desktop infrastructure needs to retrieve the photo for the user.

*Priority: high*

**UC.29 restore material from archive** *The user accesses material already moved to the archive.*

The user has identified a resource such as a photo which was preserved and now is available only from the archive. This use case addressed the interaction of the user and the UI of retrieving such a resource from the archive. The user needs to know that a resource is preserved and available from the archive. The UI has to provide the means to retrieve and restore the resource on the local computer providing also the contextual information stored in the archive. The resource has to be updated in

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<sup>4</sup> *Thing* is a technical term from the PIMO, which denotes an instance in the PIMO.

the PIMO, e.g., as being available locally.

*Priority: high*

**UC.30 discard restored material again** *The user decides that the restored material is not required locally anymore and discards all or parts of it.*

This UC complements the one before: the user restored material from the archive and after inspection decides to discard all or parts of it again. This is maybe due the user checking if required material is available, or the archiving is working well, etc. The restore process in the UI should give the user the possibility to select the resources to discard.

*Priority: medium*

**UC.31 contribute new information to archive** *The user adds new information to an already preserved information object.*

After having restored a resource from the archive, the user adds new information to the resource such as new annotations or a textual description which then requires to update the archived resource. This use case shall provide the user such a possibility and will show how an update in the archive is possible.

*Priority: medium*

## 2.4 Use Cases – Scenario Preservation

In the previous scenarios we already identified several use cases which deal directly with preservation issues such as restoring from the archive or updating the archive. The sub-scenarios addressed here are specifically motivated from the preservation perspective.

### 2.4.1 S.P.1 Disaster with family PC

This sub-scenario addresses the benefits of the preservation in a short-term view, i.e., how it contributes to restore valuable data preserved in the archive.

disaster	after
use cases	<b>search &amp; access archive</b>
	<b>restore environment</b>
	<b>restore Semantic Desktop</b>
	<b>restore from archive</b>
	<b>view resource in archive</b>

**Table 7: Selected use cases from S.P.1 Disaster with family PC**

**UC.32 search & access archive** *After the disaster, the user wants to access preserved material in the archive.*

In this use case a dedicated web-based access to the archive is required where the user is able to search and access material preserved in the archive. Here, we address especially the case that the user's computers are lost and last resort is a web-based access to the archive.

**UC.33 restore environment** *The user wants to regain access to the PIMO on a new computer.*

The Semantic Desktop infrastructure is a client/server-based architecture and connected to an archive. In the case of a disaster at home, the client-side will be lost, the server-side with the PIMO and the stored resources in the cloud is still available. The user will eventually have a computer back again and wants to restore the Semantic Desktop environment and connect to the archive again.

**UC.34 restore Semantic Desktop** *The user wants to restore all material on their desktop computer with connection to the semantic Desktop.*

After setting up the environment, the user decides to restore all material connected to the PIMO in the setting as it was before the disaster. The Semantic Desktop infrastructure would restore the resources on the user's computer which were not forgotten.

**UC.35 restore from archive** *The user wants to get back material from the archive w/o requiring the Semantic Desktop.*

A previous use case already addressed to restore material from the archive with the help of the PIMO. In this use case, we want to address the possibility of a full restore of all archived material (resp. selecting the ones to restore) as a service for the user to regain access to archived material and this without the need to have the PIMO. Naturally, this will be a reduction in benefit, but will regain access to all resources even if the Semantic Desktop service wouldn't be available anymore. The user needs to get an overview on the archived data to be able to decide what to restore on the computer. Furthermore, there might be data which is not viewable anymore on the user's machine, this needs then to be handled by the archive to give the user access.

**UC.36 view resource in archive** *The user wants to access a resource where no possibility to view it on the local machine exists anymore. The archive will provide this access.*

In this use case we assume that the user does not have the possibilities anymore to open or view certain material because the required application program does not run on the current operating system anymore. To overcome this, the archive offers virtual appliances which will provide access to the preserved resources by a virtual machine equipped with the resources and the required software to render the resource.

change archive service provider	now
use cases	<b>archive migration</b>
	restore from archive
	decide for preservation

**Table 8: Selected use cases from S.P.2 The Stainers want to change the archive service provider**

## 2.4.2 S.P.2 The Stainers want to change the archive service provider

**UC.37 archive migration** *The user wants to migrate their archive content to a new provider.*

This use case points out that it should be possible to migrate ones archive from one provider to another. This could be realized in exporting the archive and allowing to import such an exported set.

*Priority: low*

## 2.4.3 S.P.3 Peter's children remember Peter after his death

reminisce	now
use cases	<b>reminisce using the PIMO</b>
	access locally unavailable material
	search archive
	<b>death of a user</b>

**Table 9: Selected use cases from S.P.3 Peter's children remember Peter after his death**

**UC.38 reminisce using the PIMO** *A user wants to reminisce using the PIMO.*

This use case addresses the possibility to use the PIMO to reminisce. Two scenarios can be seen here: reminisce by the user themselves, or by close relatives which have full access to the PIMO (as in the case of Peter's wife).

The challenge is to provide a UI which allows to explore such a PIMO with content of several years resp. decades, e.g., allow to explore Peter's life (i.e., events and prominent PIMO concepts). This can be achieved by a timeline view with landmarks and allowing to browse and dig deeper if wished. Part of these are already covered by other use cases such as *retrieving details* or *accessing forgotten material*.

*Priority: medium*

**UC.39 death of a user** *The PIMO owner has died. Apply a policy to handle the PIMO & the archive after the user's death.*

This use case is dedicated to deal with the legacy of a user. ForgetIT has to provide a policy on how to handle a user's archive after death such as handing over to a dedicated user (e.g., the Peter's wife Jane in our example).

*Priority: medium*

## 2.5 Use Cases – Scenarios Noise & Interest

The following use cases cover activities of users from other areas of their life such as short term activities or interests.

hobby	now	in X years
use cases	collect information	reminisce
	take notes	timeline view
	annotate	
	share photos	

**Table 10: Selected use cases for S.I.1 Hobby**

noise	now	some time after
use cases	<b>purchase decision</b>	<b>cleanup</b>

**Table 11: Selected use cases from S.N Noise**

**UC.40 purchase decision** *The user looks in the internet for making a purchase decision.*

This is a use case providing noise for the PIMO, i.e., annotations of webpages, downloaded material, etc. which is only of short-term interest of the user. The use case involves other use cases such as collect information, but we want to stress here the short-term importance.

*Priority: low*

**UC.41 cleanup material**

After some time of the purchase decision, users either tend to cleanup and throw away material collected during such activities or let their information space clutter, e.g., with the material in the download folder. In this use case, we want to show how the ForgetIT approach will deal with such material, i.e., with the help of forgetting, condensation, and ultimately also deleting.

*Priority: low*

## 3 Mock-ups

In the following, we will present mock-ups and prototypes in different stages of development in order to address use cases of Personal Preservation.

The mock-ups and prototypes are explained in a separate presentation accompanying this deliverable (file named `ForgetIT_WP9_D9_2_Annex_Mockups.pdf`), showing step-by-step storylines. To give an overview for the reader on the different parts of that presentation, the remainder of this document will shortly introduce the motivation for the mock-ups and give some details where applicable.

We will explain mock-ups along the Stainer data set and scenarios presented in deliverable D9.1 [1]. Where applicable, especially due to better availability of real-life data, we will refer to the PIMO deployed in the DFKI knowledge management department.

### 3.1 Preservation

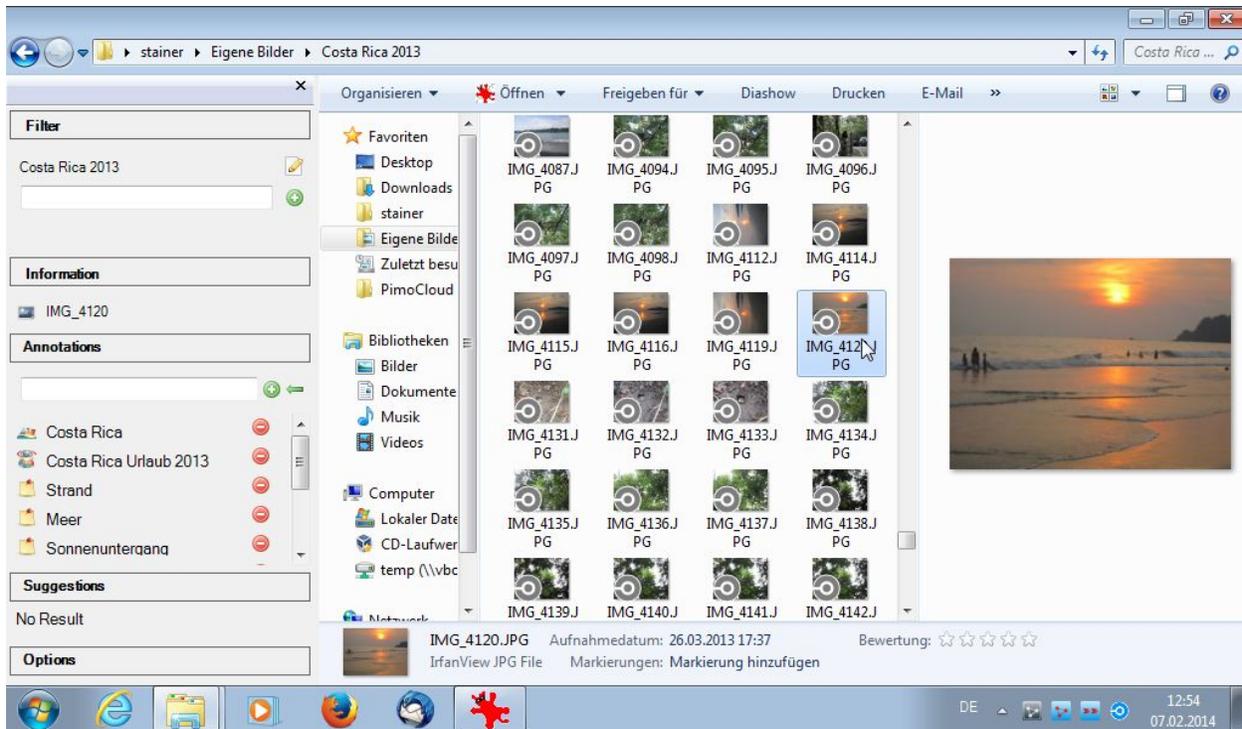
The first solution allows to preserve files if either the PoF-framework decides to do so or preservation is triggered manually by the user. The mock-up shows this preservation embedded in the file system of the user, supported by the PIMO, allowing to easily connect a user's files to the PoF-framework's preservation process.

As preservation is ideally done in the background, users will not be aware of this, hence, the functionality can't be shown easily. Therefore, the first mock-up shows how users are enabled to easily preserve their files with one click (i.e., manually triggering preservation) and by showing this, introduce and explain the PIMO supported cloud storage 'PIMO-Cloud' (see Figure 2). Furthermore, with the use of the PIMO, it can be seen that there is additional information to a file with the use of the PIMO which will be contributed as metadata for the preservation process.

#### 3.1.1 Some details on the prototype solution for ForgetIT

The mock-up is based on a solution integrated in MS Windows as part of the MS Windows File Explorer sidebar, called the SemanticFileExplorer (SFE) which was brought into ForgetIT [6]. The SFE allows to easily annotate files on the user's desktop with concepts from the PIMO (see Figure 2). As soon as a file is annotated it is created in the PIMO – we call this 'rebirthed' as a 'thing' – i.e., an instance of a PIMO type 'Document' (resp. 'Image') is created and a pointer to the file is added to the instance (the so-called grounding occurrence). Users are able to annotate the file with various other concepts from the PIMO such as instances of events or persons.

The integration of the PIMOCloud service provides a cloud storage for files, syncing, versioning, and sharing extended with the PIMO. This allows an access to all files of the



**Figure 2: PIMO embedded in Windows File Explorer and Cloud Annotation status. Annotations of the image are shown in the sidebar. The blue round icon in the Windows Tray shows the running PIMOCloud service.**

user on all connected devices using the PIMO. This resembles basic functionality of cloud storage services such as DropBox or Google Drive. However, usage of the PIMOCloud service is not mandatory, the choice is up to the user to use SFE functionality of annotating files only, but not syncing with the PIMOCloud.

Technically, the PIMOCloud has an option to allow to upload all annotated files, i.e., as soon as a file is annotated (wherever this may happen, e.g., in a photo organization software such as PIMORE in Section 3.3) the file would be uploaded to the PIMOCloud. Furthermore, the user can add several dedicated folders: whitelist folders (rebirth and upload every file which is located there, even w/o annotation by the user; this resembles a well-known cloud storage functionality of DropBox) or blacklist folders (files there never being uploaded).

It is important to note that this solution enables a preservation of all user files which are known to the PIMO either because they are annotated or reside in a dedicated folder (to resemble a DropBox-like cloud sync behavior w/o requiring the user to actually annotate the file).

This service also recognizes changes of files such as rename, moving, deleting, content changes. The respective action is then triggered such as changing the path to the file in the PIMO if the file is moved into a differed folder on the computer.

Users will be able to access files in the PIMOCloud from various devices, providing benefit

for PIM as well as ease of use.

## 3.2 Forgetting

In this section we address forgetting functionality in the PIMO and remembering resp. restoring forgotten resources.

### 3.2.1 Forgetting in the file system

With the help of the solution presented in the previous section, the forgetting functionality is embedded in the operating system. Now it is possible that files can be removed from the computer if the PoF-framework decides to do so. Depending on the user policy chosen, either the user will be informed of files to be removed or this will happen automatically in the background.

The slides show along the example of the Stainer's Costa Rica vacation the forgetting of two files (bus travel information) which were relevant during the trip but afterwards were never accessed again. Therefore, their memory buoyancy drops below the threshold of keeping the files on the user's computer (see Figure 3). The slides show a manual request of triggering the forgetting process on the computer and the subsequent removal of the files.

Although the files are forgotten, their instances (or things) in the PIMO, i.e., their semantic representation of the files in the PIMO is still there. However, due to the low memory buoyancy it will not show up in normal browsing (i.e., the user will not stumble upon it easily; see also Section 3.2.3). At what time such things shall be removed from the PIMO, is subject of the user's policy of trashing things as well as condensing things into a landmark such as the Costa Rica trip.

The next section addresses how to restore the files anyway.

### 3.2.2 Restoring forgotten resources

The next part of the slides shows how the user is able to find, inspect, and restore once forgotten files. The starting point is some time after the bus travel information from the previous section was forgotten.

Assume the user somehow recalls there was some information on bus travel during a trip and now wants to access it. By using PIMO's associative search, the user is able to retrieve the forgotten things. The user is then able to inspect the thing (i.e., the semantic representation of the file) and, finally, decides to restore it on the local computer.

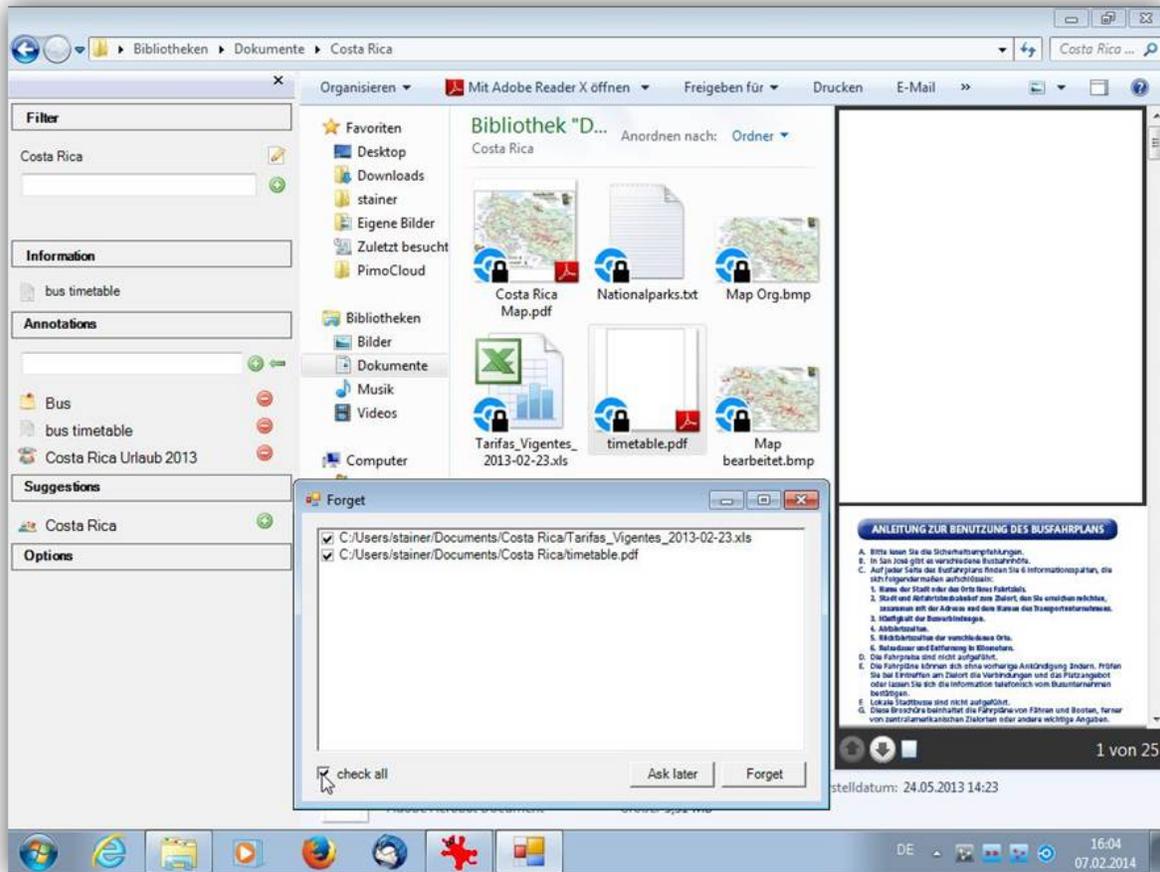
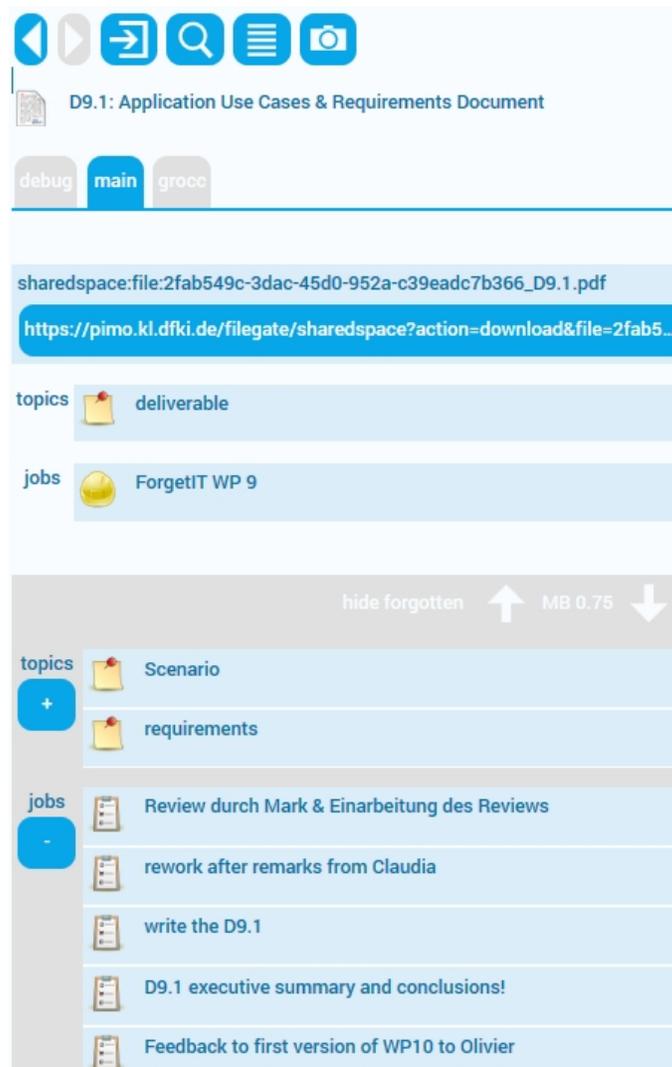


Figure 3: The PoF-framework has decided to forget two files on the user’s computer. A dialog shows the user which ones and allows modification of the list before the forgetting is executed.

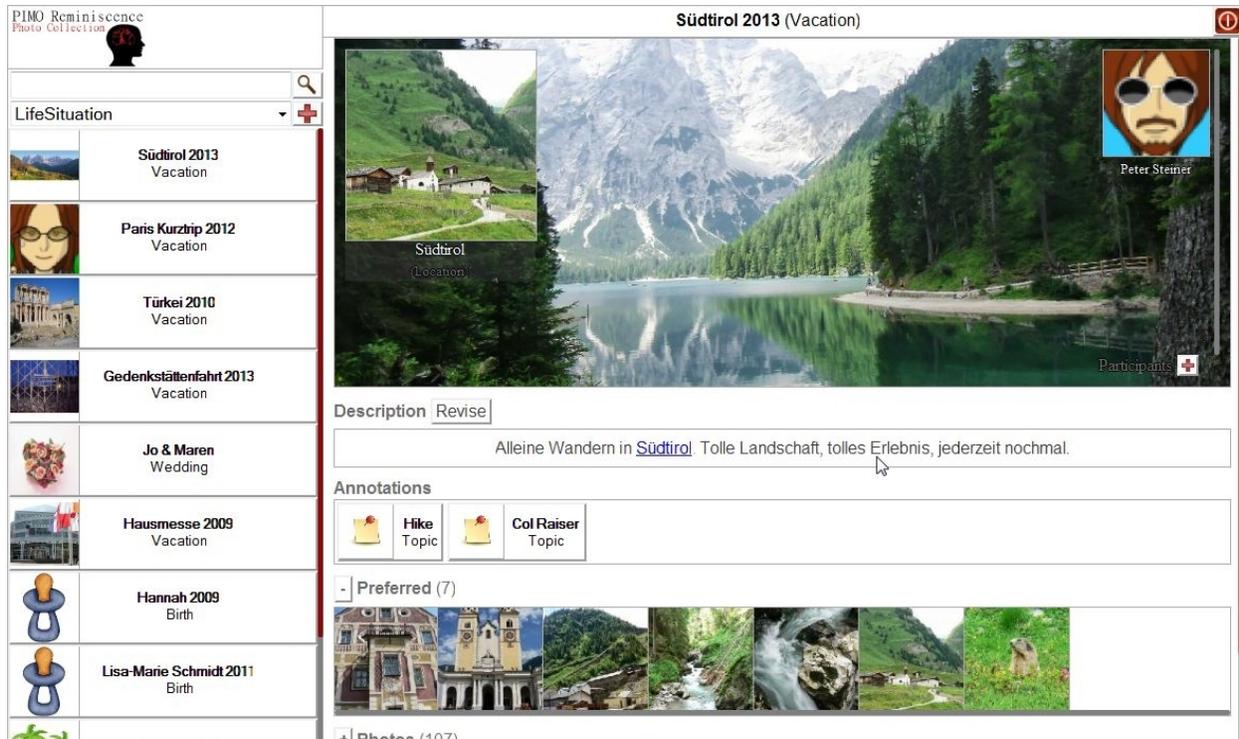


**Figure 4: The PIMO GUI (a HTML5 client) shows a view on deliverable D9.1 with expanded ‘show forgotten’ (the grey part only visible on explicit request).**

### 3.2.3 Forgetting in the PIMO GUI

The next part shows how the memory buoyancy can be used in the PIMO GUI by hiding things with low memory buoyancy when browsing the PIMO (see Figure 4).

The example shows browsing the PIMO with different MB thresholds (i.e., things with MB above the threshold are shown) and how to show the forgotten things. This hiding feature will be applied throughout the whole PIMO, i.e., also when searching.



**Figure 5: The Stainer family’s photos organized in PIMORE: a condensed view on the hiking tour of Peter to South Tirol.**

### 3.3 Reminiscence with photos

The next part focuses on a specific application as part of the PIMO infrastructure (referred to as ‘special purpose application’) with a dedicated purpose: organizing a user’s photo collection.

As we see from the first user survey in D9.1, users would appreciate support in organizing their photos. As there are various photo organization software on the market, we believe embedding such a software in the PoF framework will also show how user efforts can be used for the project goals.

The mock-up presented in the slides is a photo organization application named PIMORE (*PIMO Reminiscence*, see Figure5). PIMORE makes use of and contributes to the PIMO, and in doing so, delivers evidences for ForgetIT’s project goals of supporting preserving, forgetting, and remembering.

The design goal for the mock-up is to provide the user with an application which could be part of his normal personal information management for the family. If such a software would take part in the PoF framework, evidences can be derived which contribute to ForgetIT’s goals without much effort required by the user.

The challenge such an application faces is how to motivate people to use and contribute information when organizing photos. The approach taken in PIMORE is first to provide

a better experience than organizing photos simply by naming folders (or even keeping them on the camera). The PIMO supports in organizing photos by providing the user's mental model as well as details to activities and events (such as a trip). Furthermore, by using the mental model represented in the PIMO, we reduce effort for the user both on organizing photos as well as reusing the mental model constructed while organizing photos.

Photo organization software for home users such as Apple's iPhoto<sup>5</sup> already provides easy organization by events (actually just a set of photos with a label), geo-location, and persons (via face detection). PIMORE extends this by providing life situations such as birth, wedding, or travel, each with a different view on such an event, tagging with PIMO concepts and resources, (semantically interpreted) texts, condensation of events, quality assessment of photos etc.

The mock-up shows how to motivate users to give some details on life situations by providing photo album-like design possibilities such as cover pages for life situation. The resulting life situation with its photos is embedded in the PIMO, thus, services will be possible such as preserving, forgetting, reminiscence, PIMOCLOUD and mobile access, contextualizing and condensation, or associative retrieval of photos via PIMO's search.

### 3.4 PIM for ForgetIT

The open nature of the Semantic Desktop infrastructure – i.e., providing access and semantic services on the user's PIMO (Personal Information Model, see also D9.1 [1], Section 2.1.2) but leaving the actual usage in plug-ins or special purpose apps open to developers – allows a multitude of special purpose applications or plug-ins to be developed.

Therefore, the last part of the mock-up slides provides an overview on the current Semantic Desktop infrastructure supporting Personal Information Management embedded in the PIMO such as tagging in the email client (see Figure6). Several of these applications and plug-ins were already part of the Semantic Desktop infrastructure which were brought into the ForgetIT project (see [6]).

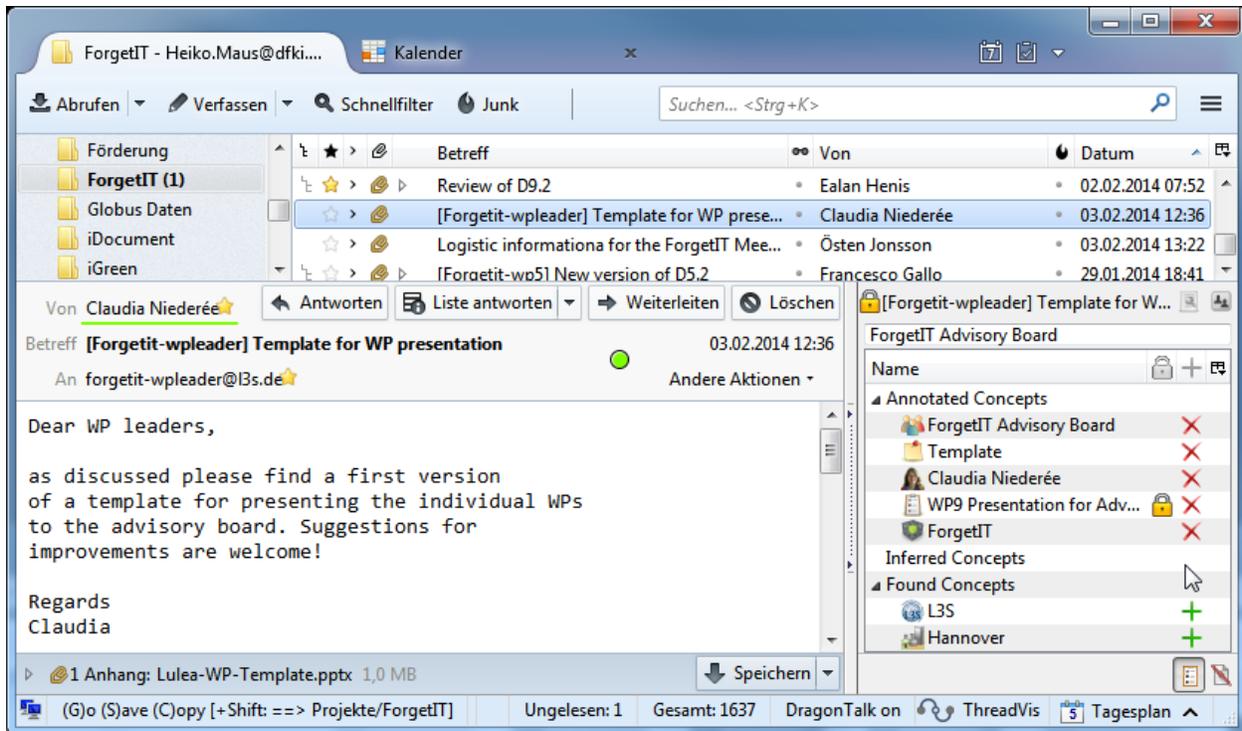
The multitude of applications and plug-ins provide on the one hand support for the users in every day life, and thus, in various scenarios identified for WP9. On the other hand, the resources, concepts, and the interaction with them provide both evidences for services in the Preserve-or-Forget framework such as memory buoyancy or preservation value calculation as well as reduction of effort for actually preserving resources if this is embedded and supported by PIM applications.

The presented infrastructure consists of

**annotation support** Annotation resp. tagging of various resources with one vocabulary (the PIMO) embedded in standard applications: web browser and email client (with

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<sup>5</sup><http://www.apple.com/mac/iphoto/>



**Figure 6: PIM with PIMO: FireTag an add-on for Mozilla Thunderbird embedding the PIMO into the email client.**

the add-on FireTag for Mozilla Firefox and Thunderbird; also MS Internet Explorer), file system (SemanticFileExplorer for Windows), and annotation embedded in special purpose apps such as PIMORE.

**task management** Tasks, reminders, due dates, notes, resources etc. are managed with FireTasks (for mobile and desktop).

**file organization** With the SemanticFileExplorer it is possible to annotate, access, filter, and find files using the PIMO. With PIMOCLOUD this is extended to cloud storage with file synchronisation across different devices, versioning, and sharing.

**calendar** The Semantic Desktop offers a CalDAV<sup>6</sup> endpoint, thus allowing to manage events and reminders within the PIMO. Using this, events are part of the PIMO, can be annotated and delivered to calendar software and devices supporting CalDAV such as Mozilla Thunderbird (with Lightning calendar) or the iPhone.

**contacts** The Semantic Desktop offers a CardDAV<sup>7</sup> endpoint, thus allowing to access and exchange contacts in the PIMO, i.e., persons in the PIMO will be available via CardDAV resp. the Semantic Desktop can extract contact information from address books supporting CardDAV.

<sup>6</sup>CalDAV is a standard internet protocol for accessing scheduling information on a server.

<sup>7</sup>CardDAV is a standard internet protocol for accessing address book information on a server.

**writing** Taking notes, writing descriptive texts or whole documents will be supported by a semantic text editor (seed, result of WP4 [7], embedded in the PIMO)

The mock-up slides show those applications which were not yet addressed in the previous sections.

## 4 Conclusion

This deliverable presented use cases to be considered for Personal Preservation in WP9. The use cases address daily life situations as well as interaction with services the Preserve-or-Forget-framework will provide such as accessing the archive. With this set of use cases, the interaction and benefits of the ForgetIT approach will be shown.

The mock-ups and prototypes presented in this deliverable show the idea on how services of the PoF-framework are reflected in the user's every day applications. Here, we see differences in embedding services within standard applications such as email clients or the file system and special purpose applications such as photo organization apps. Such special purpose applications show the vision of the Semantic Desktop to be part of various applications by embedding the PIMO, thus, reducing the effort for the user to maintain the PIMO as well as applications taking advantage of the user's mental model.

For ForgetIT, these mock-ups and prototypes provide evidences to realize synergetic preservation, managed forgetting, and contextualized remembering while drastically reducing effort to actually taking care on manual preservation. This is achieved by a natural integration of the PoF into the Personal Information Management activities and applications of a user.

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