ForgetIT

Concise Preservation by Combining Managed Forgetting and Contextualized Remembering

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Deliverable D9.4

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Executive summary

This deliverable documents the *Personal Preservation Pilot II* which is an outcome of ForgetIT's application scenario in work package WP9. Pilot II is a continuation and extension of Pilot I with stronger focus on preservation.

The main achievements documented in this deliverable are as follows:

First, the deliverable presents the extensions applied to Pilot I for the WP9 final evaluation with the use case of the PIMO Photo Organization app. In particular, this includes further integration of components from technical work packages, most notably the ForgetIT image services.

Second, the implementation of the Preservation Value assessment in the Pilot II allows to embed a Preservation Strategy into the Semantic Desktop. This Preservation Strategy is based on indicators from the Semantic Desktop and the Personal Information Model (PIMO) and is defined by users using policies and rules listed along the dimensions for assessment identified by ForgetIT. This is embedded in a user interface to define the Preservation Service Contract with a service provider including Preservation Levels for various Preservation Values.

Third, having Preservation Value assessment and individual Preservation Strategy now in place, Pilot II realises the full Preserve-or-Forget (PoF) Framework's Preservation Preparation Workflow allowing the PoF Middleware to decide on preservation on its own terms, thus enabling Synergetic Preservation for the Active System Semantic Desktop.

Fourth, Pilot II uses the Memory Buoyancy assessment in the Semantic Desktop to realise a further beneficial functionality: currently important – i.e., high buoyant – PIMO resources and concepts are synced based on their Memory Buoyancy to desktops and mobile devices for, e.g., offline access. This functionality, together with a PIMO user interface, is also suitable for mobile browsers (PIMO5) and a proof-of-concept for native clients shows that the ForgetIT-enhanced functionality of the Semantic Desktop is also realisable on mobile devices. Thus, Pilot II extends Pilot I from a "concise preserving desktop information assistant" to a "concise preserving mobile information assistant".

Finally, a reassessment of the uses cases with the achievements of Pilot II and a reassessment of the success indicators of WP9 close the deliverable.
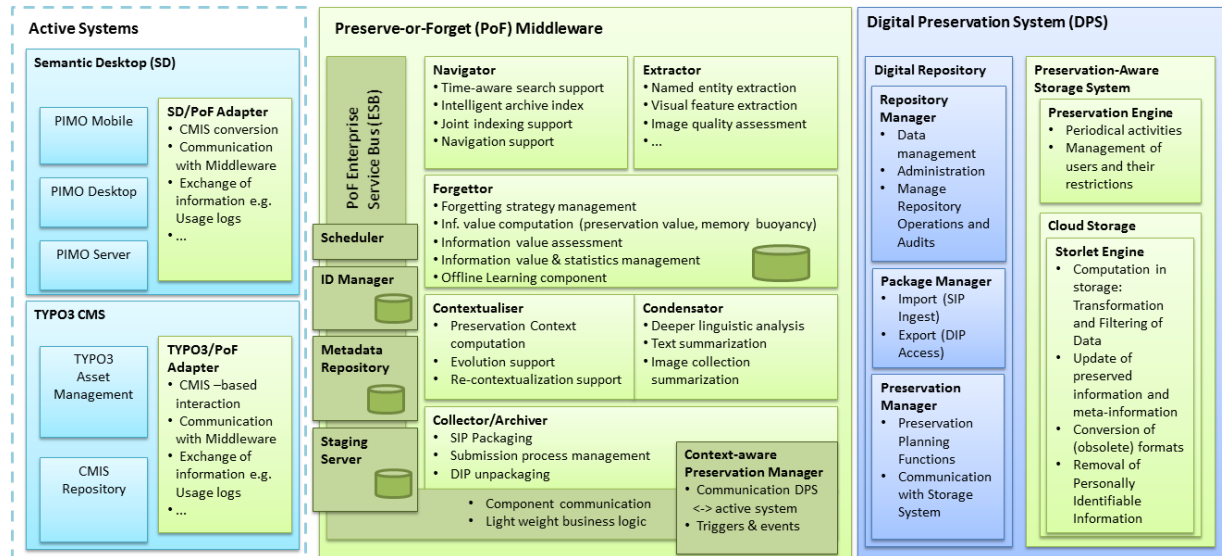
Figure 1: The Personal Preservation Pilot II is comprised of the Semantic Desktop as Active System and connects to the PoF Middleware and the Digital Preservation System (Figure from D8.4 [ForgetIT, 2015f]).

1 Introduction

This deliverable documents the *Personal Preservation Pilot II* (Pilot II, for short) which is an outcome of ForgetIT's application scenario work package WP9. This deliverable and second pilot documentation builds on WP9 deliverables D9.1 [ForgetIT, 2013c] and implements mockups and functionalities described in D9.2 [ForgetIT, 2014c]. It extends the Personal Preservation Pilot I presented in D9.3 [ForgetIT, 2014d].

This deliverable is an extension to D9.3 where the WP9 application scenario, the motivation for using the Semantic Desktop approach for Personal Information Management (PIM), and details of several features and applications are explained. Thus, readers not familiar with D9.3 should consult it beforehand to understand D9.4's content to full extend.

The final evaluation is still ongoing at the time of writing this deliverable, therefore, reporting of evaluation results will be done in WP9's final deliverable D9.5 [ForgetIT, 2016f] "Personal Preservation Report".

Pilot II is an implementation of the PoF Framework (see Figure 1; the technical details are explained in deliverable D8.4 [ForgetIT, 2015f]) with the Semantic Desktop as Active System and is integrated in accordance with the ForgetIT PoF Reference Model as explained in deliverable D8.2 [ForgetIT, 2015e]. Pilot II is also fully deployed on the ForgetIT testbed.

As with the first pilot, the second pilot was made possible by the close cooperation of WP9 with all ForgetIT work packages.

1.1   Target Audience

The target audience are all readers interested in how ForgetIT goals are realized in the personal preservation application scenario within the second pilot.

The audience should have read D9.3 [ForgetIT, 2014d] as details are not repeated but rather the newly achieved results are documented.

In addition, application developers would see how applications could contribute to an infrastructure which supports preservation as well as how an Active System can benefit from ForgetIT technology and approaches.

1.2   Structure of the Deliverable

The deliverable is structured as follows:

Section 2 details the achievements of the Personal Preservation Pilot II including extensions of the user interface, especially the PIMO Photo Organization app. Then it details the introduction of Preservation Strategies for personalized Preservation Value (PV) assessment and its definition in a Preservation Service Contract. The Section finishes with the details of the "concise preserving mobile information assistant".

Section 3 reassesses the WP9 uses cases in the light of the Pilot II achievements.

Finally, a reassessment of the success indicators of WP9 in Section 4 closes the deliverable.

2 The Personal Preservation Pilot II

This Section presents the Personal Preservation Pilot II starting with the extensions applied to Pilot I by integrating further ForgetIT services, namely text services in Section 2.1 and image services in Section 2.3.

To support the WP9 final evaluation with the use case of the PIMO Photo Organization app, Section 2.2 presents the changes and features introduced for this app.

Section 2.4 details the main focus of work in Pilot II: the realisation of the Preservation Value assessment in the Semantic Desktop allows to embed a detailed and personalized Preservation Strategy into the Semantic Desktop. This Preservation Strategy is based on indicators from the Semantic Desktop and the PIMO specified as policies and rules. These policies and rules are classified along the dimensions for assessment identified by ForgetIT which is explained in Section 2.4.1.

Users can use pre-defined Preservation Strategies as explained in Sections 2.4.2 as well as customize their own as explained in 2.4.3. This is embedded in a user interface to define the Preservation Service Contract with a service provider including Preservation Levels which is presented in Section 2.5.

Given the availability of the Preservation Value assessment and individual Preservation Strategies, Section 2.6 explains how the full PoF Framework's Preservation Preparation Workflow is realised in Pilot II.

Finally, Section 2.7 details how the Memory Buoyancy assessment in the Semantic Desktop is used in Pilot II to synchronize high buoyant PIMO resources and concepts to desktops and mobile devices for, e.g., offline access.

2.1 Integration of ForgetIT Text Services

In Pilot II, the Semantic Desktop infrastructure uses enhanced text services provided by WP4's GATE component (see D4.3 [ForgetIT, 2015c]) for contextualization using personal knowledge with the PIMO (i.e., PIMO is used as a vocabulary for entity disambiguation in GATE (a so-called gazetteer)) and world contextualization with DBPedia using WP6's YODIE as described in deliverable D6.3 [ForgetIT, 2015d]).

Thus, the PIMO service for finding entities in texts now provides better performance to apps and plug-ins. In particular, FireTag for analysing and annotating web pages and e-mails and the SemanticFileExplorer for files, benefit from this.
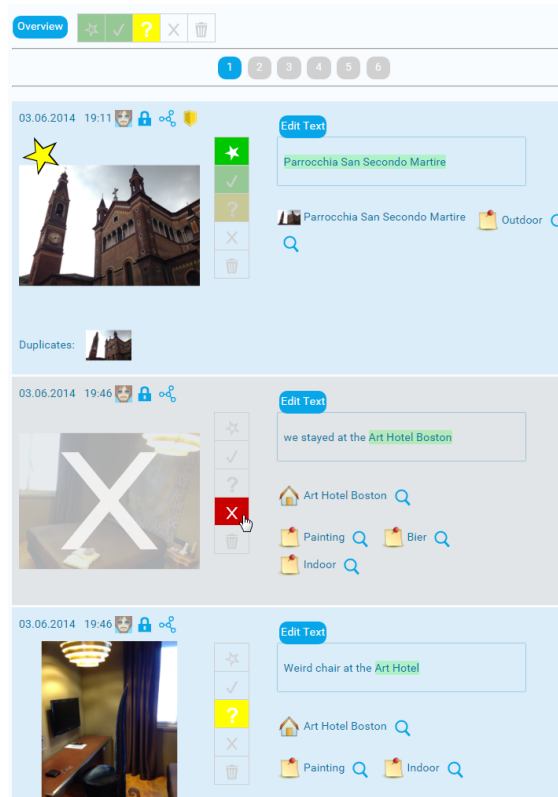
Figure 2: Each photo has quick rating buttons influencing their visibility in the photo collection. On top, a filter bar selects those photos to be shown in the current view.

2.2   Photo Collections in Pilot II

In Pilot I, the PIMO Photo Organization app was introduced. In this Section, we list major enhancements to this app which are also used in the final evaluation of the Personal Preservation Application Scenario. A more detailed and step-by-step documentation is given in the WP9 Pilot online documentation.[1]

One major change in the user interface was the removal of the keep/delete slider used in the PIMO Fringe evaluation (see D2.1 [ForgetIT, 2013a] and D9.5 [ForgetIT, 2016f]). The evaluation identified 4 categories as sufficient classification for a user's ratings in our setting, plus "trash" to delete an image. In the new UI, buttons now allow a rating of an individual image (see Figure 2) with the following meaning (in parentheses is the respective icon used):

favourite (star) This photo is one of the user's favourites. It will be shown in the home page of the photo collection as a thumbnail in the overview image gallery (see Figure 3) as well as used in the default set of the photo collection's slideshow (by pressing the button "slideshow"; which is also a new feature in Pilot II).

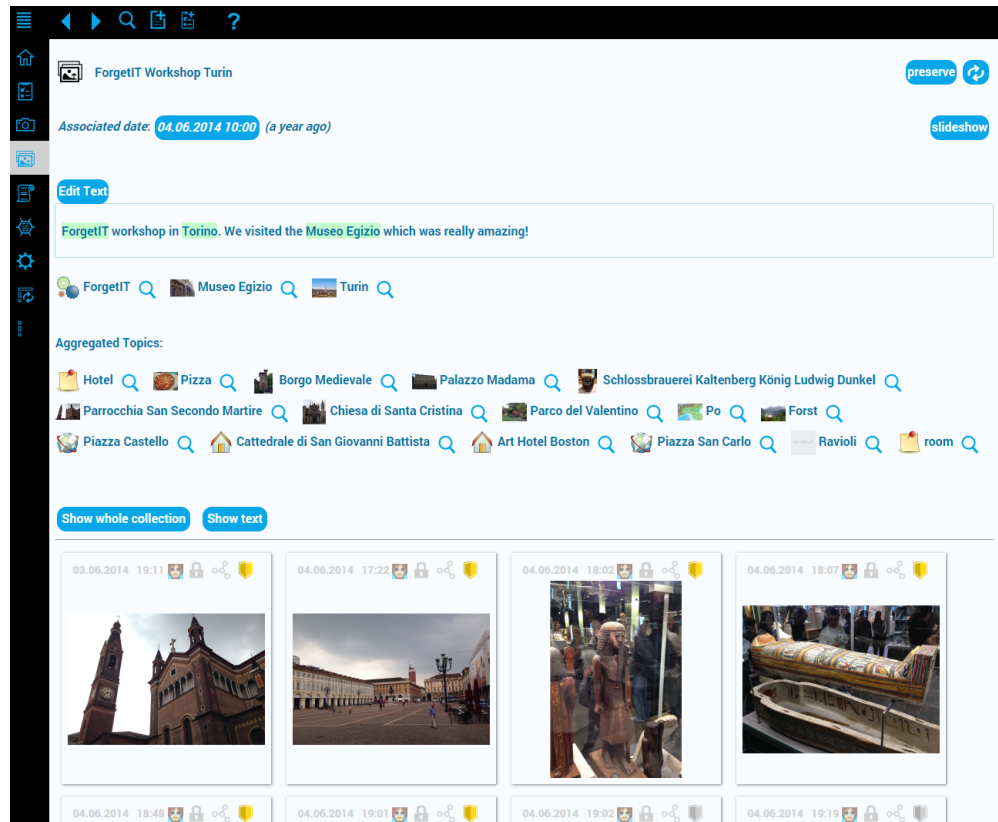[1]see `https://pimo.opendfki.de/wp9-pilot/pimophotoappfunctions.html`

Figure 3: The entry page of a photo collection shows the favourite images in a thumbnail gallery, all annotations in the photo collection, and a descriptive text. This overview serves as a condensed view of the whole photo collection.

show (check mark) This photo is shown if the user selects "Show whole collection" in Figure 3 together with the favourites.

not decided yet (question mark) No decision has been done yet. The photo is treated as if the "show" has been selected, i.e., the photo will be shown in the photo collection. The yellow question mark indicates that no decision has been done yet.

hide (X) This photo should be hidden in the photo collection but neither removed nor trashed. This might apply to those photos which serve a mere documentary purpose and should not hinder the enjoyment of watching the photo collection (e.g., a boring photo of the hotel bed as in Figure 2). Such photos can still be shown if the user sets the filter to show hidden images.

trash (trash bin) This photo shall be trashed. Similar to "hide", the photo will be hidden directly, can be shown when the filter is set to "trash", but after a certain time, the photo will be deleted. Then a retrieval is not possible anymore (unless it was preserved beforehand).

(a) A photo with highest Preservation Value, indicated with a gold badge.

(b) A photo with high Preservation Value, indicated with a silver badge.

(c) A photo which is already preserved indicated by a ForgetIT-green (PIMOCloud) icon.

Figure 4: Among the metadata of a photo, now the Preservation Value is indicated using human readable categories.

Setting the rating for a photo also influences the Preservation Value (PV). The PV is now a part of the visible metadata of a photo as shown in Figure 4. The current result of the PV assessment is shown to the user using icons as badges in *gold*, *silver*, and *bronze*. This classification corresponds to the human readable categories as proposed in deliverable D3.3 [ForgetIT, 2015b] with gold having the highest PV. If the photo is already preserved, the PIMOCloud (ForgetIT-) green icon is used (as introduced in Pilot I, see also D9.3 [ForgetIT, 2014d]; this icon is also used throughout the Semantic Desktop to indicate that a thing has been preserved; see also Figure 21).

2.3 Integration of ForgetIT Image Services

In integrating the services from WP4 (see D4.2 [ForgetIT, 2014a], D4.3 [ForgetIT, 2015c], and D4.4 [ForgetIT, 2016c]), the Semantic Desktop infrastructure and especially the use case of photo organization benefits from the following three functionalities:

2.3.1 Image Quality Assessment

The quality of an image is assessed by the image service and a number btw. 0 and 1 is returned.[2] This number is used, e.g., for choosing the best picture out of several equally qualified ones as representative of a diary entry (for PIMO Diary see D9.3 and [Jilek et al., 2015]), for deciding which is the best picture in a set of near duplicates (see Figure 8b), and one of several evidences for Preservation Value calculation.

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[2]In Figure 6 the image quality is listed in the detail view of an image.

2.3.2   Visual Concept Detection

Figure 5: Exemplary visual concepts in an image which could be detected.[3]

Photos can have visual concepts as indicated in Figure 5. Using WP4's visual concept detection, the Semantic Desktop gets a set of possible visual concepts in an image, each with a specific confidence value. The Semantic Desktop uses a subset of the proposed ones which are above a certain threshold[4] and automatically annotates an image with these concepts.[5] The automatic annotation allows to search for images with these concepts without previous manual annotation effort by the user as shown in Figure 7.

2.3.3   Near Duplicate Recognition

A photo collection can have very similar photos. To identify these, the near duplicate recognition service for photos in a collection is used. This service delivers none, one, or more set(s) of photos which are near duplicates of each other. As a benefit, such sets are shown in the photo collection view with a representative of the set and the near duplicates listed as thumbnails below the photo (see Figure 8).

Furthermore, image quality and near duplicates are used to support users organizing their photo collection in the following way: During the initial upload of the photo collection, the image quality serves as an indicator to set a photo's rating: If the image quality is high (e.g., above 0.7) the photo gets a "show" as default, if it is very low (e.g., less than 0.2), a "hide" is set. Otherwise, the "question mark" is the default to indicate that no decision has been done yet. Furthermore, for a set of near duplicates, the chosen representative gets a bonus on top of its image quality for each duplicate, thus, raising the probability that

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[3]Please note, that the visual concept detection by the image service does not provide the location of the concept in the picture.

[4]Such a threshold is concept specific and ranges between 0.75 and 0.9

[5]To distinguish the automatically annotated concepts from manually annotated ones, those concepts are annotated using the PIMO property `pimo:hasSuggestedTopic`. In the PIMO, this is done every time where services propose concepts such as by using text services.
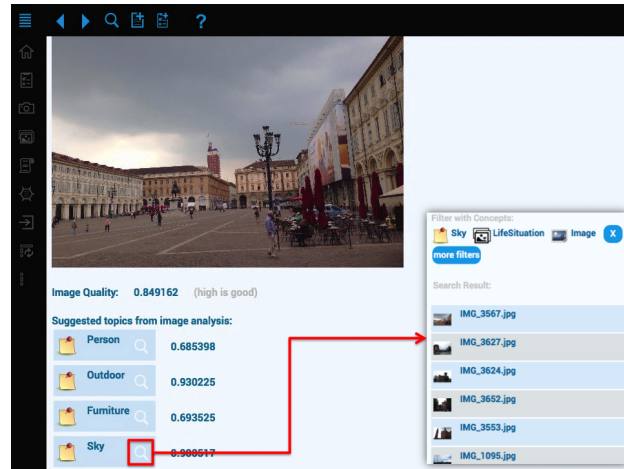
Figure 6: Detected visual concepts are automatically annotated as suggested topics. The detail view shows also the confidence of the detected concept. By clicking on the magnifying glass of a detected concept, a semantic search for images and photo collections is started which are annotated with the same concept.

it is selected as "show". The assumption behind this is that the scene might have been important to the user, therefore several photos were taken and/or several trials to get a good photo (as in Figure 8b).

2.4 Preservation Strategy in the Semantic Desktop

Whereas the focus of the Personal Preservation Pilot I was on manual preservation of resources, research and implementation done in ForgetIT now allows for a PV assessment of resources in order to enable Synergetic Preservation by the ForgetIT PoF Middleware connected to the Semantic Desktop.

In the ForgetIT PoF Framework this is done in the functional entity called *Content Value Assessment* defined in D8.2 [ForgetIT, 2015e] (see also the Preservation Preparation Workflow in Figure 19).

This entity has the task of assessing resources wrt. Memory Buoyancy (MB) and Preservation Value (PV). In Pilot II we focus especially on the Preservation Value which reflects the long-term importance or relevance of a resource. This PV is then used by the PoF Middleware as a basis for making preservation decisions, e.g., if a resource should be preserved or how much should be invested in the preservation of a resource, i.e., which *Preservation Level* (see Section 2.5.1) should be used.

To allow an assessment of resources, first, it must be clarified what aspects in the assessment could possibly contribute to the long-term importance and then consider individual preferences of the user in a so-called *Preservation Strategy* (as addressed in D8.2 [ForgetIT, 2015e], Section *Preservation Strategies*). The following Sections explain how Pilot II supports a Personal Preservation Strategy.
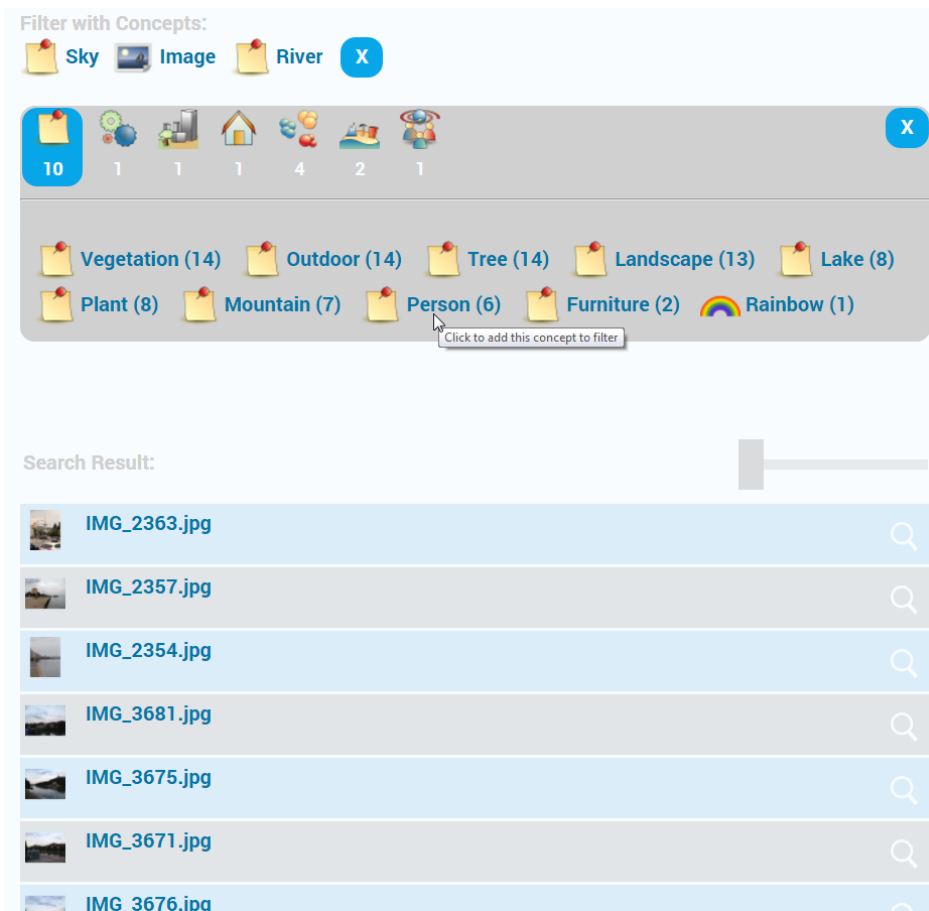
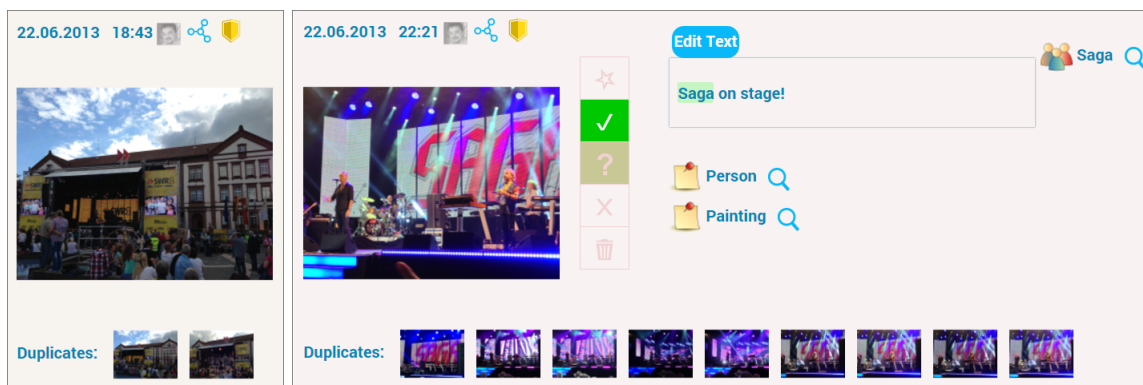**Figure 7: A facetted search for images using visual concepts. The screenshot shows the possibility to add even more concepts to the filter.**

(a)   **(b)**

Figure 8: Near duplicates are shown in the photo collection as a set of images: the best of the set is shown as normal photo, its duplicates as thumbnails below.

To ease the usability for the user, such a Preservation Strategy can be defined along specific dimensions for assessment which will be detailed in Section 2.4.1. The Pilot II allows to define Preservation Strategies in two ways: pre-sets based on dedicated user profiles (Section 2.4.2) or a combination of pre-sets and a more detailed customization using policies and rules (Section 2.4.3).

2.4.1 Preservation Strategy

The Preservation Strategy will be based on a set of policies and rules which support an assessment of the PV. In WP3, 6 dimensions for this assessment were identified (see deliverable D3.3 [ForgetIT, 2015b]) which are – from the point of view of the Semantic Desktop – relevant for the Personal Preservation Scenario. These are:

Investment The investment which has been made to the resource or rather effort which has been spent in its creation, improvement, and changes.

Gravity Relationship or closeness of a resource to important events, processes, and concepts.

Social Graph Relationship of the resource to the relevant social graph, i.e., the persons related to the resource, their roles, closeness to the user, and relationships.

Popularity Usage and perception[6] by the user(s) of the resource.

Coverage Factors which consider the resource in relationship to other resources in the same collection (diversity, coverage of sub-events, . . .).

Quality Quality of the resource, such as image quality.

These are the dimensions identified for collecting evidences for the assessment and finally the calculation of the Preservation Value. Which evidences are used and with which weighting they contribute in policies and rules in the calculation to the PV is defined by a Preservation Strategy. The following sections detail the two realised approaches in Pilot II. For a detailed explanation of the calculation please refer to deliverable D3.4 [ForgetIT, 2016b].

2.4.2 Personal Preservation Strategy based on Personas

To help users who are new to a personal preservation service, it would be useful to have a predefined set of policies and rules defined for the 6 dimensions mentioned above, so that unexperienced users don't need to care about defining a rather complex Preservation Strategy.

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[6]i.e., how a resource is perceived by the user(s), e.g., rating (favourite vs. hide).

The ForgetIT survey on personal preservation of photos conducted in WP2 and preliminary results published in [Wolters et al., 2015] and final results reported in deliverable D2.4 [ForgetIT, 2016a], identified four personas representing attitudes towards personal Preservation Strategies. The personas are defined along two key preservation dimensions of "Loss" – the user is worried about losing important photos – and "Generations" – importance to the user of preserving important photos for future generations.

For each dimension, two habits could be clustered. Regarding "Loss", a group took less precautions against losing their photos (therefore named 'Forget') than the 'Safety in Redundancy' group which tended to have redundant copies of their photos on different storage units. Regarding "Generations", one group put much more effort in organizing their photos (therefore named 'Curators'), e.g., by assigning keywords, than the 'Filing First' which rely almost exclusively on files and folders.

Using these dimensions, the four personas identified are

- Safe Curators,

- Safe Filer,

- File & Forget, and

- File & Forget Curator.

To achieve the aforementioned ease of use, we defined one Preservation Strategy for each persona. We assigned different weights to policies and rules to match the personas preferences and assumed behavior.

The different personas tend to score differently on the six dimensions of PV assessment:

Investment The Curator's investment is on purpose, thus evidences for investment in this group should be ranked higher, whereas in the File & Forget group, the investment might be sporadic.

Gravity This is assumed to be more helpful to Safe Filers as Curators are supposed to decide on importance on their own.

Social Graph Important for everyone

Popularity Filers are purposeful in accessing resources valuable to them and ratings might be rare. In contrast, Curators are expected to access more resources especially for curation purposes which does not directly indicates popularity of the resource, thus this evidence should be weighted less.

Coverage For both Curators and Safe Filers coverage is important; to the Curator more than to the Safe Filer.

Quality For Filers the quality (expressed by image quality) is more important whereas for the Curator quality is not that important.
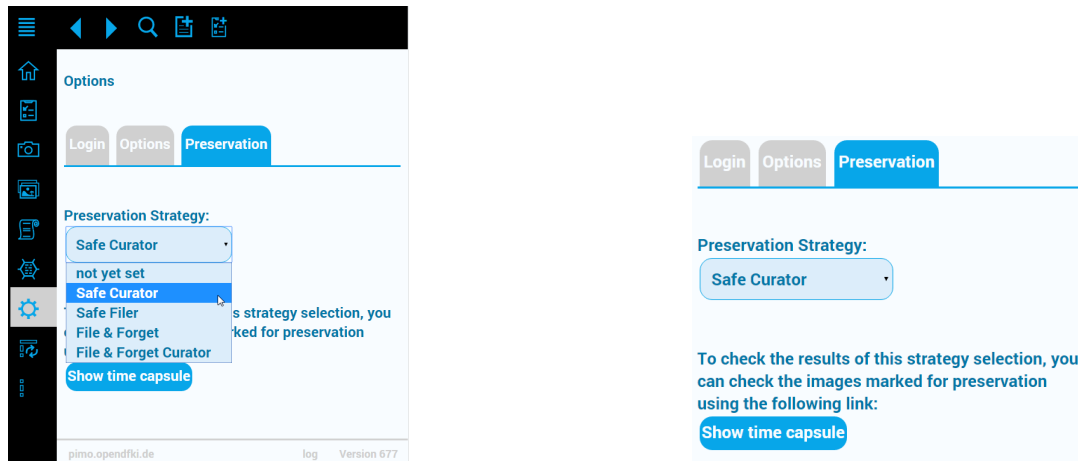
(a) **The list of Preservation Strategies available in the Personal Preservation Scenario**

(b) **The Preservation Strategy was set to "Safe Curator"; now the time capsule can be invoked.**

Figure 9: A user can change the Preservation Strategy profile in the PIMO5 options dialog. Pressing "Show time capsule" will present the time capsule to the user. This will be the setting for the WP9 final evaluation.

To reflect these persona perspectives in the Preservation Value assessment, corresponding profiles were created for the Preservation Value calculation. The profiles mirror the basic distinction between *Curators* and *Filers* by mainly basing the preservation suggestions on the investment spent by the former, and an emphasis on popularity and material quality by the latter. For the safety-conscious persona profiles, the algorithm tries to ensure a certain coverage of the different subsets (e.g., photo collections) of the material to be preserved.

This calculation is used in the WP9 evaluation scenario for personal preservation and results will be reported in upcoming deliverable D9.5 [ForgetIT, 2016f]. For this evaluation we will use hired participants which are unknown to us. They will spend only a limited time with the PIMO Photo Organization app. Therefore, their settings will be chosen based on an interview, as explained below:

In the first interview, the user will answer several questions used in the WP2 survey which will result in an identification of the respective persona. The specific persona is then set as Preservation Strategy in the PIMO5 options as shown in Figure 9. (For a commercial personal preservation service this could be accomplished by an online questionnaire embedded in the service contract settings (see Section 2.5)).

Once the Preservation Strategy is set, the so-called *time capsule* can be invoked by pressing the "time capsule" button. The selected Preservation Strategy is used for a new calculation of the Preservation Value and the time capsule view is opened as shown in Figure 10.

The time capsule gives an overview on the photo collections and the respective set of photos to be preserved (on left-hand side) and those which will not be preserved (on the
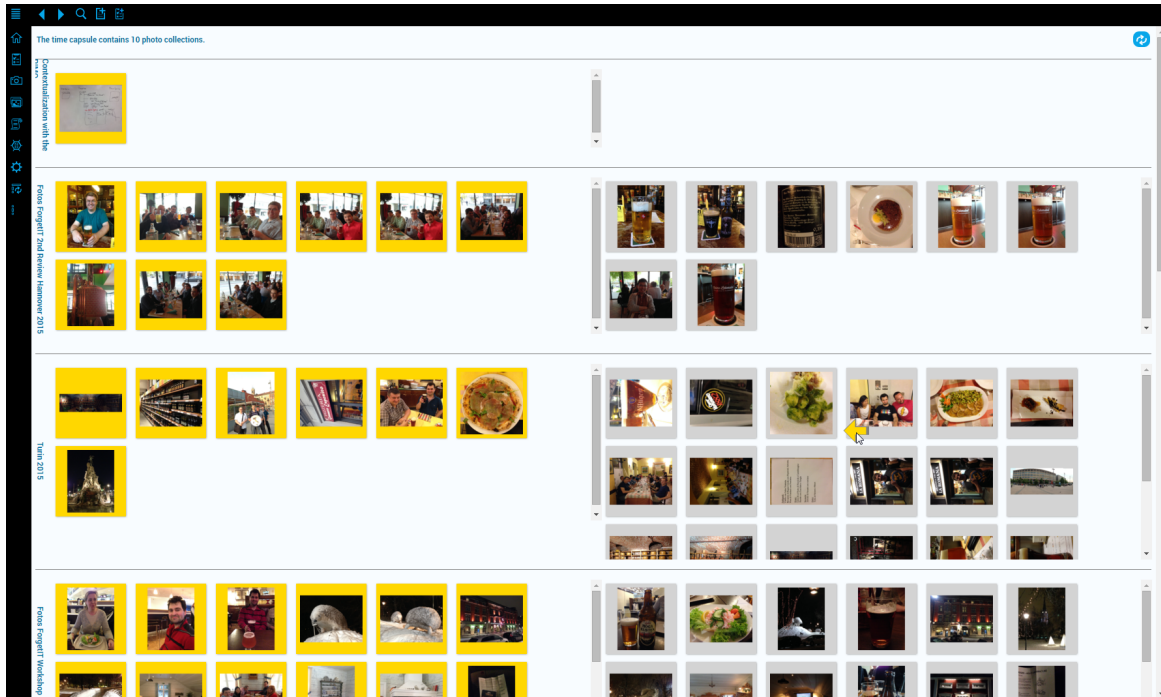
Figure 10: The time capsule lists all photo collections with an indication of the ones that will be preserved (left side, gold marking) and those that will not be preserved (right hand). The user is able to manually remove or add photos from/to the preserved list (the respective direction is shown by the yellow arrow).

right-hand side). Users are able to inspect these automated decisions and change the decision manually. This is done by clicking on a photo either to add or to remove it from the list of photos to be preserved. Changes done by the users are logged and used for evaluating the persona-based PV assessment.

The next section will describe an extended view of inspecting preservation decisions, which is not restricted to photo collections only.

2.4.3   Customization for Preservation Strategies

In the previous section, the Preservation Strategy has been based on personas defining strategies where the user is not able to influence details but only can change the persona itself. To allow a more fine-grained Preservation Strategy setting for the Semantic Desktop along the preservation policy and rules as proposed in D3.3 [ForgetIT, 2015b], finally, the following more detailed strategy setting has been realised in Pilot II as an extension of the aforemention persona-only approach:

For the application scenario of Personal Information Management, several evidences or indicators were identified in the Semantic Desktop along the aforementioned 6 dimensions which could help in the assessment of the expected long-term benefit of a resource. Now, the Semantic Desktop allows one to adapt these to one's preferences without re-

Figure 11: Setting a more detailed Preservation Strategy in PIMO5: allowing to easily select / deselect those policies and rules which matter the most to the user.

quiring the user to be an expert in policy or rule management:

Figure 11 once again shows the PIMO5 user interface allowing to set and change the Preservation Strategy applied to a user as introduced above.

Here, a more detailed choice of indicators (i.e., evidences from the Semantic Desktop usage and PIMO to be used as policy as well as rules) to be applied for calculating the Preservation Value of the user's resources are shown. Each indicator is explained in human readable terms explaining the effects to the user. Each indicator is internally bound to a calculation or a rule used in the algorithm which is then switched on or off.

For better readability, the set of policies and rules currently used in Pilot II are listed below along the 6 dimensions. In parentheses, a short explanation of the effect of choosing an indicator is explained.

INVESTMENT

- number of annotations (things having a higher number of annotations are more likely to be preserved)

- wikitext length (the longer a thing's wikitext, the more likely it will be preserved)

- usage (the more frequently a resource is modified, the more likely it will be preserved)

GRAVITY

- connectivity (the more a thing is related to other things, the more likely it will be preserved)

- type-based heuristic (certain things such as contracts are more likely to be preserved)

- important projects (the higher the number of person involved in a project, the more likely it will be preserved)

- closeness to important things (things related to tasks or events are more likely to be preserved)

SOCIAL GRAPH

- important persons (the higher the number of projects a person is involved in, the more likely it will be preserved)

- PIMO user on photo (photos containing PIMO users are more likely to be preserved)

POPULARITY

- image rating (the higher an image's rating, the more likely it will be preserved)

- number of views (the more a thing is accessed/viewed, the more likely it will be preserved)

COVERAGE

- cover photo collections (at least one photo of each photo collection should be preserved)

QUALITY

- image quality (high quality images are more likely to be preserved)

These policies and rules could be even more detailed, e.g., letting the user specify which types in the type-based heuristic are important. For this Personal Preservation Scenario we think that simplicity is important for an acceptance and take-up by the user.

As in the previous section, the user can choose a persona (as done in Figure 12) which describes him/her the best (or rather could be inferred by preference questions as done in the evaluation and then set automatically). Selecting a persona will load a default profile and set the respective check mark to those indicators which best fit the respective persona (including a pre-defined weighting).

Once changed and saved, the settings are used in calculating the Preservation Values of the user's resources in the periodic PV calculations in the Semantic Desktop.

Figure 12: Selecting a persona loads a pre-defined set of choices. Changes are possible and saved as a personal Preservation Strategy.

This customized Preservation Strategy is part of a *Preservation Service Contract* which is explained in the following Section.

2.5 Preservation Service Contract

In addition to the Preservation Strategy, another detail to be considered in the Personal Preservation Pilot is which service infrastructure is used for preservation. In other words, who provides the actual service for preservation to the user and what are the conditions?

As pointed out in deliverable D11.4 [ForgetIT, 2015a], preservation could be offered as a service by a telecom provider using a PoF Framework instance for preservation services and a subset of the Semantic Desktop infrastructure – most prominently the Photo Organization – as applications for customers. The deliverable sketches a potential business model and challenges for realising Personal Preservation as a commercial service.

Assuming such a service is established, a contract between the user and the company would state the conditions of the service and its costs. Moreover, such a contract would also detail how the service would be used, e.g., the amount of space to be consumed, preservation levels, how formats are migrated, etc. The ingredients of such contract between a user and a service provider will be discussed in detail in deliverable D5.4 [ForgetIT, 2016d] also providing dedicated user interfaces.

To show a proof-of-concept for such a contract in the Personal Preservation Pilot II, the PIMO5 options page has been extended with basic options for selecting and changing conditions of a user's service contract with a preservation service provider as shown in Figure 13 under the tab "Contract". The tab "Strategy" then leads to the Preservation Strategy settings as discussed above.
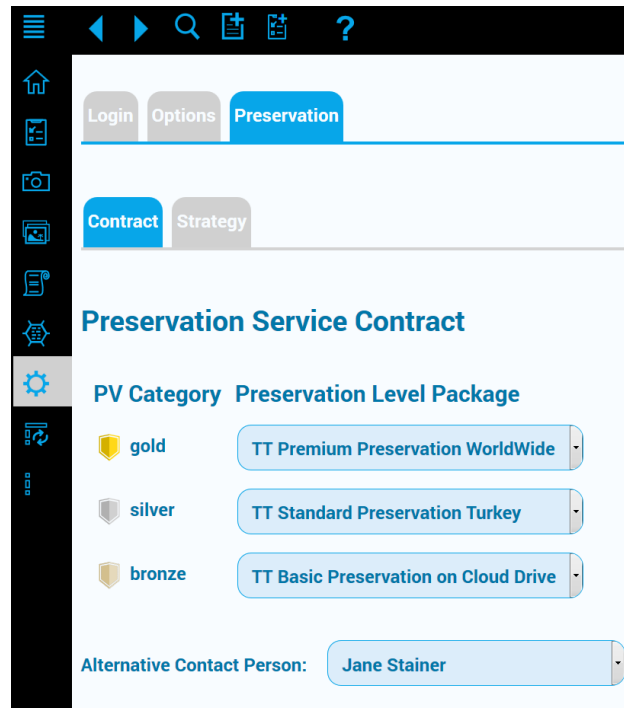
Figure 13: In the PIMO5 options, the user is able to set the Preservation Service Contract.

In the following, the details of this basic service contract preference selection are detailed.

2.5.1 Preservation Level Package

With regards to preservation, a huge amount of options and parameters have to be decided upon. But complex decisions on preservation parameters might discourage normal customers to choose a preservation service.

Looking at the business of a telecom provider such as ForgetIT partner Turk Telekom (TT), pre-configured contracts are usually offered containing several bundles (flat rates for text messages, landline, broadband, mobile data, and options for roaming) making it (more or less) easier for customers to decide on suitable contracts.

As the goal of ForgetIT is to reduce the effort for Personal Preservation, offering such bundles for preservation options as in telecom contracts makes sense for the average customer but still allow advanced users more detailed options to adapt a contract to personal preferences. Finally, the bundling of preservation services with normal telecom contracts holds the potential of bringing preservation to a larger audience.

Therefore, we assume that a preservation service provider such as TT would offer bundles of preservation functionalities and options as packages similar to mobile contracts to customers. This allows customers to choose for the respective Preservation Value (PV) Category (gold, silver, bronze) between several preservation levels offered as *Preservation Level Package* as well as "do not preserve" for a category as shown in Figure 14.
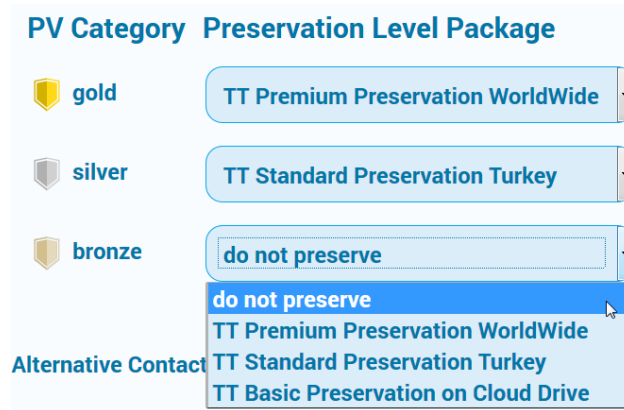
Figure 14: In PIMO5 the user is able to select Preservation Level Packages for each Preservation Value Category.

Such a package contains a reasonable default set of preservation functionalities and options for a certain price. These packages could range from a basic package – which could be free with a mobile contract – up to packages with extended functionalities or security with additional costs. Furthermore, some options might be offered to the customer such as in the package "Premium Preservation WorldWide" to limit storage to European countries only, or similar. Such options are addressed in deliverable D5.4 [ForgetIT, 2016d].

Furthermore, we also assume that for a contract bundle, the PV Categories come with a pre-set for the Preservation Levels as well as for the Preservation Strategy to accomplish an uncomplicated contract activation.

2.5.2 Alternative Contact Person

In deliverable D9.2 [ForgetIT, 2014c] we identified the use case "death of a user" which addresses the requirement to hand over preserved material after the death of a user.

In the preservation contract tab, we allow to enter a contact from the PIMO which shall be contacted in the case a user passed away. Figure 13 shows the section where a contact can be selected via a dropdown box listing all persons in the PIMO. This contact is actually a `pimo:Person` which can either be imported from an address book together with address details or simply created in the Semantic Desktop.

Pilot II realises this as a proof-of-concept. It could be extended with more persons, with priorities, situations (death, unable to act, etc.) in which to contact, with a commitment of the selected user, e.g., by exchanging e-mails, etc. Furthermore, a functionality in the Semantic Desktop for small groups (such as as a family or a department) allows to easily integrate the selected `pimo:Person` as a user: in case a `pimo:Person` is not yet a Semantic Desktop user and an e-mail address is part of the contact details. Now, if this user creates an account in the Semantic Desktop using the same e-mail address, this user account is mapped to that instance of `pimo:Person`. This allows the new user to take over this `pimo:Person`. Then in case the situation occurred, the PoF Framework
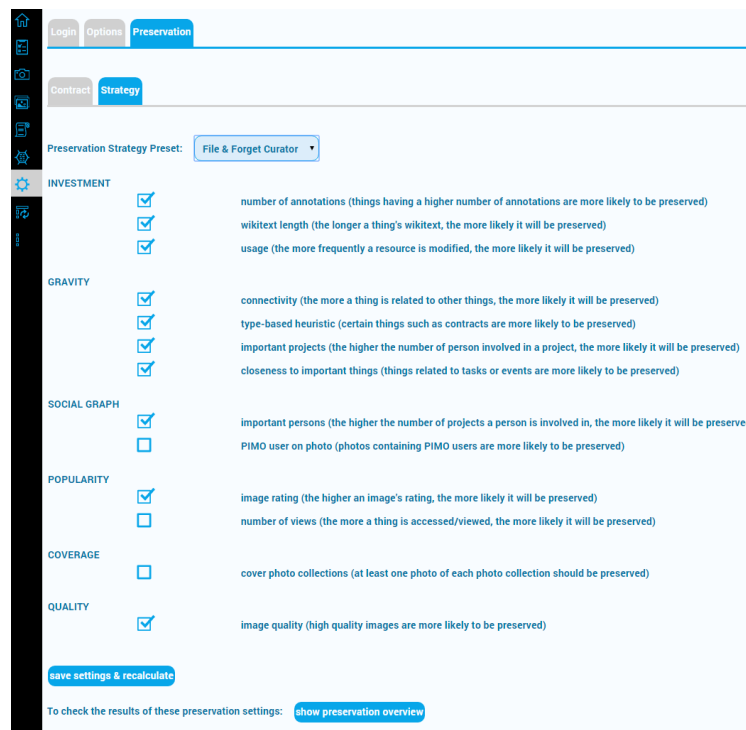
Figure 15: In PIMO5 the user is able to set the Preservation Strategy in the Preservation Service Contract settings and check the consequences by clicking on the button "show preservation overview" which opens the view shown in Figure 16.

can use this functionality to grant access rights to the preserved material also to this new user account if the access to the preserved material is done via the Semantic Desktop.

2.5.3　Preservation Broker Contract

The terms of this Preservation Service Contract are transferred in a so-called *Preservation Broker Contract* (see deliverable D5.4 [ForgetIT, 2016d]) to the PoF Middleware via the SD/PoF Adapter (in the PoF Framework, this adapter is part of the Active System and communicates with the PoF; see Figure 1) and used in the *Managed Forgetting & Appraisal* step (see Section 2.6) to decide on the preservation actions.

2.5.4　Investigating the results of the chosen Preservation Strategy

Once a user has set the Preservation Strategy, a new PV calculation is started after saving the new strategy by pressing the button "Save setting & recalculate" as shown in Figure 15. Pressing the button "Show preservation overview" opens a view which provides the user with an overview of the current material from the PIMO which would be preserved (if the PoF Framework decides to start preserving) using the selected Preservation Strategy. Compared to the photo collection-only time capsule view shown above
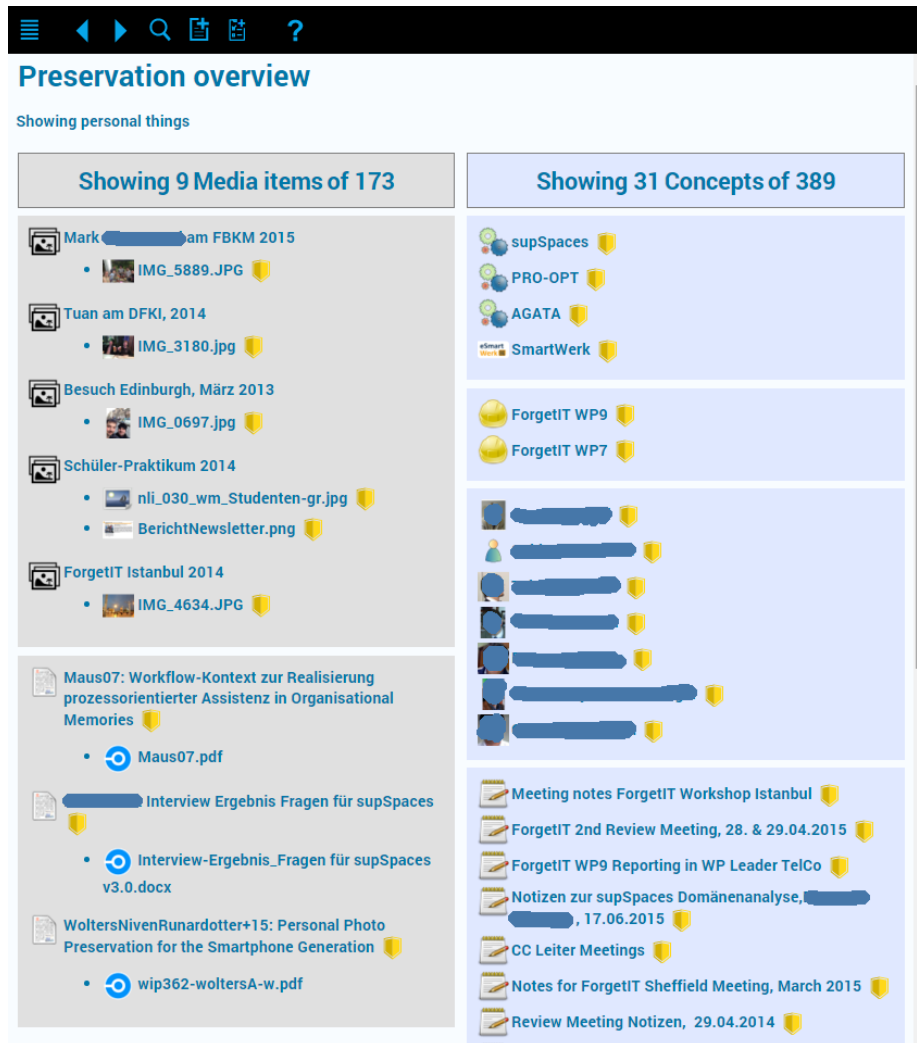
Figure 16: For the Pilot II, a dedicated preservation view has been integrated in PIMO5 to check the Preservation Strategy setting. This view allows to browse through all resources and concepts to be preserved. The screenshot shows an individual (& partly anonymized) view on the DFKI PIMO with a Safe Curator profile.

in Figure 10 which was used in the WP9 evaluation, this view is extended to all material from the PIMO such as documents and concepts such as projects and persons.

For easier inspection, the view lists those images which would be preserved under their respective `pimo:LifeSituation`. Currently, the list starts with an overview of the resources with the highest PVs first and allowing the user to request more items as shown in Figure 17.

Clicking on a thing's badge indicating the PV Category shows an explanation for the PV decision as shown in Figure 17 and Figure 18.
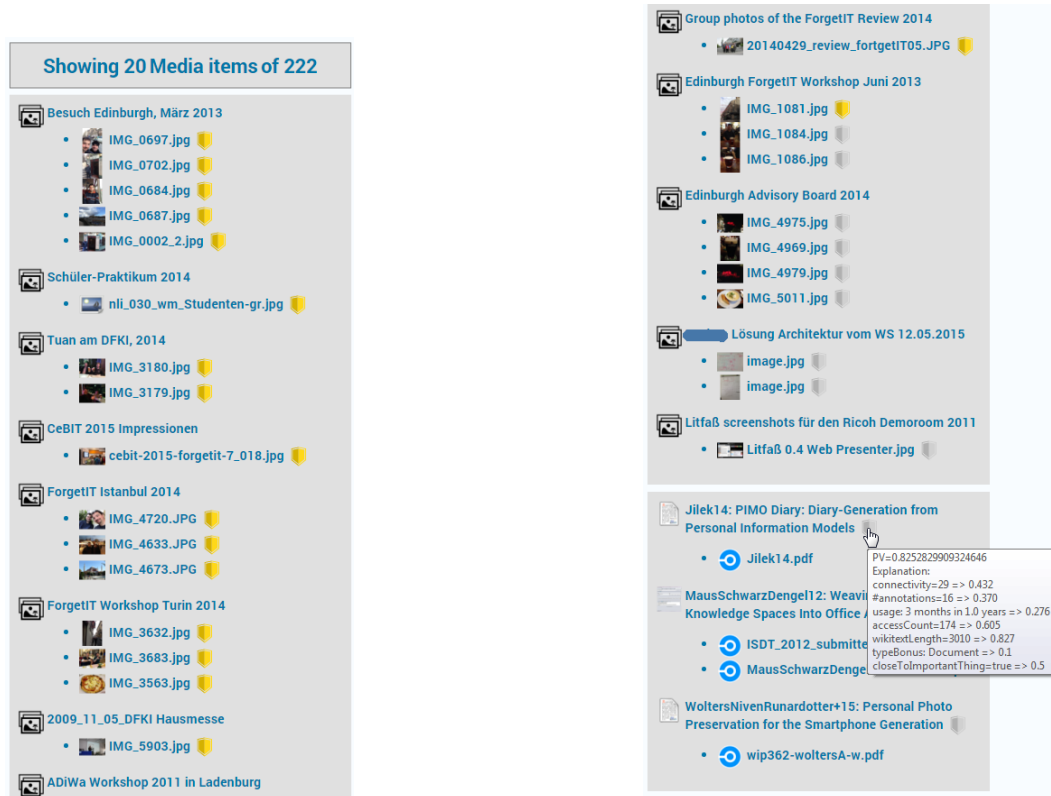
(a) Scrolling down all the photos . . . 　　　(b) . . . to the media items.

Figure 17: Choosing the File & Forget Preservation Strategy generates this list which contains mainly photos as media items.
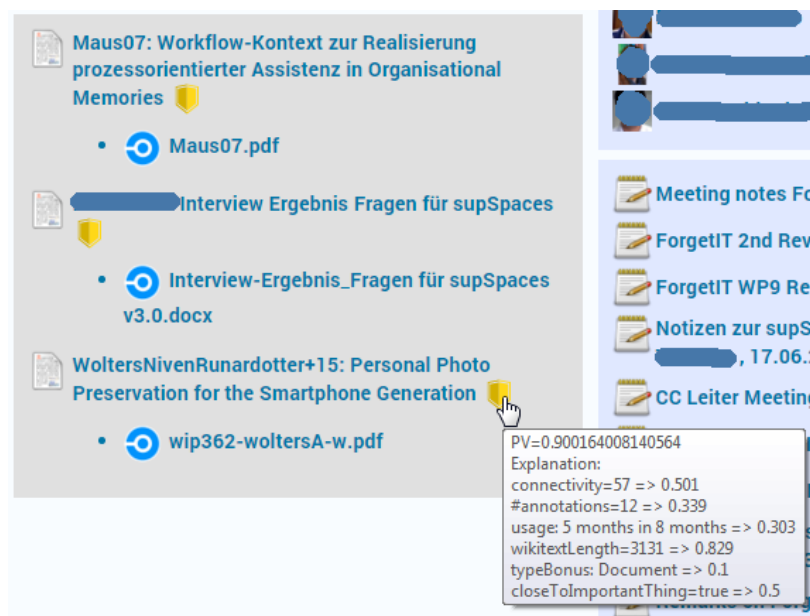
Figure 18: A short explanation of the decision for PV using the Preservation Strategy settings. (Though, the explanation is not yet adapted for end users.)
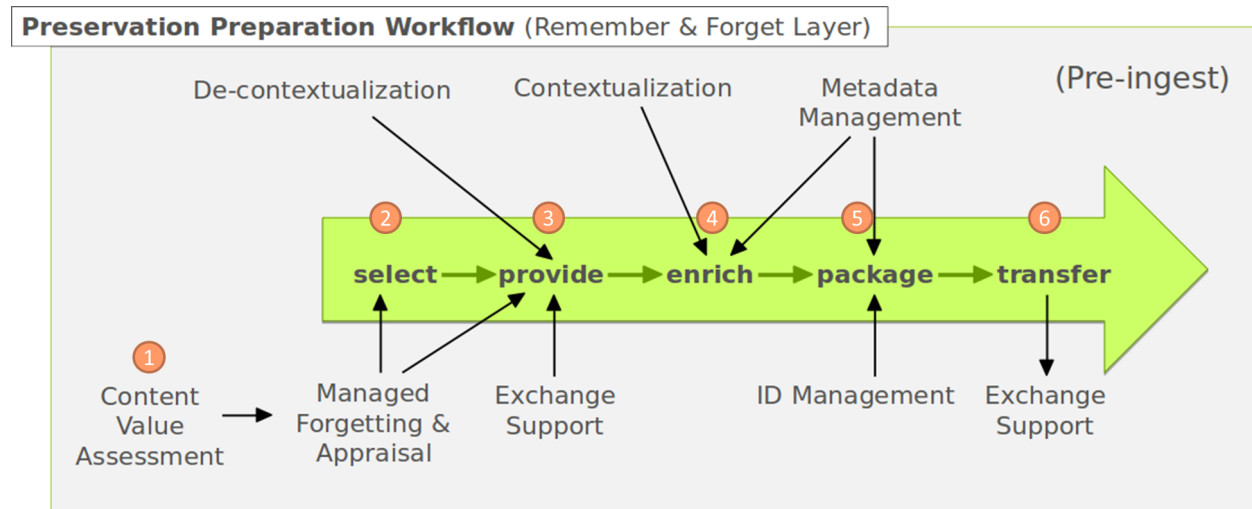
Figure 19: The Preservation Preparation Workflow (adapted from D8.4 [ForgetIT, 2015f]).

2.6 Preservation Preparation Workflow

Preservation was already possible with the functionality provided by Pilot I. There, resources could be selected and manually preserved using the PoF Middleware. Pilot II extends this with the ability of the PoF Middleware to enable Synergetic Preservation by relying upon the user's Preservation Strategy and Preservation Value (PV) explained in the previous sections.

This section describes the updated preservation workflow steps of Pilot II along the ForgetIT PoF workflow "Preservation Preparation Workflow" as defined in deliverable D8.4 [ForgetIT, 2015f] with a focus of the Pilot's contribution to the steps. The full technical details will be reported in the final deliverable of the PoF Framework D8.6 [ForgetIT, 2016e].

The workflow is depicted in Figure 19 with its steps and functional entities involved in these steps (which are explained in D8.2 in the Functional Model [ForgetIT, 2015e]). The additional numbers in the Figure are aligned with the following subsection numbers to explain the steps with involved functional entities.

2.6.1 Content Value Assessment

Before the workflow starts, the functional entity *Content Value Assessment* (CVA) is responsible for the assessment of resources in the PoF Framework. As already pointed out in Section 2.4.1 this step provides the Preservation Value of a resource.

Considering the role of the functional entity CVA in the PoF Framework, the Semantic Desktop as Active System is an example of the situation where the Active System is capable of providing the PV for the preservation decision (as well as the MB for Managed Forgetting in the Active System) and thus, the functional entity CVA is part of the Active

System.[7]

This design decision was made because of the beneficial usage of both MB and PV in the Semantic Desktop infrastructure. The rich semantic model of the PIMO and the usage statistics of the Semantic Desktop allow for a comprehensive view on the resources wrt. MB and PV. Furthermore, the nature of the PIM application scenario implies a lot of access, usage, and changes to resources and the PIMO resulting in a lot of traffic as well as content assessment in the PIMO as a knowledge base. Therefore, both values are computed in the Semantic Desktop and stored directly in the PIMO to be easily accessed by its components and thus, making them an integral part of the PIMO.

Therefore, to enable the PoF Middleware to make decisions based on the PV in the *Select* step, the values are reported and updated in certain time intervals to the PoF Middleware by the SD/PoF Adapter (see Figure 1).

The update contains the resource' URI, its Preservation Value, and last modification date of the resource. Adding the last modification date allows the PoF Middleware to decide if the resource might need to be sent to the archive again if the resource changed since the last preservation.

2.6.2   Select

The *Select* step uses the functional entity *Managed Forgetting & Appraisal* to make conscious decisions about preservation of resources of the Active System. To accomplish this, the results of the *Content Value Assessment* are used for deciding about preservation actions.

The *Forgettor* component (see Figure 1) selects the set of resources to be preserved based on the selected Preservation Value Categories set in the user's Preservation Strategy. This information is part of the *Preservation Broker Contract* introduced in previous Section 2.5, set in the Preservation Service Contract, communicated to the PoF Middleware and managed there for each user.

2.6.3   Provide

The step *Provide* uses the functional entity *De-Contextualization* to extract a resource from its Active System context in preparation of packaging it for archiving.

Since Pilot I, the PoF Middleware retrieves resources via the *Collector* using the CMIS interface embedded in the SD/PoF Adapter. For the PIMO, this means that a thing and its grounding occurrence (i.e., the semantic representation and the actual physical file) is separated: the CMIS interface hands over the resource to be preserved as a `cmis:Item`

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[7]In contrast to that, the implementation chosen for WP10's application scenario is an example of the situation where the Active System does not calculate the values by itself but rather delivers the evidences to the PoF Framework where the computation will take place.

and the PIMO's model information about its thing will be part of the context information handed over in the `forgetit:context` attribute of the `cmis:Item` (for technical details of the interface please refer to D8.4, Section *CMIS Integration*). This attribute is then available for the modules in the PoF Middleware, especially the *Contextualizer* in the next step.

Technically, the context information export is an excerpt from the PIMO semantic graph describing the resource in the PIMO and its connection to other things such as topics for a document or persons attending an event. The format used for the exported excerpt is RDF/S using the PIMO Ontology RDF Schema and Turtle[8] as exchange format.

For Pilot II, this interface was enhanced by handling collections of resources (see D8.4 [ForgetIT, 2015f]) and using the additional context delivered by the SD/PoF Adapter. Furthermore, now every concept in the PIMO can be preserved separately, i.e., the handling was extended to all PIMO classes not only those representing (file) resources such as `pimo:Media` and `pimo:LifeSituation` as in Pilot I. Now, it is also possible to preserve a, e.g., `pimo:Project` such as *ForgetIT* in the DFKI PIMO, although it might not have a physical file attached.

2.6.4   Enrich

In the *Enrich* step the functional entity *Contextualization* shall provide additional information for the content to be preserved in order to allow archived items to be fully and correctly interpreted at some future date (see D8.3). All resources in the submitted collection are handed over to the *Contextualizer* which runs three different components:

First, the **world knowledge contextualization**, as described in deliverable D6.3 [ForgetIT, 2015d], processes each textual resource in the submitted collection. This component creates a *World Context* by applying an entity recognition to the text of a resource (e.g., a document or e-mail) using DBPedia[9] as source to disambiguate entities. Each entity found in the text is added as semantic annotation (i.e., as URI) to the World Context. This World Context is then stored as additional context information to the metadata of the respective resource.

Second, the **visual concept detection**, as described in deliverable D4.3 [ForgetIT, 2015c], adds visual concepts detected in images as additional context.

Third, the **personal knowledge contextualization** takes the context information provided in the previous step by the Semantic Desktop in the `forgetit:context` attribute as separate context. In terms of the PoF Reference Model, this context information generated from personal knowledge represented in the PIMO is stored in the so-called *Local Context* (see also D8.2 [ForgetIT, 2015e]).

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[8]The *Terse RDF Triple Language* is a compact textual syntax for representing RDF, `http://www.w3.org/TR/turtle/`
[9]`https://dbpedia.org`

The context information delivered by the Semantic Desktop satisfies the context dimensions identified in deliverable D6.1 [ForgetIT, 2013b]:

Time The excerpt contains the thing's creation time, last modification, and in addition any time information associated with certain things such as events (either a point in time or a time period).

Location If locations are associated with a resource, e.g., usually for events or also for the sub-class `pimo:LifeSituation`.

Topic Any kind of topics identified for the resource. For the PIMO, this includes manually annotated topics (e.g., with the property `pimo:hasTopic`), suggested ones with `pimo:hasSuggestedTopic` (e.g., suggested by the entity recognition using General Architecture for Text Engineering (GATE) in FireTag or Semantic-FileExplorer, or using the ForgetIT image services), or inferred concepts with `pimo:hasInferredTopic` (e.g., because the photo collection as a whole has this topic, or the super task was annotated with it).

Entity Space This is comprised by the remaining relations a resource has in the PIMO not already covered above. These are various properties such as `rdfs:partOf` or `pimo:isFundedBy`.

Document Space This consists of other documents or sub-classes such as web pages or e-mails related to the resource.

2.6.5 Package

In this step the functional entity *Archiver* creates from the resource(s) collected from the Semantic Desktop the content and metadata to create a *Submission Information Package* (SIP). This is then handed over to the *Transfer* step.

2.6.6 Transfer

The *Transfer* step then submits the SIP to the *Digital Preservation System (DPS)* (see Figure 1) which stores it as an *Archival Information Package* (AIP). In the case of Pilot II on the ForgetIT testbed, the DPS is composed of DSpace and Openstack Swift.

2.6.7 Preservation finished

Once the preservation is finished, the PoF Middleware notifies the Active System of the outcome.

Notifying the user of the outcome is twofold: first, the user gets a notification once a collection has been preserved in the PIMO5 home screen as shown in Figure 20.
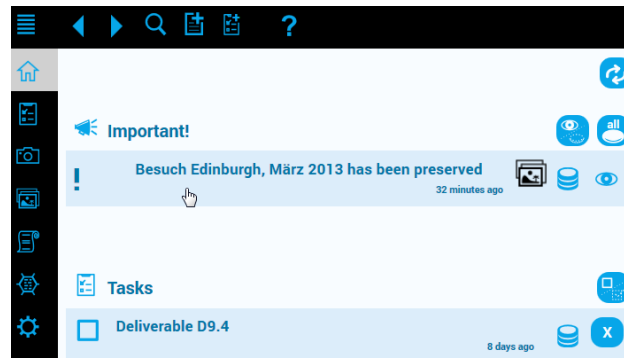
Figure 20: Notification of the successful preservation on the PIMO5 home screen.
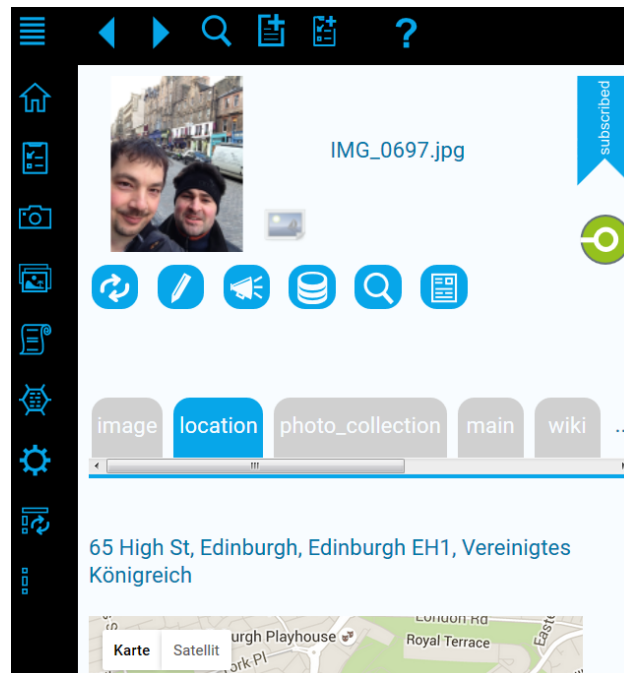
Figure 21: Showing the preservation state of a photo in the PIMO5 image detail view.

Second, several places in the Semantic Desktop show if a thing is preserved such as in the thing view in Figure 21, Figure 22, and Figure 4 (as well as in the PIMOCloud with the green PIMOCloud icon, see D9.3).

2.7   Mobile Information Assistant

The *Content Value Assessment* of the PoF Framework allows for realising enhanced features in the Active System. In this section, we focus on the ability to assess a resource's current importance to the user by means of the Memory Buoyancy (MB).

The availability of the PIMO5 user interface allows to access and use the PIMO also on mobile devices. Therefore, components and features of the Semantic Desktop are also
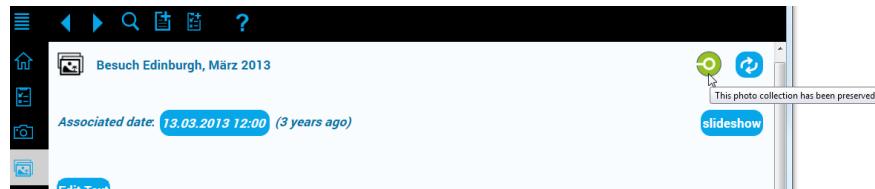
Figure 22: Showing the preservation state of a photo collection.

available on mobile devices such as the Semantic Text Editor (Seed) and the apps PIMO Photo Organization, PIMO Diary, and task management.

Furthermore, by supporting the CalDAV and CardDAV-endpoints (see also D9.3), mobile devices such as the iPhone can also sync and access persons, organizations, tasks, events, and reminders from the PIMO. Therefore, a large number of PIM activities are also supported on mobile (Not yet all, e.g., annotating web pages with PIMO concepts is not (yet) possible on, e.g., iOS). Thus, by introducing PIMO5 the Semantic Desktop evolved from a desktop-only information assistant to also being a mobile information assistant.[10]

Nonetheless, using PIMO5 in a mobile browser has certain limitations which we will outline in the following Section 2.7.1. Therefore, to fully experience the benefits, native clients which can be installed on the mobile device are required to overcome these limitations and grant more freedom to access resources on a device. Then a mobile information assistant can be realized with the ability to synchronize resources and concepts from the PIMO based on the current and expected importance and required accessibility of resources relying on the Memory Buoyancy assessment. The proof-of-concept for this feature is presented in Section 2.7.2.

2.7.1 PIMO5 Native Clients

Pilot I introduced the HTML5 user interface, PIMO5, for working with the Semantic Desktop on mobile devices using a web browser. Meanwhile, the Java applications brought into the project have been replaced by PIMO5 as it can be used also on the desktop in a web browser.

But still, this browser-based UI has several limitations: First, it does not allow access to local files on desktops or mobile devices. Being restricted to PIMO5 only (i.e., not using the SemanticFileExplorer) would require users to download files first in the browser before usage, and vice versa, requiring manual uploads by the user via an "Open File"-dialog to the PIMO. This is cumbersome and error-prone as, for instance, uploads could be forgotten, and thus, different file versions would exist.

Second, to support offline access and the envisioned syncing of files, currently, PIMO5 is limited to the browser's local storage which is usually only up to 5MB space for storing objects. Therefore, a larger cache is required, which can be realised only with a native

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[10]Therefore, we should think about extending the term Semantic Desktop to *Semantic Device*.
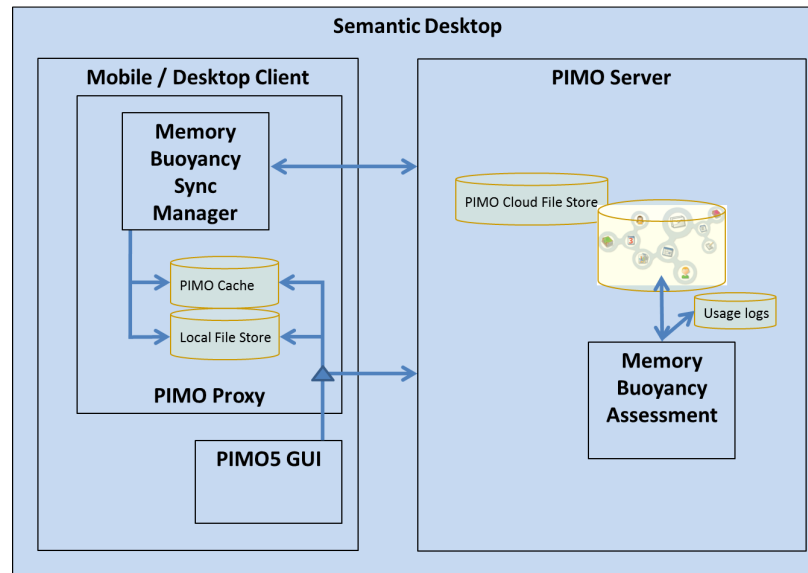
Figure 23: The Memory Buoyancy Sync Manager ensures the availability of resources in the local cache in the PIMO5 native client.

client.

Therefore, the Personal Preservation Pilot II introduces native clients for mobile devices as well as desktops using the Semantic Desktop infrastructure w/o relying on a web browser. The architecture of the PIMO5 native client is shown in Figure 23. The current proof-of-concept uses a local web server which serves the PIMO5 web pages and uses a local database as cache and runs as a native client. Then PIMO5 communicates with the PIMO Server using an embedded proxy which checks if resources are available locally. If a file is available in the local cache, the PIMO5 interface currently offers to open the file from the local cache as shown in Figure 24.

To ensure availability on a vast amount of desktop and mobile operating systems, we plan to migrate to the *Electron*[11] framework which allows to build cross platform applications using HTML5.

2.7.2   Syncing Resources to Devices based on Memory Buoyancy Assessment

As demonstration of the utility of Managed Forgetting developed in ForgetIT, Pilot I already provides several features which use Memory Buoyancy, namely hiding concepts with low MB when browsing or in search, removing files from a file system with low MB as well as restoring them (see D9.3).

A new functionality realised in Pilot II is the syncing of resources from the PIMO Server to mobile devices based on the Memory Buoyancy assessment. This shows how the MB is capable of supporting the PIM of users by ensuring accessibility of information objects in

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[11]http://electron.atom.io/
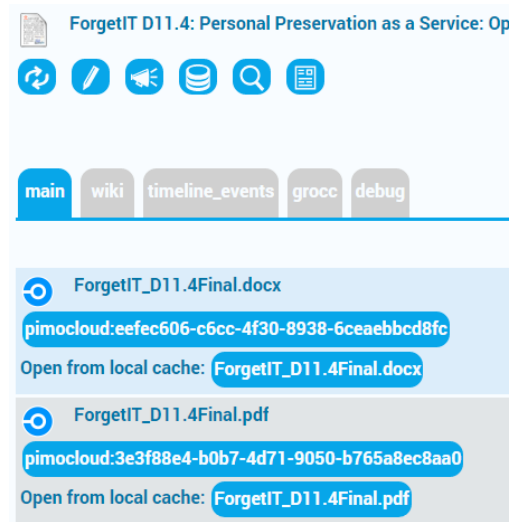
Figure 24: When PIMO5 runs as a native client, if a file is available in the cache, the user gets the option to open it from the local cache.

the information management system, in our case, the Semantic Desktop with the PIMO as knowledge base. Thus, by relying on the Memory Buoyancy, we are able to reduce required mobile data traffic as well as to support a smarter offline support (e.g., on an airplane) for working with the PIMO.

Figure 23 shows the architecture of this functionality. The Memory Buoyancy assessment on the PIMO Server ensures that the MB of things in the PIMO is calculated accordingly. Other applications or the PIMO5 can access the MB for value-added services.

The PIMO5 native client has an embedded *Memory Buoyancy Sync Manager* which takes care of filling the local cache with high buoyant PIMO concepts and copies file resources to the local store. The manager uses a dedicated Memory Buoyancy threshold to decide on the set of resources which should be synced. This threshold is higher on a mobile device than on a desktop computer. For a mobile device, we assume a tighter disk space issue as well as a more focused work and information need which does not require to have a large amount of data on immediate access. On the desktop, the disk space constraints are usually more relaxed and the main focused work will happen there. Especially for offline usage the Semantic Desktop can offer a broader spectrum of relevant media. On the DFKI PIMO we use a MB threshold of 50% (of the MB-spectrum) for the desktop and 70% for the mobile.

Figure 25 shows a PIMO5 page listing the currently high buoyant resources and concepts which are synced to the device. On the left-hand side, resources are shown which are kept on the local device (i.e., either desktop or mobile device) for local access. Clicking on a resource opens the local copy of the `pimo:CloudFile`[12] instead of downloading it. This handling is done throughout PIMO5. If a file is not in the cache, it is then accessed via the PIMOCloud.

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[12]More precisely, the latest version of the file as `pimo:CloudFileVersion`.

Figure 25: An overview page showing the high buoyant resources which are synced to the device on the left hand side. The list on the right shows the high buoyant PIMO concepts (starting with `pimo:Note` usually written with Seed). The screenshot shows a user's individual view on the DFKI PIMO.[a] The `pimo:Document` D11.4 has two `pimo:CloudFile` which are now cached as shown in Figure 26.

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[a]The number of items must be seen in relation with the potential items: in the DFKI PIMO there are currently over 7000 items of `pimo:Media` and approx. 3900 concepts which belong to the user shown and are shared by the group.
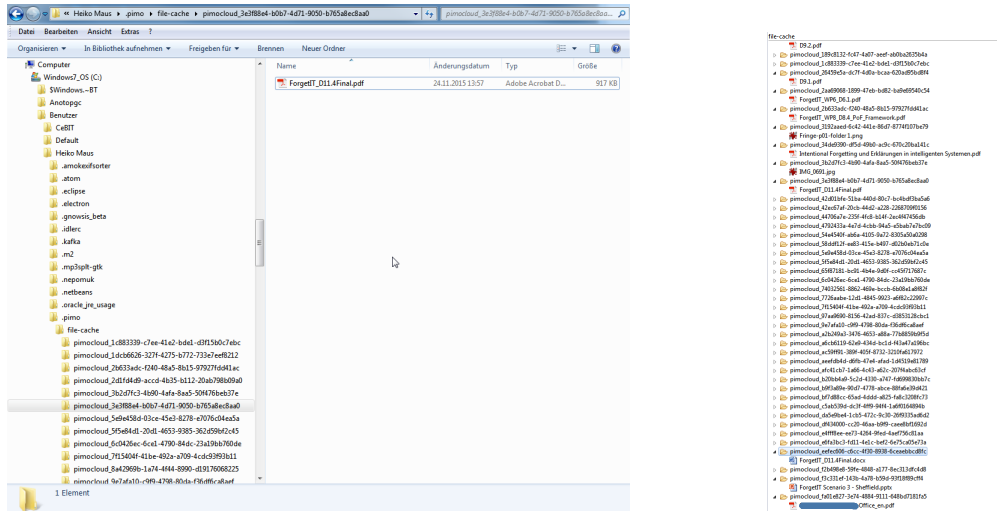
(a) View on the PIMO native client file-cache: folders are named after the `pimo:CloudFile` URI, the file is located in the folder.

(b) A different view showing several synced files, especially the D11.4 versions (docx and pdf).

Figure 26: A view on the local cache of the PIMO5 native client on a desktop where resources are synced to by the Memory Buoyancy Sync Manager. The PIMO5 native client then offers these files to be opened from local cache as shown in Figure 24.

On a desktop, the behavior is slightly different, as there might be local files of the user available in the file system anyway (e.g., annotated by the SemanticFileExplorer and having a local file path as *grounding occurrence*[13] in the PIMO), then a download to the cache is not necessary, the local file is opened instead.

Figure 26 shows a screenshot of the local cache of the PIMO5 on a desktop where resources are synced to by the Memory Buoyancy Sync Manager. The folders are the PIMO URIs of the respective `pimo:CloudFile` which is located in the folder.

The presented functionality together with the PIMO5 user interface for mobile browser and a proof-of-concept for syncing in native clients shows that the ForgetIT-enhanced functionality of the Semantic Desktop is also realisable on mobile devices. Thus, Pilot II extends Pilot I from a "concise preserving desktop information assistant" to a "concise preserving mobile information assistant".

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[13]With *grounding occurrence* the PIMO denotes the occurrence of the thing in the real world which stores its content. It grounds the thing in reality. For instance, if a web page is represented in the PIMO ('rebirthed'), a thing of type `pimo:Webpage` is instantiated and the URL of the web page is added with the property `pimo:groundingOccurrence`.

3   Assessment of Use Cases in the Personal Preservation Pilot II

In deliverable D9.2 we identified several use cases which we wanted to address in ForgetIT for the Personal Preservation application scenario. In deliverable D9.3, the use cases were assessed based on the functionality of Pilot I. In the following, we do a reassessment of the use cases with the new contributions by the Personal Preservation Pilot II.

This reassessment also contributes to the success indicators of WP9 as listed in ForgetIT's Description of Work [ForgetIT, 2012]: the use cases identified for Personal Preservation are assessed according to their progress and fulfillment which is a success indicator for WP9 which will be addressed in Section 4.1.

Therefore, in this final Personal Preservation Pilot deliverable, a further indicator is added to tell if a use case has been accomplished in WP9. The following entries will be used for the indicator "**Accomplished**":

full All of the intended features for a use case are implemented and either available in the Pilot or realized in other applications in WP9 or in ForgetIT.

most Most of the features of a use case were addressed. Only minor issues are missing, e.g., full-fledged user interfaces which would allow to use all features of technical components.

proof-of-concept This use case was realised as a proof-of-concept. However, a full functional integration in the Pilot has not been done.

no This use case has not been addressed in the Pilot or an implementation has not been done.

In order to emphasize the additional contributions of Pilot II, the respective use cases are signed with "**Pilot II**", and the additional descriptive text (in *italics*) describes the new contributions.

The use cases (**UC**) and their assessment are listed as follows:

UC.<**id**> <**use case name**> <*short description*>
<use case assessment for Personal Preservation Pilot I>[14]
if applicable: **Pilot II** <*use case assessment for Personal Preservation Pilot II*>
Priority: {**high, medium, low**}
Accomplished: {**full, most, proof-of-concept, no**}

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[14]To keep the assessment explanations short, the text explaining the use case is not repeated here. The reader might refer for details of the use case to deliverable D9.2.

From deliverable D9.3, we keep the references to the Pilot Documentation (PD) at `https://pimo.opendfki.de/wp9-pilot/`, where each Pilot I video got a number which derives from the succession of the section-numbers it is presented in:

<p align="center">PD.⟨section⟩.⟨subsection⟩.⟨subsubsection⟩</p>

For Pilot II, we still have to extend the online documentation . However, for the extensions to the PIMO Photo Organization app (see **PD.4.2**), this has already been done.

UC.1 preserving resources *The Semantic Desktop automatically preserves valuable resources.*
By connecting the Semantic Desktop to the PoF Middleware, resources can be preserved if the PoF Middleware decides to do so. Then, the Content Management Interoperability Service (CMIS) interface of the PIMO Server is accessed by the PoF Middleware and resources can be retrieved for preservation. The decision which resources are valuable relies on the Preservation Value computed in the PoF Middleware. The Semantic Desktop infrastructure provides evidences for this decision using various applications and plug-ins.

Furthermore, allowing to trigger manual preservation on resources enables the user to impose his/her decision. Choosing preservation manually causes the as the Preservation Value is to be set to the maximum value, which is an indication for the PoF Middleware to preserve it (see for manual preservation **PD.10.1.1**).

Pilot II now accomplished the full support of the PoF Framework by introducing Preservation Strategies to compute the Preservation Values (hence, identifying the 'valuable resources') and allowing the PoF Middleware to access and preserve resources using the Preservation Preparation Workflow if the PoF Middleware decides to do so (hence, 'automatically preserve') as explained in Section 2.6.
Priority: **high**
Accomplished: **full**

UC.2 forgetting resources *The Semantic Desktop hides resources from the user similar to a human forgetting.*
The Pilot uses Memory Buoyancy to hide PIMO concepts and resources on the PIMO5 interface (see **PD.9.2.1** and **PD.9.2.2**). Likewise, files with low Memory Buoyancy values are removed from the file system (see **PD.9.1.1**).

Pilot II introduces the file synchronization based on Memory Buoyancy as presented in Section 2.7.
Priority: **high**
Accomplished: **full**

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 PIMO Diary (see **PD.8.1.1**) is a step towards this solution: it computes a set of clustered concepts which represent an activity in the respective time frame. It generates an entry for this time frame with a title, the most prominent resources, an image if one is available, and condensed text and context. The next step will be to store such entries permanently (i.e., rebirth in the PIMO) and also identify a hierarchy of such entries, ultimately resulting in a landmark.

Furthermore, to cover several candidates for landmarks in a personal setting, a new class of for PIMO concepts has been introduced starting with the PIMORE prototype in [ForgetIT, 2014c]: the so-called 'LifeSituation': it is a sub-class of an event and shall represent various life situations of users such as birth, wedding, or holidays. Thus, they are close to landmarks for users in personal settings, whereas the PIMO already contains classes (for instance, projects) as landmark candidates for organisational settings. See **PD.4.1.2** for the use of the LifeSituation in the PIMO Photo Organization app.

Pilot II supports the collections of the CMIS interface for several classes in the PIMO such as `pimo:LifeSituation` *and* `pimo:Project` *which have instances which could qualify as landmarks (see, e.g., Figure 16). Therefore, the PoF Middleware is able to also preserve such landmarks and retrieve all connected resources as a collection.*
Priority: **high**
Accomplished: **most**

UC.4 collect information *The user shall be able to collect & organize information for an event, i.e., during an extensive search. The resources range from web pages, emails, notes, to files.*

The Semantic Desktop infrastructure provides support for this Personal Information Management activity with the various plug-ins and applications (see, e.g., **PD.2.1.1**). Users are able to link any kind of information with events (which could also originate from a calendar).
Priority: **medium**
Accomplished: **full**

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

The Semantic Desktop allows to manage tasks (see **PD.5.1.1**). This ranges from simple task lists – which can be put on a stack (e.g., checklist) and synchronized with different third party applications – up to more sophisticated task management with start/end dates, reminder, notes, annotations, sharing etc.
Priority: **medium**
Accomplished: **full**

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

The Semantic Desktop allows to organize events in the PIMO, but also enables

user to connect to third party applications where users keep and manage their own calendar (see **PD.6.1.1**). The current Pilot supports the CalDAV standard protocol for this, other protocols would be possible.
Priority: **medium**
Accomplished: **full**

UC.7 access information *During the event, the user accesses relevant information on mobile.*
With the PIMO5 interface, the Pilot shows that accessing the PIMO on mobile devices is already possible by using a web browser on the device (see, e.g., **PD.5.2.2**). This prepares for the next Pilot which will show the benefits of using Memory Buoyancy to keep high buoyant information on the mobile as well as pushing it there in the background.

Pilot II *introduces the Memory Buoyancy Sync Manager (see Section 2.7) syncing resources and concepts in the local cache of a PIMO5 native client.*
Priority: **medium**
Accomplished: **full**

UC.8 take photos *The user takes photos.*
The PIMO5 interface includes a dedicated app which allows to take photos and upload them directly into the PIMO. Photos are represented in the PIMO without further interaction of the user.

Photos taken outside of the Semantic Desktop, e.g., on the iPhone, can be easily uploaded as PIMO5 allows to take a picture or select a photo from the picture roll and upload it.
Priority: **medium**
Accomplished: **full**

UC.9 take notes *The user takes notes.*
By embedding Seed from WP4, this use case is fully covered (see **PD.7.1.1**). Especially as the Pilot shows different places where (semantically-enriched) notes are available now: simple note-taking, notes on tasks, pictures, events, actually it is possible on every thing in the PIMO.
Priority: **medium**
Accomplished: **full**

UC.10 share photos *The user shares photos with others.*
The Pilot allows to share photos with other users registered on the same PIMO Server. The possibility to upload a photo to a social platform is not implemented. The sharing itself provides a further evidence for Preservation Value assessment. That means, by the ability to provide sharing on a restricted social platform (i.e., the group of users on a PIMO Server), the user action of sharing a resource is available as an evidence for assessment in ForgetIT, e.g., for the Preservation Value.
Priority: **low**
Accomplished: **full**

UC.11 organize photos *The user will inspect and organize their photo collection.*
This use case is supported twice: in the Pilot I the PIMO Photo Organization app allows users to organize their photos with the help of the PIMO (see **PD.4.1.1-3**). Connecting them to PIMO concepts such as persons, events, topics, documents, etc. is possible. Furthermore, the Photo Preservation Application in D9.3 supports users in selecting photos for preservation.
Priority: **high**
Accomplished: **full**

UC.12 add contextual information *After the event, the user adds additional information with relation to the event.*
The Semantic Desktop infrastructure allows to add information to an event from various sources such as address books (contact details of persons), calendars (e.g., location, duration, attendees), the internet (e.g., web pages on the event), or events (e.g., arrange a photo collection and connect it to the event).
Priority: **medium**
Accomplished: **full**

UC.13 reminisce event *After several years, the user reminisces an event.*
This use case is realized in the PIMO Diary for contextual remembering (see **PD.8.1.1-8**). A condensed view of events or activities are shown. Users are able to zoom into time intervals from decades down to days. Contained resources can be accessed if they are still in the PIMO. What is still missing is to access archived material after it is removed from the PIMO.

Pilot II *allows to access archived material via the SD/PoF Adapter interface. A convenient interface where this access is embedded in the PIMO Diary is still missing.*
Priority: **high**
Accomplished: **most**

UC.14 reuse details from last event *The user wants to recall booking details to reuse for this year's event.*
This use case is supported by the PIMO as such material stays accessible in the PIMO an can be found and reused.

Parts of the material might be forgotten and hidden from the user's view. Still, the UI allows for showing such forgotten details (see **PD.9.2.1** and **PD.9.2.2**).
Priority: **medium**
Accomplished: **full**

UC.15 annotate photos *The user adds tags and descriptions to photos, organizes them together as events.*
The PIMO Photo Organization app realizes exactly this use case (see **PD.4.1.1-3**).

Pilot II *now uses the ForgetIT image services as detailed in Section 2.3 detecting visual concepts and automatically annotating them as PIMO concepts (see* **PD.4.2.15***).*
Priority: **high**
Accomplished: **full**

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

The Photo Preservation Application presented in D9.3 shows how image analysis components from PoF Middleware are used for image quality assessment in order to support users in the selection of photos for preservation.

The PIMO Photo Organization app allows to mark photos as 'favourite' and have a slider for keep and delete (see **PD.4.1.2**).

Pilot II *now uses the ForgetIT image services (see Section 2.3) which supports users in the evaluation of their photo collections. Pilot II also extends the Photo Organization app with several features for a better organization explained in Section 2.2 and functions explained in **PD.4.2**.*
Priority: **medium**
Accomplished: **full**

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

Deletion is possible in Pilot I. There are several supported steps: deletion of a local file which was synced with the PIMOCloud; in such cases the file in the cloud will be kept. It will be deleted finally, when the user deletes the thing representing the file to which the cloud file is connected.

We still have to address deletion if the file resides in the archive: If the Preservation Value was high, it might already be in the archive. In that case the user should be informed and decide if the file in the archive should also be deleted. This should cover privacy issues for the user.
Priority: **high**
Accomplished: **most**

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.*

The PoF Middleware allows to access single resources and collections by an authenticated user via browser interface. This also allows to view photos in the browser.

The extension of the Photo Preservation Application in D9.3 will allow this with a dedicated UI which will be reported in D9.5.
Priority: **medium**
Accomplished: **most**

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

This use case is supported in the Pilot by browse and search facilities. There are different ways of retrieving a photo, e.g., by accessing the life situation it is contained in (see **PD.4.2.1**), by drilling down in the PIMO Diary (**PD.8.1.3**), or by the facetted search (**PD.4.1.4**), which allows an associative retrieval of the photo. This is supported by the PIMO Photo Organization app which adds annotations to the photo with entities found in the descriptive text of the photo (using Seed), and also adds concepts[15] annotated to the life situation the photo is contained in.

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[15]Technically, the property used for such inferred annotations is *PIMO:hasInferredTopic* to differentiate btw. those annotations the user explicitly added to the photo.

If a photo is no longer available in the PIMO, it might be accessed in the archive. Search & retrieval in the archive is supported by the PoF Middleware components and can be found in deliverables such as D3.3 [ForgetIT, 2015b] and D7.2 [ForgetIT, 2014b] and upcoming D9.5 [ForgetIT, 2016f].
Priority: **high**
Accomplished: **full**

UC.20 reminisce based on a photo *The user starts to reminisce based on a photo.*
This use case is supported by two different applications: PIMO Diary (see **PD.8.1.3**) and PIMO Photo Organization app (see, e.g., **PD.4.1.2** and **PD.4.1.5**) which allows to browse and inspect the relations of a photo in the PIMO such as the life situation a photo is contained in, the annotated and inferred concepts, etc.
Priority: **high**
Accomplished: **full**

UC.21 import photos *The user introduces new photos to their collection.*
This use case is supported by the Pilot (via SemanticFileExplorer and PIMO5 which allows to add a photo collection to the PIMO; see **PD.4.1.1**,**PD.4.2.1**) and the Photo Preservation Application in D9.3.
Priority: **high**
Accomplished: **full**

UC.22 preserve situation *The user preserves the situation for later generations.*
In the Pilot, the user has several possibilities to add contextual information for a situation such as photos, textual descriptions, concepts from the PIMO as well as various external resources such as web pages or documents. As this is connected to the situation, the PoF Framework is able to identify connected information objects in case of preservation to add this to the contextualization step as well as to archive this additional material.

Pilot II now supports the whole Preservation Preparation Workflow and extends above proof-of-concept to a full support as explained in Section 2.6.
Priority: **high**
Accomplished: **full**

UC.23 decide for preservation *The user explicitly decides to preserve a set of photos.*
The Photo Preservation Application presented in D9.3 realizes this use case.

In the Pilot I, manually triggering preservation is realized (see **PD.10.1.1**).

Pilot II allows a manual preservation of a whole photo collection by clicking on the "Preserve" button in the life situation in Figure 3 (and if successful turns into the preserved icon as in Figure 22).

Furthermore, in the PIMO5 time capsule view, an individual change of the preservation decision from the PV assessment is possible (see Figure 10).
Priority: **high**
Accomplished: **full**

UC.24 browse a person *The user browses a person's connections in the PIMO.*
Persons are important concepts in the PIMO and are supported in the Pilot. They have dedicated properties to represent and synchronize information from and to address books as well as further relations such as attendee, mentioned in texts, member of organization, etc. (see **PD.6.2.1**).
Priority: **high**
Accomplished: **full**

UC.25 view a condensed resource *The user inspects a resource which was already condensed.*
This is realized in the PIMO Diary as explained above by allowing to zoom into a diary entry (see **PD.8.1.5**).

The development of a condensed view outside of the PIMO Diary app is required as soon as the condensation is stored (i.e., rebirthed) in the PIMO and can be accessed independent from the PIMO Diary.
Priority: **high**
Accomplished: **most**

UC.26 timeline view *The user wants to see a timeline with things (i.e., events or life situations) with relation to the person.*
This use case is supported by the PIMO Diary which allows to set time intervals and browse the condensed activities there (see **PD.8.1.1** and **PD.8.1.3**). Focusing on a specific person (or any other thing), this person can be selected from the context sidebar (see **PD.8.1.4**). A re-computation of the time interval giving the selected person a higher weight, will put more focus on those occasions where that person (or thing) is connected to.

A more basic timeline view is available for each and every thing in the PIMO. This timeline shows what happened with the thing in the PIMO, e.g., modifications of the thing or relations to other things.

Also, the RememberMe App in deliverable D3.3 [ForgetIT, 2015b] presents users a timeline view on their resources from a social media platform.
Priority: **high**
Accomplished: **full**

UC.27 investigate details *The user will investigate, e.g., an event in more detail, therefore will retrieve details.*
This too is supported in the PIMO Diary where more information on an (condensed) activity can be requested, drilled down, and resources inspected if still available (see **PD.8.1.5**).

For things in the PIMO, PIMO5 shows a view of a thing (person, event, life situation, document, etc.) which hides other connected things if their Memory Buoyancy is below a threshold. If wished, the user can request to also show forgotten details (see **PD.9.1.2**).
Priority: **medium**
Accomplished: **full**

UC.28 access locally unavailable material *The user accesses forgotten resources which were removed from the local computer.*
   This is realized in the Pilot: files which were forgotten can be retrieved by either finding them directly (see **PD.9.1.2**) or through other connected material (for instance, by accessing the task context as shown in **PD.9.1.3**). Files can be restored on any computer using desktop clients or accessed via the PIMO5 interface by any browser.
   Priority: **high**
   Accomplished: **full**

UC.29 restore material from archive *The user accesses material already moved to the archive.*
   This is also shown in the Pilot, a preserved file is retrieved from the archive. This scenario is supported by the Pilot's desktop clients (SemanticFileExplorer and PIMOCloud service, see **PD.10.1.1**).

   Accessing and restoring material w/o the PIMO is also possible using the PoF Middleware.
   Priority: **high**
   Accomplished: **most**

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 is supported by the PIMOCloud versioning mechanism in the Pilot (see also **PD.10.1.1**): a restored resource is retrieved from the archive and copied into the PIMOCloud as new version of the preserved file.[16] This general approach makes sense as the restored file might not be the same as the preserved one due to format transformations.

   The restored file is then downloaded[17] and can be inspected safely without interfering with other versions. The user may decide that the restored version is the 'correct' version. Alternatively, the restored version could be 'discarded', in which case the locally restored file as well as the version in the cloud will be deleted.
   Priority: **medium**
   Accomplished: **full**

UC.31 contribute new information to archive *The user adds new information to an already preserved information object.*
   On the Pilot's side, it is possible to continue to use a preserved resource. Changes, additions, especially new contextual information from the PIMO are possible. It is then up to the PoF Middleware to decide how to treat this additional information of a once preserved resource. This is topic of a separate preservation workflow but not yet realized in Pilot I.

   Pilot II *now supports the full Preservation Preparation Workflow (see Section 2.6) with full access of the PoF Middleware to the SD/PoF Adapter. The updates of the*

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[16]Technically, a branch branching from the preserved version is created.
[17]The restored file gets a ForgetIT-green icon with red exclamation mark, to indicate it is an unchecked restored version.

Preservation Values as well as last modification date of the resource allow to decide if the resource needs to be updated in the archive.
Priority: **medium**
Accomplished: **full**

UC.32 search & access archive *After the disaster, the user wants to access preserved material in the archive.*
This is possible with the PoF Middleware.

The new versions of the PoF Middleware as well as the upcoming extension of the Photo Preservation Application will allow this with a dedicated UI and will be reported in D9.5.
Priority: **medium**
Accomplished: **most**

UC.33 restore environment *The user wants to regain access to the PIMO on a new computer.*
The Pilot realizes this use case as the Semantic Desktop installation page allows the user to quickly set up the Semantic Desktop infrastructure again.
Priority: **medium**
Accomplished: **full**

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.

This is possible in the current setting. PIMO files in the PIMOCloud, as well as material available in the archive, can be restored on the computer. However, there is no convenient uniform UI available for that so far.
Priority: **medium**
Accomplished: **most**

UC.35 restore from archive *The user wants to get back material from the archive without requiring the Semantic Desktop.*
This is possible to some extent with the web-based access to the archive the PoF Middleware provides. A dedicated end-user interface for this is not available.

With the new versions of the PoF Middleware especially with the Search & Navigate *component this will be possible. This will be reported in the final deliverable of the PoF Framework in D8.6 [ForgetIT, 2016e].*
Priority: **medium**
Accomplished: **most**

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.*

This is already possible with the PoF Middleware as part of the Pilot.
Priority: **medium**
Accomplished: **full**

UC.37 archive migration *The user wants to migrate their archive content to a new provider.*
This is not addressed in the Pilot.
Priority: **low**
Accomplished: **no**

UC.38 reminisce using the PIMO *A user wants to reminisce using the PIMO.*
This is realized with the PIMO Diary as part of the Pilot (see **PD.8.1.1-8**).
Priority: **medium**
Accomplished: **full**

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 not addressed in Pilot I.

Pilot II *introduces a Preservation Service Contract in the PIMO5 interface with the possibility to add a contact from the PIMO which should be contacted in case of the user's death (see Section 2.5).*
Priority: **medium**
Accomplished: **proof-of-concept**

UC.40 purchase decision *The user looks in the internet for making a purchase decision.*
This use case is supported by the Pilot by various possibilities to search, collect, and organize information for a decision such as annotating web pages, writing notes, storing images, etc.
Priority: **low**
Accomplished: **full**

UC.41 cleanup material
This use case is supported in the Pilot by the forgetting and removing of files with low Memory Buoyancy. The video about the 'task context' (see **PD.9.1.3**) shows how short-term material stored on the desktop to fulfill a task gets deleted after the task has been finished a while ago and the buoyancy drops.
Priority: **low**
Accomplished: **full**

Pilot II contributes to several use cases which were not accomplished with Pilot I. In particular, the support of an Personal Preservation Strategy which is used in the Preservation Value assessment in the Semantic Desktop. Furthermore, the implementation of the Preservation Preparation Workflow from the Semantic Desktop side using the Preservation Strategy. These two contributions allow for a successful overall coverage of the use cases.

4 Summary

This deliverable presented the second Personal Preservation Pilot as result of WP9 and how it contributes to the ForgetIT goals. The Pilot is deployed and running in the ForgetIT testbed environment and consists of components from technical work packages which are part of the PoF Middleware but also part of the Semantic Desktop infrastructure. Pilot II extended Pilot I especially with focus on Preservation and especially strengthened the interaction with the PoF Middleware.

To demonstrate the progress and success in WP9 including Personal Preservation Pilot II, the performance indicators for WP9 are reassessed in the following. This assessment now includes both pilots as reported in the deliverables but leaves out the yet-to-report evaluations in WP9 which will be reported in upcoming deliverable D9.5 [ForgetIT, 2016f].

4.1 Assessment of Performance Indicators

In the ForgetIT's Description of Work [ForgetIT, 2012], the following expected outcomes for WP9 were listed together with success/progress indicators:

Expected Outcomes

1. *A Preservation Strategy suitable for Personal Information Management using the Semantic Desktop approach*

2. *Prototypes showing the realization of the personal preservation*

3. *Evaluated best practice of preservation-oriented knowledge modelling and personal preservation*

In the following, the progress of these outcomes are discussed along the success indicators. Achievements introduced with Pilot II are added in *italics*.

A Preservation Strategy suitable for PIM using the Semantic Desktop approach

- *Availability of several documented use cases for personal preservation, with appropriate presentation materials*

  Deliverable D9.2 [ForgetIT, 2014c] listed in Section 2 relevant use cases which are addressed by the pilot. *Their fulfillment is reassessed in Section 3 of this deliverable. We have shown that most of the use cases are successfully covered in both pilots.* Furthermore, the pilot documentation demonstrates the realization of several use cases.

- *Documented Preservation Strategy suitable for users applying PIM*

  The initial Preservation Strategy realized and documented by the Personal Preservation Pilot I is as follows:

  The pilot shows how PIM is supported by the Semantic Desktop infrastructure. In doing so, various evidences are collected for the PoF to make preservation decisions. Furthermore, all resources known to the Semantic Desktop are candidates to be preserved automatically without user intervention. In addition, manually triggering preservation on resources is also possible even if the resources are not initially known to the PIMO.

  Making resources known to the Semantic Desktop is simply done by either annotating a resource, defining file folders where files are automatically introduced into the PIMO, or using a specialized app from the Semantic Desktop infrastructure such as photo organization, calendar, task management, or note-taking, thus, being part of user's PIM.

  The preservation is then realized by connecting the Semantic Desktop with the PoF Middleware. This is documented in the web-based documentation of the Personal Preservation Pilot I.

  Thus, users using at least some of the components offered by the Semantic Desktop infrastructure for their PIM are supported by synergetic preservation of PoF. As pointed out in this deliverable, even if a user just uses one app from the infrastructure, e.g., photo organization for their photo collections, their resources are connected to the PoF.

  The Personal Preservation Pilot II extends the initial Preservation Strategy as follows:

  Pilot II allows to set an individual Preservation Strategy by either selecting policies and rules along the 6 dimensions for Preservation Value assessment and/or choosing among the four personas offered (see Section 2.4). The PIMO5 user interface allows for inspecting the consequences of the selected Preservation Strategy. Further details of a Preservation Service Contract are shown as proof-of-concept such as choosing different Preservation Levels which are sent to the PoF Middleware as Preservation Broker Contracts (Extensions of this will be part of deliverable D5.4 [ForgetIT, 2016d]).

  Based on the individual Preservation Strategy, the Preservation Value assessment in the Semantic Desktop calculates the PV of each thing in the PIMO. The PoF Middleware via the Forgettor then is able to decide on the set of resources to be preserved (using the selected PV Categories communicated in the Preservation Broker Contract) and start the Preservation Preparation Workflow.

  With the setting of the Preservation Strategy in the Semantic Desktop allows the user not to care about preservation henceforth, because ForgetIT's approach of Synergetic Preservation will start to pull things of the PIMO into the archive if their PV reaches the thresholds or rather categories (gold, silver, bronze) set in the contract.

- *Level of contribution of Semantic Desktop for selection and preservation activities*

  Pilot I shows how user's are able to interact with resources in the Semantic Desktop. This allows to provide evidences for the PoF to decide for preservation. In deliverable D3.3 and upcoming D3.4 ([ForgetIT, 2015b, ForgetIT, 2016b]) the contributions for calculating the Preservation Value are explained. For the Memory Buoyancy, the calculation is based solely on interaction evidences and semantic model information from the PIMO. Pilot I shows several benefits which make use of the Memory Buoyancy to realize Managed Forgetting.

  As mentioned above, Pilot II introduces Preservation Strategy and individual Preservation Value assessment and thus realizes a contribution which shows the usefulness of the approach, of the infrastructure chosen, and also a proof-of-concept for adapting selection and preservation activities to the individual user's choice. Now users can continue with their PIM and resources will get preserved (according to the chosen contract) while still allowing manual preservation of material.

  Furthermore, the PIMO provides rich context from personal knowledge for the contextualization in the PoF Framework which is usually not producible by world knowledge contextualization.

Prototypes showing the realization of the personal preservation

- *Existing prototype for a concise preserving personal desktop*

  Pilot I shows the implementation of the preservation workflow by connecting to the PoF Middleware. This enables the Semantic Desktop to preserve resources in the preservation system. Restoring preserved resources is also realized within the Semantic Desktop infrastructure.

  Several applications within the Pilot contribute to the ForgetIT goals of Managed Forgetting, Synergetic Preservation, and Contextualized Remembering as pointed out in the Pilot I documentation in D9.3.

  As mentioned above, Pilot II introduces Preservation Strategy and individual Preservation Value assessment, therefore strengthening the achievement of Pilot I in the area of Preservation.

- *Existing prototype for a concise preserving mobile information assistant*

  In ForgetIT, the Semantic Desktop infrastructure was extended by an HTML5 interface (the so-called 'PIMO5') which is capable of running on mobile devices. Apart from the desktop clients for preserving on the desktop, PIMO5 is the main focus of development to realize the use cases for personal preservation. With this, the second pilot which focuses on mobile devices will embrace the functionality of PIMO5 in Pilot I.

  Pilot II realized with the Memory Buoyancy assessment and the Memory Buoyancy Sync Manager the synchronization of files and concepts from the PIMO which are of current relevance for the user. The benefit is to provide access to these files and

concepts also if the user is offline as well as reducing required mobile data bandwith by saving the user the need to download the files first.

The availability of native clients on mobile devices also enables to connect resources to the Semantic Desktop and thus, also to allow preservation by connection of the Semantic Desktop infrastructure with the SD/PoF Adapter to the PoF Framework.

Depending on the mobile operating system, access to resources can be restricted.[18] However, embracing these resources is a task for the future development of the Semantic Desktop infrastructure on mobile devices. For ForgetIT, the proof-of-concept in Pilot II shows the general realisability.

Evaluated best practice of preservation-oriented knowledge modelling and personal preservation

The last success indicator will be addressed with the evaluation in the final deliverable of WP9 in D9.5 [ForgetIT, 2016f].

- *Ease of use of the personal Preservation Strategy, as shown in demonstration use cases*

- *Low additional effort for personal preservation, as shown by experimental use of the prototypes*

- *User satisfaction with the identified personal Preservation Strategy, as assessed by user feedback during evaluation experiments*

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[18]For instance, on iOS access to files of other apps is not allowed, they need to be handed over explicitly by the user.

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Glossary

CMIS Content Management Interoperability Service. 29, 39, 40

FireTag is a PIMO-enabled sidebar plug-in for Mozilla FireFox web browser and Thunderbird e-mail client for annotating resources, i.e., web pages and e-mails. 9, 31

GATE General Architecture for Text Engineering. 9, 31

MB Memory Buoyancy. 5, 6, 9, 14, 28, 29, 32–35, 37, 39, 41, 45, 48, 51

PD Pilot Documentation. 39

PIM Personal Information Management. 7, 29, 33, 34, 40, 49–51

PIMO Personal Information Model. 6, 9, 20, 24, 29, 32, 33, 35, 37, 39–48, 50, 51

PIMO Diary is an application in the Semantic Desktop which uses the PIMO to generate a diary for various time periods w/o requiring the user to actually write one (see also [Jilek et al., 2015]). 12, 33, 40, 42–45, 48

PIMO5 is an HTML5 client in the Semantic Desktop infrastructure allowing to browse the PIMO and containing several apps such as the PIMO Diary. PIMO5 is also available for browsers on mobile devices. 6, 18, 20, 22–26, 31–35, 37, 39, 41, 44–46, 48, 50, 51

PoF Preserve-or-Forget. 6, 7, 9, 14, 22, 24, 25, 28, 29, 32, 39, 40, 43, 44, 46–52

Preservation Strategy is a profile of rules and policies for a user which is used to calculate the Preservation Value. 4, 6, 8, 9, 14, 16–20, 22, 24–29, 39, 48–52

PV Preservation Value. 6, 8, 9, 12, 14, 16–21, 23–29, 39, 41, 43, 44, 47, 48, 50, 51

Seed Semantic Text Editor. 33, 36, 41, 43

Semantic Desktop is an approach which introduces a knowledge representation layer (the PIMO) by Semantic technologies on top of information sources on the desktop and mobile devices and opening up this to applications. 6, 7, 9, 12, 14, 16, 19–22, 24, 29–35, 37, 39–42, 47–52

SemanticFileExplorer is a PIMO-enabled plug-in for the MS Windows File Explorer. 9, 31, 33, 37, 44, 46