## Deliverable D6.1 - POPEYE Demonstration Plan

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### Abstract

This document is POPEYE Project deliverable D6.1 - POPEYE Demonstration Plan. It contains a workplan for the different phases of the project that will lead to two Demonstration Events (Interim and Final) that will enable verifying POPEYE's architecture and Proof-of-Concept applications.

### Keywords List

Demonstration Plan, Proof of Concept, Integration, Risk Management, Collaboration, Peer to Peer, Mobile ad hoc network,
Executive Summary

This document is POPEYE D6.1 deliverable, the POPEYE Demonstration Plan. This is the first deliverable produced for Workpackage WP6, concerning the specification and development of selected collaboration applications to test and validate the POPEYE approach and the developed architecture, platform and services, making use of the scenarios and requirements defined in WP2.

The goal of this deliverable is to present a workplan for the two Demonstration Events that will take place during the project's lifetime; the first (Interim Demonstration) due on month M18 and the second (Final Demonstration) due on month M24 at the end of the project, including a timetable for the main phases and milestones and a plan describing the contributions coming from the different workpackages to the proof-of-concept application that will be demonstrated during the two events.
## Revision history

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### Acronyms

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<tr>
<th>Acronym</th>
<th>Meaning</th>
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<tr>
<td>CWE</td>
<td>Collaborative Working Environment</td>
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<td>DYMO</td>
<td>Dynamic MANET On-Demand Protocol</td>
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<td>EMAP</td>
<td>Extensible MANET Autoconfiguration Protocol</td>
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<td>MANET</td>
<td>Mobile Ad-hoc Networks</td>
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<td>MMARP</td>
<td>Multicast MANET Routing Protocol</td>
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<td>P2P</td>
<td>Peer-to-Peer</td>
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<td>PDA</td>
<td>Personal Digital Assistant</td>
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</table>
Table of Contents

1 Introduction .................................................................................................................................................. 7
  1.1 References ............................................................................................................................................. 8

2 Demonstration Plan General Guidelines .................................................................................................. 9
  2.1 POPEYE Demo Scenarios ....................................................................................................................... 9
  2.2 Project’s research objectives .................................................................................................................... 12
  2.3 Target POPEYE Applications ............................................................................................................... 14

3 POPEYE Demonstration Workplan .......................................................................................................... 15
  3.1 Workplan and Timetable ....................................................................................................................... 15
    3.1.1 phase I - scenario analysis and requirement definitions ................................................................. 16
    3.1.2 phase II - design phase ................................................................................................................... 16
    3.1.3 phase III - first prototype and interim demonstration ..................................................................... 17
    3.1.4 phase IV - second prototype and final demonstration ..................................................................... 19
  3.2 Interim Demonstration Event .................................................................................................................. 20
    3.2.1 POPEYE research contribution ..................................................................................................... 20
    3.2.1.1 System Architecture .................................................................................................................. 20
    3.2.1.2 Security ..................................................................................................................................... 20
    3.2.1.3 P2P over MANET .................................................................................................................... 21
    3.2.1.4 Core Services ............................................................................................................................ 22
    3.2.2 Integration ...................................................................................................................................... 23
    3.2.3 User Group .................................................................................................................................... 25
    3.2.4 External Contribution ...................................................................................................................... 26
  3.3 Final Demonstration Event ..................................................................................................................... 27
    3.3.1 POPEYE research contribution ..................................................................................................... 27
    3.3.1.1 System Architecture .................................................................................................................. 27
    3.3.1.2 Security ..................................................................................................................................... 27
    3.3.1.3 P2P Over MANET .................................................................................................................... 28
    3.3.1.4 Core Services ............................................................................................................................ 29
    3.3.2 Integration ...................................................................................................................................... 29
    3.3.3 User Group .................................................................................................................................... 30
    3.3.4 External Contribution ...................................................................................................................... 30
  3.4 Risk Management ..................................................................................................................................... 31
    3.4.1 POPEYE Process for Risk Management ....................................................................................... 31
    3.4.2 Early identified risks ....................................................................................................................... 32

4 Conclusions ................................................................................................................................................ 35
1 Introduction

This document is POPEYE D6.1 deliverable, the POPEYE Demonstration Plan. This is the first deliverable produced for Workpackage WP6, concerning the specification and development of selected collaboration applications to test and validate the POPEYE approach and the developed architecture, platform and services, making use of the scenarios and requirements defined in WP2.

Though formally belonging to WP6, this deliverable is also closely related to the results of Workpackage WP8, concerning a the two-stage demonstration activity that will constitute the two demonstration events of the POPEYE proof-of-concept applications, having the goal of validating the applications themselves in realistic situations.

The first demonstration event, foreseen in month M18 (October 2007), will be an initial demonstration that will be set up involving a user group selected internally to the project consortium by the project partners themselves. This initial test will enable verifying the architecture and applications in a controlled environment, identifying problems and providing useful feedbacks for adjustment and consolidation of both the POPEYE architecture and the tested applications.

The second demonstration event, foreseen in month M24 (April 2008) at the end of the project's lifetime, will be the most relevant of the two, in that this demonstration will provide an open, public show case of POPEYE technologies. The event will be set up in the context of a project open Workshop organised in conjunction with some major ICT RTD event (for instance, the annual IST event). This will allow to demonstrate and disseminate project results to the wider IST, scientific and technical communities.

Specifically the goal of deliverable D6.1 consists in providing a plan for the activities to be performed in order to lead to a successful demonstration in both of the Proof of Concept Demonstration events.

Section 2 of this document defines the general guidelines for the workplan of the activities that - through the definition of the requirements, the specification and implementation of the components of the POPEYE architecture and the identification of the POPEYE proof-of-concept applications - will lead to the two foreseen demonstrations events. The project's objectives in terms of research goals and the reference scenarios are summarised.

Then, section 3 enter into the details concerning the workplan of the activities that will result in the development of the POPEYE proof-of-concept application that will be used to demonstrate the system. The relation between the contributions of each workpackage to the global architecture will be analysed and, for each WP, the foreseen state of advancement in correspondence with each one of the two events will be defined, indicating which parts of the workpackages output will be ready and will be able to contribute to the demonstration, in which status and maturity level (including the identification of parts that will be present only at an interface level, with a simulated implementation) and if there will be any foreseen limitations in performances or under other aspects. The same chapters analyses in its last section the potential risks and plans possible action to mitigate them.
1.1 References

[POPEYE D2.1] POPEYE Project Deliverable D2.1 - Description of Collaboration Scenarios

[POPEYE D2.2] POPEYE Project Deliverable D2.2 - Description of functional, non-functional and technical requirements

[POPEYE RqWorkshop] POPEYE End-User Requirements Workshop Public Proceedings stand alone Annex to [POPEYE D2.2]
2 Demonstration Plan General Guidelines

In this section we will identify the general guidelines for the process that through the definition and development of the selected POPEYE mobility-enabled peer-to-peer e-collaboration applications will lead to the organisation and set up of the two demonstration events, the Interim Demonstration, foreseen in month M18 (October 2007) and the Final Demonstration event, foreseen at the end of the project in month M24 (April 2008).

First of all we will summarise the POPEYE technical and research objectives of the project and then by analysing the scenario chosen as a reference for the definition and the specification of the target POPEYE application on which the two demonstration events will focus, with an eye to the more complete analysis of collaboration scenarios that has been performed during the first phase of the project and that was summarised in deliverable D2.1, Description of Collaboration Scenarios (see [POPEYE D2.1]).

2.1 POPEYE Demo Scenarios

The baseline POPEYE scenario addressed by the our research activity is summarised in Tab 1 at the end of this section (also refer to [POPEYE RqWorkshop]).
In this scenario the activities involved in the organisation of an annual symposium on sustainable development, in a location where no network infrastructure is available, are supported by a simple and reliable computing environments for collaborative work, namely the future POPEYE system. This baseline user story captures the most important elements that characterise the usage of a system like the one POPEYE tries to define, and for this reason this has been chosen as the reference scenario for the activities that will take place during the Demonstration Events.
Though this user story covers a main role as a reference, this does not mean that this is the only source of information that helps define the POPEYE system's requirements and the proof-of-concept application features. A complete work of analysis was performed in the first phases of the project leading to the collection of a set of User Stories covering the widest possible range of uses that can be made of a collaborative working environment like POPEYE. These User Stories were collected in deliverable D2.1 - Description of Collaboration Scenarios [POPEYE D2.1] and used as input for the system functional and non functional requirements collected in deliverable D2.2 - Description of functional, non functional and technical requirements [POPEYE D2.2]. These User Stories are summarised in Tab 2.
To make the picture even more complete, a User Workshop meeting involving the POPEYE User Group including several CWE experts was set up and held in Oldenburg during month M5, leading to a collection of further input concerning user expectations. The results, summarised in [POPEYE RqWorkshop], has inspired some recommendations in the present Demonstration Plan.
Today is Monday 7th December 2009 and Sandra is early on her way to Château Villette, near Versailles. Sandra is the Organiser of the annual world symposium on sustainable development that is due to start today.

All previous such meetings took place in one or another major conference centres throughout the world, this time Sandra obtained a great bargain in renting a huge Castle in the countryside near Versailles in France.

The main justification for this bargain being the almost complete absence of communication infrastructure, with the exception of a few fixed telephone lines and the relatively good signal strength of the main mobile operators, thanks for the castle being on a small hill. This symposium, like most such meetings these days, heavily relies on modern computing environment and multimedia data but Sandra needed no more than what Château Villette had to offer.

Indeed, since a little research project called POPEYE showed the way a few years ago, it has become extremely easy to share data in near real time within spontaneous virtual communities without any pre-requisite for a complex infrastructure like Internet or even a simple LAN.

As it is, the symposium participants all have access to the each other’s data that they decided to share (such as a multimedia presentation, or a text document) on their own PDA or laptop. They can interact with the document accordingly to their individual privileges (author, contributor, reader/spectator,…). With the integral security features they may also decide to authenticate themselves and then get access to additional services such as participating to the election of the administration board and voting in near real time.

Later this day, when the participants arrive, they are impressed by the simplicity and reliability of the new collaborative environment offered to them and they are amused to review some of the most impressive documents that they have access to by simply switching on their PDA.

Sandra is confident when she gives her kick-off talk to the Symposium, instantly displaying a few animations to each participant. There are some questions raised about the agenda and everybody can browse through all the comments and suggestions put forward by all participants.

Sandra answer some questions directly and her assistant types these answers in the resulting collaborative document. Some amendments to the agenda are necessary and every participant also gets the update in real time.

Soon though, a potential problem arises, there are not enough power sockets available and some participants now run short of battery. In addition, most of the devices (mainly PDA) have not enough storage capacity to save all the available documents locally. A few years ago, this would have considerably disturbed the work, but today, thanks to the new collaborative environment, no single device needs to store all the relevant data. Each device can get on and off and instantly retrieves the synchronised data for which the persistence was collectively guaranteed. When joining the parallel working groups, the participants join the corresponding community and instantly are able to collaborate and share data, the results of the working groups are later passed to the general symposium community for everybody to use at will.

When the polling session start on the third day, stronger security is required and each voter has to authenticate himself to join the restricted area of the dedicated working environment. On top of that, with a single connection of her own laptop to the Internet, Sandra (or any participant for that purpose) offers the few major stakeholders that could not make the trip the possibility to join the sessions and even to vote in near real time during the polling sessions.
**Tab 2 - Additional scenarios (User Stories) from D2.1 Description of functional, non functional and technical requirements**

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<thead>
<tr>
<th>User Story 1</th>
<th><strong>Collaboration at a Scientific Conference</strong></th>
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<tr>
<td></td>
<td><em>This user story is focused on providing collaborative working tools to the participants of a scientific conference.</em></td>
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<tr>
<th>User Story 2</th>
<th><strong>Bad guy at a Scientific Conference</strong></th>
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<tr>
<td></td>
<td><em>This is a variation of the previous User, introducing a bad guy character trying to find a security hole in the POPEYE framework while the previous scenario goes on.</em></td>
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<th>User Story 3</th>
<th><strong>Rapid Illustrator Context</strong></th>
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<td></td>
<td><em>This story illustrates the scenario of a quick drawing contest, the &quot;Drafters Deathmatch Delegation&quot; (triple-D). The members of this association are interested in the art of very quick drawing with a computer program. A contest between two combatants is followed by a voting session to declare the winner.</em></td>
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<th>User Story 4</th>
<th><strong>Collaboration on Travel</strong></th>
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<td></td>
<td><em>The User Story illustrates the scenario of a software testing expert performing his work during travel.</em></td>
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<th>User Story 5</th>
<th><strong>Isabel the Journalist</strong></th>
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<td></td>
<td><em>Isabel, a journalist, is on her way to office by taxi and exploits the POPEYE system to continue her work.</em></td>
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<th>User Story 6</th>
<th><strong>Velotypist always on</strong></th>
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<td></td>
<td><em>Alice is a deaf person. She manages peer to peer conversations by lip reading in her native language, but telephone is not possible, meetings are difficult, communication in foreign language is an ordeal. The &quot;Velotypist always on&quot; service helps her by forwarding audio and video to a remote velotypist who returns closed captions in real time on her laptop screen.</em></td>
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<tr>
<th>other</th>
<th><strong>Scenarios from WearIT@Work</strong></th>
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<td></td>
<td><em>Additional scenarios were extracted from the work performed in the WearIT@Work project.</em></td>
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2.2 Project's research objectives

The main goal of the strategic research of POPEYE is to provide concepts, methods and core services for the next generation of mobile collaborative working environments with emphasis on p2p information exchange model in the environment of heterogeneous mobile ad hoc networks (MANETs). Research objectives are summarised below.

In the general notion of virtualised working environments, POPEYE addresses mobile P2P and ad hoc groups, where fixed infrastructure is not a prerequisite, where virtual communities can emerge spontaneously and share data with the appropriate quality of service (persistence, synchronisation, security,…).

With this approach in mind, POPEYE sets the following specific objectives:

- Design an integrated overlay networking architecture that combines the stability and performance of infrastructure networks (when available) with the flexibility and spontaneous character of mobile ad hoc communications.

- Design and implement a communication platform that exploits cross-layer functionality down to lower-level protocols to provide efficient P2P management and communication primitives. A key feature is its “network and terminal awareness”, allowing adaptation in accordance with the underlying physical links, network availability and local device resource constraints.

- Design and implement higher-level context-aware, secure and personalised core services. Based on the P2P middleware platform, core services are designed and developed to simplify application development. In the frame of spontaneous virtual communities/groups, users’ preferences are exploited to publish, discover and access or deliver information within the P2P network in a targeted and personalised fashion. User preferences combined with ambience information, such as time, location, user activity, and peers’ presence, enable applications to propose automatic actions, such as joining or leaving a group and publishing or subscribing to some particular type of information, under user control.

Peer to peer networks have already shown their potential in fixed packet-based networks. Their distributed nature, makes them particularly suited for mobile applications. Moreover, deploying P2P architectures in mobile networks can bring the same wide range of new applications and services to mobile users. However, in this project we concentrate on the deployment of P2P services in the context of spontaneous ad-hoc network formation and how we can fully take advantage of P2P in a mobile environment, with an architecture carefully designed to guarantee it adapts to the particular properties of mobile networks.

The design of a P2P architecture and adaptation of its required functions (peer location, content representation, etc.) to a mobile (or infrastructure free) environment such as wireless ad hoc network and the service provision to the group of users dynamically created over it represents a great challenge of this project. In fact, the implementation of those P2P functions needs to be revisited to deal with the possible intermittent disconnections among nodes, changes in the topology, etc.
Despite the huge success of various P2P applications over the internet, P2P technology research has given little attention to specific issues related to mobile environments. The most important characteristics of mobile environments in addition to the need for roaming are: the limited capabilities of mobile handheld devices, the diversity of the communication links, the high variability of the surrounding context of the user and their varying quality.

Most existing P2P systems inherently assume rich connectivity and vast storage space that are indeed features of most desktop computers and fixed infrastructures.

With reference to the development of the POPEYE proof-of-concept application, specific goals are defined in this document concerning the foreseen state of advancement of the different architecture components, in correspondence with the Interim and Final Demonstration event, indicating which parts of each of the architectural workpackage's output will be ready and will be able to contribute to the demonstration, their status of their advancement, which of parts that will be present only at an interface level, or with a simulated implementation, and in case any limitations in performances or under other aspects are present, they are here stated.
2.3 Target POPEYE Applications

The main focus for workpackage WP6 consists in selecting specific e-collaboration applications to test and validate the POPEYE architecture. As mentioned in the previous sections, the selection of the specific mobility-enabled peer-to-peer application will come as the consequence of the analysis work of POPEYE scenarios and identification of functional, non-functional and technical requirements performed in the course of previous workpackage WP2 completed with inputs coming from collaboration with other research projects related to the POPEYE strategic objective and from the results of the first User Requirements workshop, held in Oldenburg in month M6 [POPEYE RqWorkshop].

The applications specification and development will be the main task of POPEYE workpackage 8, based on the different modules coming as output from the other WPs: The diagram shown at Figure 1 at page 15 shows the relations between these workpackages and how they will eventually contribute to the interim and final demonstration events, through the development of the proof of concept application of workpackage 6.

Deliverable D6.2 (POPEYE e-Collaboration Applications: Specification and Design Document), due in month M12 (April 2007) will contain the applications' specification and design. Compare these dates with the more complete workplan focused on demonstration events illustrated in the next chapter in section 3.1.

Concerning the proof-of-concept prototype to be used as a basis for the two demonstration events, a subset of POPEYE-enable functionalities will be selected to build up such an application starting from the reference scenario mentioned in the previous sections. Sections 3.2 and 3.3 introduce in some detail what is the plan about the contributions that will be brought to such functionalities by the different workpackages.

In general terms, the Interim Demonstration will have the goal to verify the architecture and applications in a controlled environment, in order to identify problems and provide useful feedbacks, so the first proof-of-concept prototype will be focused primarily to allow the test of the available functionalities (simulating by stubs or mock-ups the modules not yet implemented in this phase) and to supply a proof-of-concept implementation of the User Interfaces in order to verify criteria like usability and effectiveness of the application.

For the Final Demonstration, the developed application prototype should be on the other hand quite complete with respect to the selected functionalities, but at the same time, considering the open and public nature of this event, supply a captivating user interface carefully designed also by the point of view of the look and feel that will characterise the image of POPEYE to the external world.
3 POPEYE Demonstration Workplan

3.1 Workplan and Timetable

This section will analyse the workplan for the different phases and major milestones that will eventually lead to the set up of the Interim and Demonstration event of the POPEYE applications. A specific plan is made concerning a timetable for this workplan.

First of all, it's necessary to analyse the relationships between the contributions of the different workpackages to the construction of the proof-of-concept POPEYE application and eventually to the two demonstration events' inputs. The diagram shown in the following picture Figure 1 shows these relationships.

![Figure 1 - workpackages contributions to the demonstration](image)

It can be seen from the diagram that two transversal workpackages, WP2 (System Architecture) and WP3 (Security) supply input to a set of layered workpackages that will eventually result in the design and development of the selected e-collaboration application that is the output of WP6.
In the two following sections 3.2 and 3.3, we will list the specific contributions' contents supplied by the different workpackages in relation, respectively, to each one of the two demonstration events, covering issues like which parts of the modules will be ready at the different stages, the level of maturity, limitations in performances etc. The same two sections will also examine other issues related to the demonstration events, like integration issues, user group composition and external collaborations.

Here, we will concentrate in tracing the road to the two events by defining the most relevant milestones. Figure 2 shows these milestones with respect to the project 24 months lifetime. Important events like issuing of deliverables (logically grouped) are indicated in chronological order.

Figure 2 highlights that the project's lifetime can be split into four main phases:

I. scenario analysis and requirement definitions phase.
II. design phase.
III. first prototype development phase.
IV. final prototype development phase.

Let's analyse these in detail, in order to identify major issues:

3.1.1 phase I - scenario analysis and requirement definitions.

This is the phase corresponding to the release of this Demonstration Plan and terminates with the identification of the applications' scenarios and the issuing of deliverable D2.2 [POPEYE D2.2] in which functional, non functional and technical requirements of the system are collected.

3.1.2 phase II - design phase.

The second phase starts from phase I results to specify and design the target POPEYE e-Collaborations applications. At the end of this phase a set of deliverables containing specific design documents for the architectural workpackages will also be issued. This phase will conclude at month M12 (April 2007), which corresponds to half the project's lifetime and will coincide with the first annual review.

The development of the first prototype software modules produced from workpackages WP3, WP4 and WP5 for the 1st system integration and the first prototype POPEYE application produced by workpackage WP6 will begin in this phase.

We have already highlighted the interdependencies between the workpackages in Figure 1. From this point in the project lifetime, development work in the different workpackages should be enabled to go on in parallel, considering that a workpackage's modules are going to be issued at the same time as the software modules it depends upon.

Consequently, the end of the phase at month M12 will coincide with the moment in time when stable versions of inter-packages interfaces of the different modules will be released. These versions will be as close as possible to the final versions: any change in the interfaces that should appear desirable will be carefully considered, weighing advantages and
disadvantages and consequences on the other workpackages' work and considering in particular the risks of delays that such changes could imply.

3.1.3 phase III - first prototype and interim demonstration.

This phase will lead, through the development of the first prototype modules and the first prototype POPEYE application, to the implementation of the version of the POPEYE system that will be used as the basis for the Interim Demonstration.

As explained above, at month M12 external interfaces of the modules produced by the different workpackages should have been issued at a sufficiently stable level and development work on the different software components will be able to be carried out by the involved project partners.

At month M15 (July 2007) the first prototype software modules should be released (architectural component and first prototype application) allowing to complete the integration phase and to perform integration tests in the three months preceding the planned date for the first demonstration event, in order to ensure a successful demonstration at the foreseen date.

Another task that is going to be carried out during the final three months of this third phase is the organisation of the actual event during which the Interim Demonstration will take place. This includes choosing the kind of event (e.g. an internal meeting, a Workshop, etc.), contacting User Group representatives (see 3.2.3), physical organisation of the event, and all other aspects.
Figure 1 - project workplan main phases

Project start

Requirement definition (D2.2)
+ Basic core serv. description (D5.1)

Draft architecture description

Design documents (D3.1, D4.1, D5.2)
+ POPEYE application specif. and design (D6.2)

Interim Demonstration (D8.1)

Components' 1st prototype modules + first prototype application

Components' 2nd prototype modules + 2nd prototype application

Design definition documents (D3.2, D4.2, D5.3)

Reference implementation of architectural building blocks (D2.4)
+ Evaluation and guidelines for developing POPEYE apps. (D6.3)
+ Final Demonstration (D8.2)

Draft description reports + POPEYE application draft spec. and design

Implementation reports (D3.3, D4.3, D5.4)
3.1.4 phase IV - second prototype and final demonstration.

The fourth and last phase of the project's lifetime will repeat the cycle of development, integration and testing, that was seen for the previous phase, but this time for the second prototype software modules and the second prototype POPEYE application. The issue of the Architecture Definition Documents deliverables (D3.2, D4.2, D5.3) at the end of phase III will coincide with the release of the final versions of the architecture's modules programming interfaces.

The Final Demonstration event that will be set at the conclusion of this phase (and of the whole project) will be, in contrast with the previous Interim Demonstration, an open, public show case of POPEYE technologies consequently involving the fully fledged POPEYE User Group.

This event will be set up in the context of a project open Workshop organised in conjunction with some major ICT RTD event. One example of such events is the Annual IST Event, but the actual event will be actually chosen some time before the end of the project, taking into consideration several factors. For instance, the event's date should be close to month M24, the scheduled date for the Demonstration.

Setting up the Final Demonstration in correspondence to some major ICT RTD event will allow to demonstrate and disseminate project results to the wider IST, scientific and technical community but for this same reason it also makes this event more critical and requiring a more careful preparation and more intensive actions to be carried aimed at advertising the event and involving representatives of the fully fledged POPEYE User Group out, as illustrated in section 3.3.3.

The following two sections will analyse in more detail the two specific demonstration events, in terms of specific research contributions supplied by the single workpackages, of integration issues, user group composition and external contributions while the last section of this chapter will be dedicated to the identification of potential risks and planning of actions to prevent them.
3.2 *Interim Demonstration Event*

3.2.1 POPEYE research contribution

3.2.1.1 System Architecture

Workpackage WP2 (System Architecture) results are of central importance since this workpackage is responsible to ensure the technical consistency of POPEYE research defining the overall system architecture of the P2P collaborative system.

Within this architecture the required system components will be specified as well as their relationships with each other. All required interfaces between the components will be considered and named. The software modules implementing these components are contributed by the other workpackages as described in the following subsections of this document.

In the context of WP2, a set of user interfaces will be specified to allow the user administration of the POPEYE system and the interaction with its basic functionalities, while user interfaces for specific applications will be provided by the implementing plug-ins.

The interfaces which the specific applications need for accessing information regarding the user profile and the workspace properties as well as the interface which is required to configure the specific application will be provided completely as part of this workpackage results within the terms foreseen from the interim Proof-of-Concept Demonstration workplan, as described in section 3.1 of this document.

The interfaces defined between plug-ins and the underlying POPEYE system (including, e.g., network communication, persistence, messaging/event handling or streaming) as well as those between the POPEYE system components themselves (e.g., security on all system levels to other components) will be preliminary. Only those interfaces will be specified in full detail which are required to enable the integration of the contributions of WP3, WP4, WP5 and WP6 for the interim demonstrator. These interfaces will be clearly identified as described in the workplan (see 3.1) in order to enable parallel development work in the project phases leading to the demonstrator.

3.2.1.2 Security

Modules managing security issues, such as overall security mechanisms, group management, access control service and so on, will be the output of workpackage WP3. At month 18, the security modules will be available in two versions:

- A raw version dedicated to integration purpose in the POPEYE demonstration platform (interfaces available, functionalities emulated)
An advanced version used for validation purpose and separate stand-alone demonstrations (a set of functionalities coded but not fully tested)

Security modules will be installed on the end-user terminals of the POPEYE demonstration platform. A fixed security infrastructure will be accessible remotely (sporadic connectivity). For the interim demonstrator, the functionalities of those security modules will not be coded, but expected results will be stored in configuration files.

Those security module will be available on Laptop or PDA with operating systems as Linux and Windows. The main objective of those simulated security module is to test the security interfaces with the POPEYE framework and to have a first feed-back concerning the visualisation of the security (requirement from our security experts during the POPEYE end-user requirement workshop [POPEYE RqWorkshop]).

Stand-alone demonstrations will be also set up. That will rely on the previous security modules where some functionalities are coded. This first version of the security module will be available only on Laptop with Linux OS.

The main objective of this partially coded security module is to test some security use cases and sequences that we plan to integrate in the final demonstrator.

Finally, a list of existing products (preferably open-source) will be established for evaluation purposes.

Below is shown a list of the software modules that will be provided as output to WP6:

- Module “Group Management and Access Control Service”:
  - Interfaces only for integration purpose
  - Basic services emulated
  - Targeted HW-device: Laptop (Linux or Windows)

- Module “Trust Support Services & Privacy”:
  - Interfaces only for integration
  - Basic services emulated
  - Targeted HW-device: Laptop (Linux or Windows)

- Module “Security MMI”, the visualisation console to raise end-user awareness of security features:
  - Menu, tool bars and list of expected screenshots (emulated)
  - Targeted HW-device: Laptop (Linux or Windows)

3.2.1.3 P2P over MANET
The architecture and the mechanisms for supporting seamless integration of mobile peer-to-peer networks over mobile ad-hoc networks (MANETs) will be provided as output of workpackage WP4.

The target scenario for the Interim proof-of-concept demonstration will be a MANET without Internet connectivity in which a group of users will use P2P applications to exchange some documents. Additionally, some POPEYE collaboration services will be tested, like synchronous and asynchronous communication, late joining and presence mechanisms.

For this demonstration, a first version of some software modules will be available for testing purposes that will include:

- Communication channel: basic group communication toolkit providing a reliable channel for group information exchange, replication, event persistence and group membership.
- MMARP. Will be used to support the exchange of multicast messages among group of peers in an efficient way.
- DYMO. Will be used for unicast routing. That is, to send information directly to one peer to another

As far as hardware devices as concerned, the targeted devices we will use are laptop computers running Linux, and using IEEE 802.11 wireless interfaces. P2P middleware modules are expected to present a fully functional presence and basic group communication mechanisms for the interim demonstration. At this demonstration, services such as naming, location and advertisement services will be presented as prototypes with primary functionality.

Regarding the MANET routing protocols, the MMARP module presented will be a fully-functional implementation of the protocol. For DYMO in the interim demonstration there will be a prototype implementing all the basic functionality.

The prototype presented in the interim demonstration will include a basic interaction between P2P middleware and MANET protocols, thus the performance to be obtained is not expected to be optimal. As described in the corresponding section, for the final demonstration we expect to have a tighter coupling across modules, yielding a better performance.

3.2.1.4 Core Services

The workpackage 5 on core services will produce modules for

- the definition and management of the definition of common knowledge and information models in order to foster context-aware mobile peer-to-peer information exchange and collaboration (context models and user models, content representation models, group models and role models).
- the support of context-awareness services
- the support of data management and sharing.

At month M15 (July 2007) WP5 intends to produce 2 contributions to the interim demo:
• A base version of WP5 core services dedicated to integration purpose in the POPEYE
demonstration platform. It will include all APIs. Some functionalities will be developed
and some emulated.
• A full version of some modules for separate stand-alone demonstrations (a set of
functionalities coded but not fully tested).

The goal of these contributions will be to demonstrate the functioning of some of the basic
core services. In particular the demonstrator will rely on simple partial models of the
context, the user and the data.

The following functions will be demonstrated:

• basic context management functionalities such as context central storage and delivery
• basic data sharing functionalities;
• a simple coherence model will be enforced.

This first demonstrator will not focus on other quality of service issues such as availability,
persistency, and load balancing. Stand-alone demonstrations will be also set up to
demonstrate the functioning of more advanced module.

These demonstrations will take place either in an actual MANET setting or on a
communication overlay emulating part or all of a MANET. A connection to a server in a
fixed infrastructure network will be available. The terminals will be laptops or handhelds
(PDAs) running a LINUX-like system.

3.2.2 Integration

As described previously in the workplan related sections (see 3.1, 3.1.3), the proof-of-
concept application integration process will be guaranteed, besides by a close collaboration
and communication between workpackages', also by an early issuing of quite stable versions
of intra-module interfaces, that will help define clearly the workpackages' boundaries and
responsibilities and will allow the continuation of the development work in parallel
preventing potential delays.

During workpackage WP6, a document containing the POPEYE proof-of-concept
application draft specification and design will be issued at month M10. This document will
contain the specification of the POPEYE selected mobility-enabled peer-to-peer e-
collaboration applications. At this moment, the functionalities that will be selected for the
proof-of-concept application to be demonstrated during the two WP8 events will also be
selected and indicated, considering the reference scenario illustrated in section 2.1 of this
document, and taking into consideration the advancement state of the architecture modules
that will contribute to the demonstrations.

Considering that the main goal of the Interim Demonstration event will be to enable
verifying the architecture and applications in a controlled environment, and identifying
problems and providing useful feedbacks for adjustment and consolidation of both the
POPEYE architecture and the tested applications, the first proof-of-concept application
prototype implementation will concern only laptops and will be focused primarily, besides
to giving access and allowing the testing of the already available functionalities provided by
the architectural workpackages (while other functionality will be simulated by the use of stubs or mock-up implementation), also to supply a proof-of-concept implementation of selected POPEYE application the User Interfaces.

These will be focused at this stage on such criteria like usability of the user interfaces, effectiveness, accessibility to system functionality and so on, so as to be able to receive useful feedbacks on these aspects from the User Group members that will take part to the demonstration.

Other aspects like User Interface aesthetics or applications' look and feel won't be considered in this phase and will be tackled during the next phase leading to the Final Demonstration.
3.2.3 User Group

The POPEYE User Group is an essential part of the POPEYE strategy for developing external collaboration with other stakeholders in the New Working Environments.

However, the Interim Proof of Concept Demonstration will be set up involving a subset of the POPEYE User Group composed of those members that belong to the POPEYE consortium members themselves, and reinforced by expert CWE users belonging to the entities in the POPEYE consortium but not directly involved in the POPEYE research work. Indeed, POPEYE Consortium members qualify as the prime user community of the POPEYE framework. This is convincingly illustrated by the baseline scenario briefly recalled earlier in the present document (Tab 1).

The rationale for reinforcing the User Group with experts belonging to the entities in the POPEYE consortium but not directly involved in the POPEYE research work, is to generate a beneficial peer review of the architecture and applications.

The User Group is normally a much larger entity in POPEYE but the strategy for the Demonstration Plan is to specifically avoid the involvement of User Group members that belong to other project consortium or to CWE communities that are collaborating with POPEYE.

The rationale for not involving the fully fledged POPEYE User Group is to keep the environment of the Interim Proof of Concept Demonstration under Control, identifying problems and providing useful feedbacks for adjustment and consolidation of both the POPEYE architecture and the tested applications in a yet unstable environment.

The User Group will be invited to examine all aspects of the Interim Proof of Concept Demonstration and provide feedback to the Work Package leaders about how they believe the demonstration should be improved to meet with the user’s expectations.

For achieving this in the most efficient way, specific material will be elaborated, prior to the Interim Proof of Concept Demonstration, and distributed to the User Group to collect their feedback.

It must be noted that the involvement of such a subset of the POPEYE User Group in the Interim Proof of Concept Demonstration is part of the Project’s global risk management for ensuring a convincing final demonstration.
3.2.4 External Contribution

The POPEYE strategy for developing external collaboration with other stakeholders in the New Working Environments also include:

- Collaboration with research projects,
- Collaboration with communities

This strategy is practically enforced by bilateral collaboration agreements with several research projects or Communities in the New Collaborative Working Environments, that share common strategic objective and technology areas with POPEYE such as:

- Mobility,
- Ad hoc networks,
- Persistence and Synchronisation.

It is expected that such collaboration may provide POPEYE access to valuable application features and building block for enhancing POPEYE Interim Proof of Concept Demonstration.

It is planned that such external contributions be managed on grounds of reciprocal benefit so that, in turn, POPEYE will consider supporting other projects and communities by any appropriate means agreed by the POPEYE Management Board, for instance by providing access to POPEYE building blocks.

For the Interim Proof of Concept Demonstration, it is planned to experiment as many options as possible in the available time-frame, and face potential failure in the integration or in the performance of the initial demonstrator.

The rationale for this strategy is dual:

- First, there is generally considerable research value in exploring and describing unforeseen problems in such domains as architectural design and core services integration through concrete implementations.
- Second, we are convinced that innovation is more likely to emerge from a creative approach where cross-projects collaboration allows for combination of services or application features beyond what POPEYE alone could achieve.
3.3 Final Demonstration Event

3.3.1 POPEYE research contribution

3.3.1.1 System Architecture

Building up on the results which are targeted at the interim Proof-of-Concept Demonstrator, all interfaces defined between specific applications and the underlying POPEYE system (including, e.g., network communication, persistence, messaging/event handling or streaming) as well as those between the POPEYE system components themselves (e.g., security on all system levels to other components) will be completed in the project phases previous to the Final Demonstration event. The interfaces will enable the full integration of the software components contributed by WP3, WP4, WP5 and WP6.

3.3.1.2 Security

In the phases preceding the Final Demonstration, all the POPEYE security module will be integrated in the demonstration platform. The Final Demonstrator also integrates an IDS module selected among current products (preferably open-source) available at month 18. The following are the modules that will be part of the security contribution to the Final Demonstrator:

- Module “Group Management and Access Control Service”:
  - Fully validated (management and organisation of spontaneous groups, group management policy (access right & relationship) and credential distribution mechanisms )
  - Targeted HW-device: Laptop (Linux or Windows), a light version will be available on a PDA (model to be defined)

- Module “Trust Support Services & Privacy-:
  - Fully validated (peer certification, trust computation based on user behaviour and reputation, trust models using authentication tokens)
  - Targeted HW-device: Laptop (Linux or Windows), a light version will be available on a PDA (model to be defined)

- Module “Security MMI”, the visualisation console to raise end-user awareness of security features:
  - Fully validated (Menu, tool bars and visualisation screens)
- Targeted HW-device: Laptop (Linux or Windows), a light version will be available on a PDA (model to be defined)

- Module “Peer to Peer Intrusion Detection”:
  - Existing component (preferably open-source) tested and integrated on the platform
  - Targeted HW-device: depending of the selected IDS software

3.3.1.3 P2P Over MANET

For the Final Demonstration, the scenario will be extended to support the case of a hybrid MANET in which some of the nodes may have Internet connectivity, which can be used by the other nodes to further enhance the overall performance. Extensive POPEYE collaboration services will be tested and also general behaviour relative to late joining and presence mechanisms.

The software modules to be used in the Demonstration will be:
- 2P middleware to support collaborative applications
- MANET routing and autoconfiguration protocols to support those P2P applications

There will be three basic modules involved:
- Discovery service: a global presence mechanism based on local broadcasting.
- Communication channel: group communication toolkit providing a reliable channel for group information exchange, replication, event persistence and group membership.
- Resource location and advertisement: efficient resource location and matching constructed on top of the communication channel.

For the MANET protocols, there will be three basic modules involved: the MMARP multicast routing protocol, the DYMO unicast routing protocol and the EMAP autoconfiguration protocol.

- MMARP. Will be used to support the exchange of multicast messages among group of peers in an efficient way.
- DYMO. Will be used for unicast routing. That is, to send information directly to one peer to another.
- EMAP. This module provide the mechanisms for ad hoc nodes to automatically configure their IP addresses, discover Internet gateways, and sending data towards Internet nodes.

P2P middleware modules regarding services such as naming, location and advertisement services will be available for the final demonstration. Regarding the MANET routing protocols and DYMO a fully functional implementation for the final demonstration. Finally, regarding EMAP, the implementation presented in the final demonstration will be a prototype implementation, including as many functionalities as possible.

The devices we shall use are laptop computers running Linux, and using IEEE 802.11 wireless interfaces.
In first place, P2P Middleware will take profit from the provided MANET protocols and its basic unicast and multicast communication primitives. By taking this as a basis, P2P Middleware will offer several functionalities to the core services layer such as event persistence, publish/subscribe communication channel, and naming service.

3.3.1.4 Core Services

WP5 will produce a prototype core service platform for the final demonstrator. It will rely on a set of models (context models, user models, content representation models, group models and role models) elaborated within the framework of WP5. The prototype will include a complete set of services for the support of context-aware services (context storage and delivery, data spreading and context reasoning). The prototype will also include a complete set of data management and data sharing functions. Some level quality of service will be demonstrated with respect to data coherence, data availability, data persistency and load balancing.

These demonstrations will take place in an actual MANET setting where a connection to a server in a fixed infrastructure network will be available. The terminals will be laptops or handhelds (PDAs) running a LINUX-like system.

The final demonstration will be a proof of concept. As such, some limitations are anticipated (e.g. scalability). However, we expect that the concrete scenario set up we have defined for the demonstration will be supported without any problem.

3.3.2 Integration

In order to fulfil an end-user requirement and to present a more attractive demonstration, we planned to have both laptops and PDAs for the Final Demonstration platform.

According to the workplan, the second POPEYE proof-of-concept application prototype will be terminated at month M21 (January 2008), three months before the end of the project and the Final Demonstration event. Again, the success of the integration phase will be guaranteed by close cooperation and interaction between the partners involved in the different workpackages and by an early publication of intra-modules interfaces as foreseen by the workplan.

The final phase of integration and proof-of-concept application will concentrate on completing the access through the application's interface to the platform's functionalities that were not ready yet at the moment of the issue of the first prototype and which had been replaced at that moment by stubs or mock-up implementations and that were completed in the following months.

The feedback supplied by the User Group members that took part to the Interim Demonstration will be taken into consideration to improve the proof-of-concept application prototype's functionalities and usability.

Moreover, considering that the Final Demonstration will be an open, public show case of POPEYE technologies whose main goal is allowing the demonstration and dissemination of the project results to the wider IST, scientific and technical communities, in this phase particular care will also be dedicated to considering aesthetics and look-and-feel related aspects of the application's User Interface.
3.3.3 User Group

It is planned that the environment for the Final Proof of Concept Demonstration will be stable enough and the Demonstrator mature and realistic enough so that it is open to the wider user community.

Therefore, the Final Proof of Concept Demonstration will be set up involving the fully fledged POPEYE User Group, composed not only of:
- POPEYE consortium members themselves, as the prime user community of the POPEYE framework,
- experts belonging to the entities in the POPEYE consortium but not directly involved in the POPEYE research work,

but also of:
- experts belonging to other project consortiums where a cooperation agreement exists,
- experts belonging to the communities where POPEYE is involved under an External Collaboration scheme.

Prior to the demonstration event, the POPEYE User Group will be invited to contribute in the selection of the aspects of the Final Proof of Concept Demonstration that they believe are best illustrating the POPEYE achievements, are most innovative, are most likely to trigger the user’s uptake or best satisfy other criteria to be defined jointly with the User Group itself and validated by the project’s Management Board.

We expect that such an early and profound involvement of the POPEYE User Group in the set-up of the Final Proof of Concept Demonstration improves the impact of the demonstration event and, therefore, helps improve the overall perception of the POPEYE research work.

The POPEYE User Group will also be invited to take part in the Final Proof of Concept Demonstration event on a voluntary collaboration basis. The foreseen means of participation include co-animation of a POPEYE discussion panel, provision of a keynote speech or other means that could be agreed upon at a later stage and as a function of the concrete set-up of the event.

It must be noted that the Final Proof of Concept Demonstration event coincides with the termination of the project. Therefore, we do not plan for any specific feedback from the User Group after the event.

3.3.4 External Contribution

The strategy developed for the Interim Proof of Concept Demonstration relative to external collaboration with other stakeholders in the New Working Environments is still valid for the Final Proof of Concept Demonstration:
- Collaboration with research projects
- Collaboration with communities
It is expected that such collaboration may provide POPEYE access to valuable application features and building block for enhancing POPEYE Final Proof of Concept Demonstration. Lessons learnt from the Interim Proof of Concept Demonstration will be key to identifying the composition of the final demonstrator: proven architecture modules will be preferred and external contributions will be negotiated accordingly so as to maximise the “operationality” and performance of the final demonstrator.

The rationale for this strategy is dual:
- First, ensure the validation of POPEYE architectural design and core services integration.
- Second, optimise the impact of the POPEYE research on all CWE stakeholder communities (from end-user to technology providers).

### 3.4 Risk Management

#### 3.4.1 POPEYE Process for Risk Management

Issuing a proof of concept demonstration for the POPEYE innovative approach to support dynamic spontaneous collaborative group working environment within 2 years is a real challenge that requires a risk management.

A risk is a potential event that, when triggered, may cause problems. By risk management we refer to the process of identifying and assessing risk and developing strategies to manage it.

Risk management process is break down in several iterative steps:
- Risks Identification
- Risks Assessment
- Mitigation and back-up solutions
- Corrective actions tracking

**Risk Identification:**

In the literature, several methods are proposed to identify and classify the risks. We chose to detect POPEYE demonstration risks from the following common risk identification methods:
- Objectives-based Risk Identification: any event that can delay the availability of planned deliverables or prevent the complete achievement of POPEYE objectives will be taken in account.
- Scenario-based Risk Identification: in WP2 (System architecture), we described peer-to-peer scenarios. We extract a list of requirements from the usage of innovative mobile P2P applications and the typical or expected services. A risk can be associated to each of these requirement
- Taxonomy-based Risk Identification: by answering a structured questionnaire issue from a panel of potential damageable event and best practices in software development, we able to select at an early stage the most common risks.
- Common-risk Checking: (experience from the consortium): POPEYE partners have all a deep experience in the technical issues addressed by the project and in the management and
collaboration issues of European research projects. The experience of the whole consortium will be capitalised to find some specific risk related to cooperative research projects.

Practically, risks will be listed in an excel file “POPEYE_D6.1_risks.xls” and classified according to the proposed taxonomy proposed by the Software Engineering Institute[1][Risk Id]

Risk Assessment:

To assess a risk means to determine its probability of occurrence and its potential severity. In our case, we will rate each risk with 2 level for each of the 2 demonstrations (Intermediary and Final):

- Rate of occurrence: LOW – HIGH
- Impact of the event: LOW – HIGH

Mitigation and back-up solutions:

Once a risk is identified and evaluated, we must take decision on how we will manage it. 4 strategies are possible:

- Risk transfer: another party accepts the risk. In our case, that means that we’ll use or adapt an existing building block instead of developing.
- Risk avoidance: in our “proof-of-concept” demonstration, we can select some nominal cases where we are sure that this risk cannot occurs.
- Risk reduction: our incremental delivery approach (two demonstrators and stand-alone targeted demonstrations) is a strategy adopted to mitigate the risk.
- Risk acceptance: in our “proof-of-concept” demonstration, we can accept that some modules will not be very mature.

For each risk, a responsible will be assigned to follow its life cycle.

Corrective actions tracking:

As previously mentioned, an excel file “POPEYE_D6.1_risks.xls” will be available and updated regularly.

3.4.2 Early identified risks

Devices for POPEYE demonstrator:

Description: The preliminary implementation for the interim demonstration will concern only laptops.

We planned to have both laptops and PDAs for the final platform to fulfil an end-user requirement and to present a more attractive demonstration.

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1 Taxonomy-Based Risk Identification, by Marvin J. Carr, Suresh L. Konda, Ira Monarch, F. Carol Ulrich, Clay F. Walker (June 1993)
But porting the POPEYE framework in harsh environment as PDA where resources are limited may be more costly than expected (time, resources).

**Impact**: HIGH / **Occurrence**: HIGH

**Action**: we anticipate that only some POPEYE services will be available on PDA.

OS for POPEYE implementation:

**Description**: "Multi Operating System compatibility" is a fundamental requirement that could also be expressed as "compatibility with Legacy Operating Systems" requirement. POPEYE MUST absolutely host the huge user community running MS WINDOWS.

But implementing our solution both on Linux and Windows OS is very costly.

**Impact**: HIGH / **Occurrence**: HIGH

**Action**: POPEYE specification will be compliant with legacy operating systems (Linux and Windows) but POPEYE solution will be implemented for Linux only.

Language for POPEYE implementation:

**Description**: depending of the layer level, the existing P2P and collaborative tools software and POPEYE partners background, either Java or C/C++ can be used for implementation.

**Impact**: LOW / **Occurrence**: HIGH

**Action**: POPEYE partners have been requested to share their experience about programming languages and to precise which devices, which OS and which language they use in their projects on "collaborative environments"

DYMO as POPEYE underlying protocol:

**Description**: We selected in the POPEYE proposal DYMO (Dynamic MANET On-demand Routing Protocol) as underlying routing protocol. This is the more suitable protocol for our solution. But only a prototype will be available for the intermediary demonstration. That could required debugging work for integration.

**Impact**: HIGH / **Occurrence**: to be defined

**Action**: as DYMO is the substitute for the well-known AODV, a back-up solution could be in WP4 to have a low level prototype software based on both AODV and DYMO. (to be discussed)

Height dependencies between Core Services (WP5) and P2P over MANET lower level (WP4):

**Description**: Core services modules will use the services provided by P2P over MANET lower level (decentralised name, communication, group management , resource discovery and advertisement). For the intermediary demonstration, the services provided by WP4 may be too basic to validate WP5 features.
Impact: HIGH / Occurrence: to be defined

Action: WP4 partners are all involved in WP5. The WP4 selected services and level of complexity for the intermediary demonstration should fulfilled WP5 requirements. (to be discussed)

Mobility issues addressed in POPEYE:

Description: The type of mobility issues we want to address in POPEYE solution and demonstration affect our decision about the developments and the demonstration scenarios (joint/leave of peers participating to a meeting located in a single room, peers walking in a working area, …)

Impact: to be defined / Occurrence: HIGH

Action: discussion to be set up in the POPEYE consortium to share a common view of POPEYE objectives

Security Integration in POPEYE:

Description: POPEYE proposes the coexistence of two security approaches, a centralised one using a CA-based architecture in hybrid-P2P and a distributed one exploring the token-based authorisation mechanisms for pure-P2P. The interactions between these two approaches and the switches in case of disconnection is source of potential security leaks.

Impact: to be defined / Occurrence: LOW

Action: Aspect to be taken in account in the security architecture design

Integration support for the interim demonstration:

Description: The first two months of the integration of different modules for the interim demonstration are July and August. Due to summer holidays, the availability of modules developers might be lower than expected to provide WP6 integration team efficient support.

Impact: HIGH / Occurrence: HIGH

Action: Each developer and integrator will supply their availabilities during the integration phase. based on these inputs, an integration plan (which modules, when, which integrators, which developers) will be set up to provide an efficient support from development team for the integration team.
4 Conclusions

With the conclusion of the requirement identification phase, this Document presents a detailed Workplan for the subsequent months that will lead to the development of a Proof-of-Concept application to be used for two Demonstration Events. The first one consisting in a test involving User Group members, performed in a controlled environment and aimed to verify the architecture and applications, while the second one will be an open, public show case of POPEYE technologies whose main goal is allowing the demonstration and dissemination of the project results to the wider scientific and technical community.

In order to ensure a successful execution of these two Demonstrations, this Workplan defines:

- A timetable, identifying main project phases and principal events that will lead to the two demonstrations, analysing dependencies and WP mutual relationships and highlighting potential criticalities.
- A plan for modules and functionalities that the different architectural workpackages will issue as contributions to the Proof-of-Concept application.
- An early identification of potential risks and the identification of the actions that will be taken to mitigate these.