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Abstract

This deliverable presents the training plan according to which the training activities are to be conducted. After a discussion on the needs of the SMEs, an approach of how to efficiently present the Amigo accomplishments is described. The structure and content of the resulting training modules are outlined. In addition, the guidelines for building the training materials are laid out.

Keyword list

training activities, training modules, tutorials, seminars

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1 Introduction

The training activities aim at industrial and post-graduate learners. Especially SME participation will be encouraged by coordinating work in this work package with the dissemination activities. Courses are organized in a modular way. Modules addressing the Amigo related topics will be developed in cooperation with the different partners. This modular approach offers the opportunity to combine different modules according to the special needs of the target audience. Among Amigo specific topics, the course also addresses key technologies on which the Amigo middleware is based. This is required as SMEs are not necessarily familiar with modern software paradigms, e.g. ontologies.

To address people all over Europe, the courses will be held at different locations and in different countries. A first successful course took place in Duisburg (Germany) on May 2006. The seminar addressed decision makers who were responsible for the development of new products and applications in the area of smart homes. It introduced complex technical issues in a concise and easy to understand manner. A second seminar was given in November 2006 in Eindhoven (The Netherlands).

Further courses are being planned and carried out. New modules will be developed and integrated in coordination with the progress of the other work packages. The new modules will consist of a theoretical and a practical part. During the practical part, participants can enhance the knowledge gained during the theoretical lessons.

In order to streamline course development FhG-IMS developed a training plan which outlines the training objectives, training outputs, the didactic approach as well as the test and feedback plans. This document is a report on this training plan.

2 Goals of the Training Efforts

For the development of the content and structure of the courses, it is important to determine the goals of the training efforts. Actually, there is a single major goal that shall be reached: the intention is to *successfully inject the Amigo middleware into the market*. That is, the training efforts target at bringing the Amigo middleware and technology into real products at a wide scale. To achieve this goal, an approach has been developed to create some "distribution channels" for promoting the Amigo technology. A key channel is comprised of the training and dissimination courses which target at SMEs.

In order to reach this goal, SMEs must be aware of the deficiencies of current middleware technology and must understand the benefits that may arise from using modern technology. Further, in order to use the Amigo middleware for their products, developers have to get used to the Amigo system. This of course also covers getting in touch with the base technology elements the Amigo middleware is built upon. Finally, the SMEs have to get familiar with the amount of extra effort that is needed to incorporate the Amigo technology in their products.

The following sub-goals are addressed (in the following the terms target audience and SMEs are used interchangeably):

- The target audience must be aware of the problems and shortcoming of current technology and how they are going to be addressed by Amigo. Here, the decision makers within the SMEs are especially targeted. This is perhaps not an obvious goal but it must be noted that especially the SMEs don't typically have big development and research teams that are addressing future issues within the field of smart homes. One of the reasons for this is that the current gap between the technology that is available on the market right now and the technology that is currently developed by the research community is quite large.

- The target audience shall become familiar with the user benefits of a modern middleware technology. Benefits are the actual driver of the technology from the user's perspective. Hence, it is important to realize what benefits can be obtained from modern middleware technology and why it is not possible to achieve the same benefits with current approaches.

- The audience must be familiar with the technology on which the Amigo middleware is based.
  Modern software modelling techniques, e.g. description logics, are typically unknown to the SMEs that operate in the domotic field. As the majority of Amigo middleware components rely on such techniques, appropriate knowledge must be available at the target audience. The level of knowledge of course depends on the actual attendees. While decision makers only need a high level understanding of these technologies, developers must have a thorough insight and experience in using such technologies.

- The target audience must understand how Amigo technology is going to solve the problems and how to use it in order to crate Amigo devices or services. In order to foster application of Amigo technology in real products, the target audience shall learn how to apply the technology for building Amigo aware or compatible devices and services. To help people get started, they shall not only become familiar with Amigo on a theoretical level but also get used to it in practical sessions. To this end, people shall be provided with hands-on training material that allows them to build devices and service by their own. This of course targets mainly developers and to a lower extend decision makers as it requires some programming skills.

- The audience must become aware of the development efforts that are needed to apply Amigo technology to their products. In order to gain the additional functionality offered by the Amigo middleware some efforts to make devices Amigo compatible or Amigo-aware is required. An important aspect is to point out the extent of such efforts as well as how these

additional efforts integrate into the typically development chain. It is important for the decision makers to know about this as the additional efforts of course effect the development costs and time. Further, they need to know about the skills that are needed in order to properly staff the development team. Finally, the developers need information about the additional time and man power that may be required.

As can be seen from the enumeration, the actual goals slightly depend on whether decision makers or developers are addressed.

Table 1 summarizes the various goals with respect to the target audience. Among the specific goals, this table also briefly gives a list of prerequisites for the specific topics. Note that for the decision makers the intention was to keep the number of prerequisites as low as possible.

However, it should be noted that in order to successfully bring Amigo to the market, both, the management level as well as the leading developers must be convinced by the advantages of approach. The training efforts must show that

- Amigo provides a comprehensive set of functions that allow creation of new services and devices and hence provide significant improvement in terms of user benefits

- Amigo requires only a limited amount of additional resources to make devices Amigo-aware or compatible

- The Amigo results and software will be available as open source beyond of the actual project runtime

Topic	Decision makers	Developers
Shortcomings of current technology	**Prerequisites**: Overview of state-of-the-art home automation technologies. **Goals**: After the training the decision makers shall have a high level understanding of the problems that arise from integrating current devices using currently available solutions.	**Prerequisites**: Overview of state-of-the-art home automation technologies. **Goals**: After the training developers shall have a high level understanding of the problems that arise from integrating devices using currently available solutions. Further, they know technical details about issues that are addressed by the Amigo middleware.
User benefits	**Prerequisites**: Aware of current domotic technology. **Goals**: Decision makers shall have a high level view on the benefits of Amigo in contrast to other (simple) approaches.	**Prerequisites**: Aware of current domotic technology. **Goals**: Developers shall have a high level view on the benefits of Amigo in contrast to other (simple) approaches.
Middleware basics	**Prerequisites**: None. **Goals**: Decision makers shall have an overview on domotic middleware approaches, their advantages and	**Prerequisites**: None. **Goals**: Developers shall learn what middleware is good for and how it is typically used in domotic environments.

	disadvantages.	
Amigo technology	**Prerequisites**: None. **Goals**: Further, they get an overview on the architecture, technology and components that are used in Amigo. Finally, they shall know how the architecture contributes to reach the overall Amigo goals.	**Prerequisites**: Programming knowledge in Java or .NET. **Goals**: Developers shall get an overview on key technologies and concepts that are exploited in Amigo. They shall get an overview on the architecture and the components of Amigo. They shall learn how to use them, how to add new devices and services so that they become able to develop their own Amigo services and devices
Development efforts	**Prerequisites**: None. **Goals**: Decision makers shall gain knowledge about the skills that are required to develop Amigo devices and services. Further, they shall receive a rough overview of the resources that are needed to develop Amigo compatible devices and services.	**Prerequisites**: None. **Goals**: Developers shall get knowledge about the additional efforts that are needed to build Amigo devices or services.

Table 1: Goals that shall be achieved with respect to different topics and target audience type

3 The needs of the SMEs

In order to analyze the needs of the SMEs with respect to seminars and training courses, developers from two major SME companies have been interviewed. Both companies belong to the home automation industry. Due to the sensitivity of the assessed information, the interviews are kept anonymous.

First of all, they were asked about the technology they were familiar with. It turned out that developers within SMEs were familiar with databases and web service programming. Further, interests in Java, .Net, OSGi and XML were shown. Analysing the gathered information reveals, however, that there is no in depth knowledge or application of these technologies. With regard to the semantic technologies, it turned out that little information is present. Moreover, the interviewed companies pointed out that they did not see any benefits of using semantic technology for their business.

Further, it is interesting to note that context awareness and service discovery are topics that are of high interest to them. Similar, security will also play an even more important role to them in the future.

Form the gathered data, the following conclusion were driven:

- A special focus should be put on showing the benefits of semantic technologies. As there is some kind of scepticism about it, the advantages and power of the technology should be clearly pointed out and shown by motivating examples.

- It cannot be expected that the SME developers know much about

    o OSGi - developers may know Java but not necessarily OSGi.

    o .Net framework - the .Net framework is rather new, so that the prevalence within this area is limited.

    o Web services - due to the widespread use of internet technology, web service are obviously gaining popularity. Nevertheless, not all developers typically deal with these kinds of mechanisms in their daily business. Especially, those developers who are coming from the embedded world are not necessarily familiar with web services.

    As a result, training and seminar blocks should provide an introduction to these topics. Especially semantic techniques are quite unknown and should be introduced in a sufficient detail.

- Interesting topics to SMEs are:

    o Context awareness

    o Security

As a result, appropriate training modules should be developed for these topics

4 Approach to reach the goals

As it has been pointed out in the previous sections, there are three major means to reach the goal of establishing Amigo technology in the market. To this end, the SME managers as well as leading developers have to be convinced that

- Amigo provides a comprehensive set of functions that allow creation of new services and devices and hence provide significant improvement in terms of user benefits

- Amigo requires only a limited amount of additional resources to make devices Amigo-aware or compatible

- The Amigo results and software will be available as open source beyond the actual project runtime.

As mangers and developers have quite different needs and require information at a different level of granularity, it was decided to split the training package into two parts. The first part started before any actual software was available to the public. It is intended to provide high level information to managers. The second part actually consists of the detailed presentation of the Amigo middleware. By applying this approach both target audiences can be provided with the appropriate information without risking to overburden or to bore someone.

Section 6 explains the seminar blocks that have been developed and that are going to be developed while Section 0 gives a description for the hands-on training parts of Amigo.

5 Training module framework

In order to obtain a reusable flexible training concept, training modules have been arranged into a two-day structure as shown in the figure below. The framework consists of two parts which are associated with a complete day. The first part (day) gives a theoretical introduction into the problem domains and how the Amigo solutions are designed.
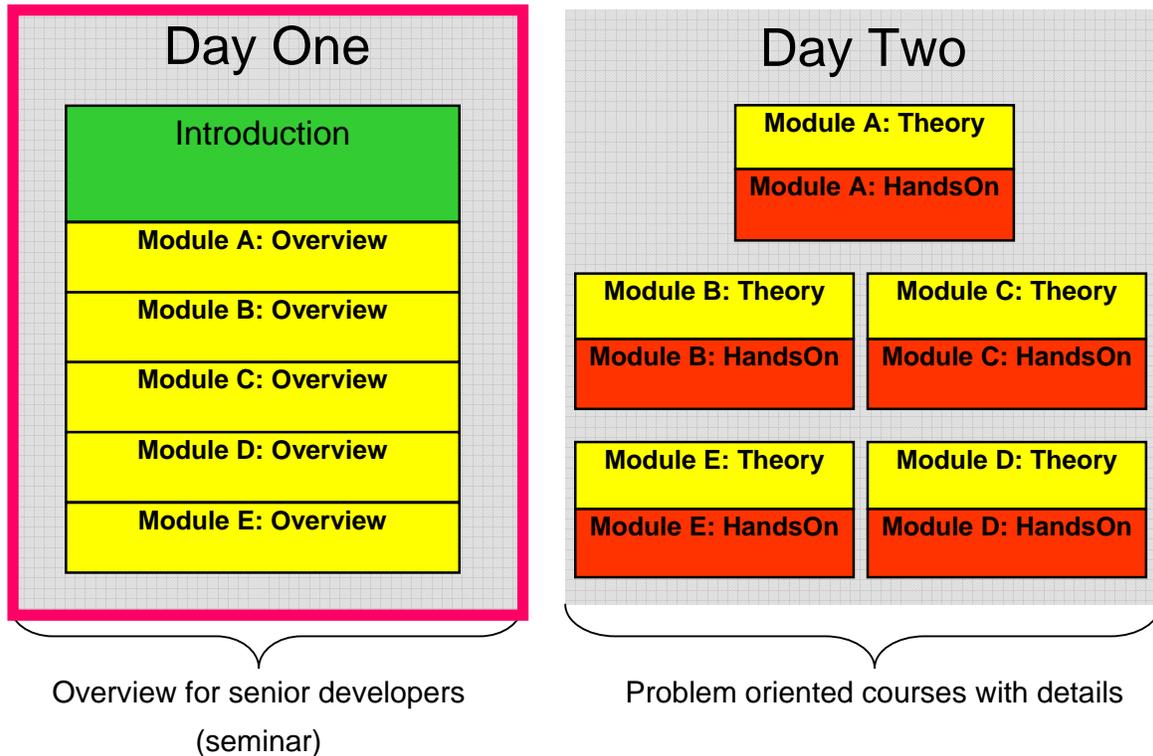
Day One

Introduction

Module A: Overview

Module B: Overview

Module C: Overview

Module D: Overview

Module E: Overview

Overview for senior developers
(seminar)

Day Two

Module A: Theory

Module A: HandsOn

Module B: Theory

Module B: HandsOn

Module C: Theory

Module C: HandsOn

Module E: Theory

Module E: HandsOn

Module D: Theory

Module D: HandsOn

Problem oriented courses with details

Figure 1: Training module framework

As the typical SME manager or developer is not aware of modern technologies like semantic based approaches to knowledge representation, during the first day the focus has been put on the presentation of the core software and modelling paradigms that are applied within Amigo. Knowledge about these technologies is mandatory for both, decision makers as well as developers. For the management level it is important to notice what kind of benefits can be gained from integrating such technologies. Note that the application of these technologies in real-world products requires a certain amount of additional resources in terms of man power. Further, it requires that the developers are educated accordingly which in turn also puts some additional pressure to the total development budget. Hence, in order to convince the management levels to use these technologies they must be clearly aware of their benefits.

Beside of giving an introduction to the core technologies, the main Amigo architecture and solutions are also introduced during the first day. As a result, the audience will learn the basic concepts applied within Amigo, how the core components are laid out and how they interact with each other at the higher levels. This provides the audience with the first knowledge of how to use the Amigo middleware in order to build an AmI system.

During the second day, the basic Amigo components are explained and trained. To this end, each module consists of two parts: a theoretical part, providing sufficient details in order to apply the

knowledge within the following practical part. Note that the second day addresses developers as some programming skills are needed during the practical parts. Note further, that the attendees of the training parts may choose to use either Java or .NET as deployment framework. Hence, the hands-on training blocks will be available for both platforms.

The actual context of both days is divided into five modules A to E which are explained in the following.

5.1 Training modules

We expect that a successful AmI middleware must address issues concerning interoperability, context awareness, multi-modal user interaction, and security. Due to the importance of these topics, each of the them is devoted a separate training module. Additionally, a module to introduce the problem domain along with the concepts of the Amigo middleware is provided. In detail the following aspects are targeted:

- **Module A: New procedures and innovative approaches in multimedia and home automation integration:** This module covers the introduction to the problem domain as well as an introduction to the Amigo architecture. Hence, Module A gives an overview what is currently available, how future home environments may look like. Further, it explains how Amigo targets the challenges by explaining its major features, components and how they interact with each other in order to provide a smart environment.

- **Module B: Interoperability in managed home networks:** Interoperability is actually one of the most important topics in heterogeneous environments like a domestic home. As Amigo's goal is to spread into real products, a major requirement for the Amigo middleware is to support various existing communication standards and protocols. Further, Amigo does not only provide mechanisms that allow devices to talk to each other but also to get a machine based "understanding" of the functionality of devices. This is a major requirement for real (automatic) interoperability. Due to the importance of this topic, an entire module is devoted to this issue. It introduces the concepts that are applied by Amigo to achieve the interoperability goal.

- **Module C: Interaction design:** User interfaces are what a user immediately gets in touch with. Hence, it is very important for the acceptance of a technology or product. As a result, a special focus in the training program is put on user interfaces and how the user interacts with the system. To this end, UI concepts of Amigo are shown and explained.

- **Module D: Context awareness in AmI-systems:** In order to make a AmI-system smart it is required to make the system aware to the context the user is currently in. This of course requires some kind of mean to describe context information in a human and machine readable form. Further, appropriate mechanisms to collect or extract this kind of information from the available data is required. As a result, Module D focuses on techniques to describe context information using ontologies and how to extract context information from sensor data.

- **Module E: Addressing security and privacy issues in AmI-systems:** If in the future major parts of the domotic environment are controlled by the home network, security will become one of the major concerns. Actually, if the security issues is not addressed and solved sufficiently, success of the Amigo middleware to become a major software basis for domotic environments is endangered. As a result, the major security problems of modern networks are introduced along with standard approaches applied to establish security. Further, appropriate means to provide a sufficient security level within Amigo are shown as well.

Table 2 provides the goals for the various modules with respect to the target audience. Note that decision makers (managers) will typically only attend the first day while developers will normally attend both days.

Module	Decision makers	Developers
A: New procedures and innovative approaches in multimedia and home automation integration	**Goals**: After the training the decision makers shall have a high level understanding of the problems that arise from integrating current devices using currently available solutions. Further, they know the benefits of applying Amigo technology for integration.	**Goals**: Same as decision makers plus providing hands-on experiences with the Amigo middleware. Especially, training on how to use the framework and how to create context sources and develop services, is provided.
B: Interoperability in managed home networks	**Goals**: Decision makers shall have a high level view on the interoperability issues and how they are addressed in Amigo.	**Goals**: Same as decision makers. Additionally, developers shall gain experience with implementing and using plain and semantic based service discovery within Amigo.
C: Interaction design	**Goals**: Decision makers shall have an overview on the UI concepts that are supported by Amigo.	**Goals**: Same as decision makers. Additionally, developers will gain experience with creating user interfaces based on the Amigo middleware.
D: Context awareness in AmI-systems	**Goals**: Decision makers shall learn about the importance of context-awareness for future products.	**Goals**: Same as decision makers. In addition, developers will learn how to semantically model context information using ontology tools and languages.
E: Addressing security and privacy issues in AmI-systems	**Goals**: Decision makers will become sensible to the security threads within a connected home. Further, they get a brief introduction on technologies that are common to establish security and how these technologies are applied in Amigo.	**Goals**: Same as decision makers. In addition, developers will gain hands on experience by designing and implementing security using the concepts and mechanisms provided by Amigo.

Table 2: Goals that shall be achieved by the various training modules with respect to the target audience

6 Seminar

At the time of writing of this report there are six seminar blocks available. All target at the providing sufficient information to the management level without giving too much detailed information. The pursued goals are:

- Showing that there are significant gaps and deficiencies that hamper development of a real smart ambient system.

- Showing that Amigo provides the solution to these problems

- Briefly explaining the Amigo technology as well as the underlying technology.

- Showing that Amigo software and solutions will remain beyond of the actual project end.

6.1 Didactic approach

The seminar blocks were implemented in form of a lecture / presentation using Microsoft PowerPoint. While the actual presentations typically did not provide significant room for interaction with the audience, it was taken care during the actual seminars, that a sufficient amount of time was available for discussions.

6.2 Seminar blocks

Six blocks have been chosen as seminars in order to provide a sufficient amount of information starting from a general introduction to the problem domain. Thereafter, the Amigo architecture is explained at a higher level.

The blocks has been chosen to gradually start from the basic problems of AmI home systems and what kind of challenges arise when designing such systems. An overview on the blocks is given in

Table 3.

Lecture name	Goals	Compo-nent	Status
Ambient Intelligence Environments	After the presentation the audience knows the benefits of modern AmI home systems as well as the challenges that arise when building such systems. The presentation is intended to give a motivation for the Amigo approach and architecture.	A	Ready
Amigo Architecture	After the presentation the audience knows the core elements of Amigo. They know the basic vocabulary that is used within Amigo in order to be able to follow additional detailed explanations of various Amigo components.	B	Ready
Service Discovery for Context Aware Applications	After the presentation the audience knows how services within the Amigo environment are discovered and how	B	Ready

	context-aware service discovery is done.		
Opportunities and Challenges of Speech Processing in a Networked Home	The audience gains knowledge about the major components of a speech processing system as well as what can be achieved with speech processing.	C	Ready
Building adaptable user interfaces	Attendees will learn how to build adaptable user interfaces with the Amigo middleware.	C	Under development
Context-Awareness Concepts and Principles: Introduction	After the presentation the audience knows the benefits of context awareness as well as how it is described within Amigo. Further, a short introduction to ontologies is given.	D	Ready
Semantic Modelling of Context Information	Attendees will gain knowledge on the ontology tools and languages and how they can be used to represent context information in AmI applications.	D	Under development
Security and Privacy	The lecture makes the audience sensitive to the security problems and shows the core techniques that are used to implement secure systems nowadays. The audience learns about the used approaches within Amigo.	E	Ready

Table 3:Overview on seminar blocks

6.2.1 Ambient Intelligence Environments

Type: Lecture.

Module: A

Presenter: Viktor Grinewitschus.

Goals: After the presentation the audience knows the benefits of modern AmI home systems as well as the challenges that arise when building such systems. The presentation is intended to give a motivation for the Amigo approach and architecture.

Description: During this block the participants will get an idea on the look and feel of an AmI home system. The focus is put on outlining the benefits of such systems as well as the challenges that arise when such systems are designed. In special, the course will introduce the user requirements and the problems that must be solved by a middleware of an AmI home system. The discovered results will be mapped to existing approaches and show why they fail. Next, a set of interesting scenarios will be given that show how a future smart home will present itself to the user and which

kind of services can be expected. These examples will serve as a motivation for the various components and solutions that are provided by the Amigo middleware.

Versions: There is a 20 minutes short version as well as a 45 minutes long version available. For both versions the appropriate slides in PowerPoint format are available. For the long version also an video has been recorded.

Status: Finished and Available.

6.2.2 Amigo Architecture

Type: Lecture.

Module: B

Presenter: Peter Vink.

Goals: After the presentation the audience knows the core elements of Amigo. They know the basic vocabulary that is used within Amigo in order to be able to follow additional detailed explanations of various Amigo components.

Description: The lecture will provide an overall introduction to the Amigo architecture explaining the Amigo middleware and its components. Major issues addressed on this lecture are service discovery, interoperability, service composition, management of context information, as well user profiles and user models. Further, an outline will be given on how to setup an Amigo network and how to write Amigo services.

Versions: There is a 20 minutes short version as well as a 45 minutes long version available. For both versions the appropriate slides in PowerPoint format are available. For the long version also an video has been recorded.

Status: Finished and Available.

6.2.3 Context-Awareness Concepts and Principles: Introduction

Type: Lecture.

Module: D

Presenter: Ioanna Roussaki.

Goals: After the presentation the audience knows the benefits of context awareness as well as how this is established in the Amigo middleware solution.

Description: During this lecture we will point out the advantages of deploying context-aware services and the necessary issues that need to be addressed in order to reach the pervasive computing vision. The concepts involved in the context-awareness (CA) and pervasive computing domains will be identified and properly defined, while the strong interdependency of these domains will be highlighted. Initially, definitions of context and context-awareness concepts will be provided,

while subsequently elaboration on the context characteristics and nature, as well as details on the sensors required to support context-aware systems. Then, the most popular context-aware applications and prototypes will be presented. Finally, the framework built to support CA in Amigo will be described. Thus, the CA architecture implemented and the CA functionality provided will be presented, while an overview of the contexts sources used will be given. Finally, the critical context-awareness aspects involved in service provision within AmI home environments will be highlighted.

Versions: There is a 30 minutes short version as well as a 45 minutes long version available. For both versions the appropriate slides in PowerPoint format are available. For the long version also an video has been recorded.

Status: Finished and Available.

6.2.4 Service Discovery for Context Aware Applications

Type: Lecture.

Module: B and D

Presenter: Maarten Wegdam and Aart van Halteren.

Goals: After the presentation the audience knows how services within the Amigo environment are discovered and how context-aware service discovery is done.

Description: The lecture will give an overview of service discovery protocols, including the general principles behind service discovery and a high-level overview of the popular service discovery protocols Jini, UPnP, Service Location Protocol (SLP) and UDDI. The second part of the lecture extends service discovery to context-aware service discovery. It discusses context-aware lookup of services and context-aware registration of services.

Versions: There is a 20 minutes short version as well as a 45 minutes long version available. For both versions the appropriate slides in PowerPoint format are available. For the long version also an video has been recorded.

Status: Finished and Available.

6.2.5 Opportunities and Challenges of Speech Processing in a Networked Home

Type: Lecture.

Module: C

Presenter: Reinhold Häb-Umbach.

Goals: The audience gains knowledge about the major components of a speech processing system as well as what can be achieved with speech processing. Further, it shows how exploit the speech signal for physical user tracking.

Description: This lecture consists of two parts. The first part gives an overview of the components of a speech signal processing system, e.g. microphones, loudspeakers, multi-channel audio cards, etc. Next an introduction to typical speech signal processing tasks, their performance, resource requirements and limitations is given. This includes a discussion of single- and multi-channel speech enhancement methods, acoustic echo compensation techniques, hands-free communication etc. The section is concluded with pointers to related internet sites and literature on the topic.

The second part discusses the state-of-the-art in automatic speech recognition for human-machine communication. The performance, resource requirements and limitations of natural language speech user interfaces are discussed. Further, it is shown how context information can be gleaned from speech signals, since speech conveys more than its verbal content. Examples include speaker identification, speaker change detection and speaker position estimation and tracking. Again this part concludes with references to further information.

Versions: There is a 20 minutes short version as well as a 45 minutes long version available. For both versions the appropriate slides in PowerPoint format are available. For the long version also an video has been recorded.

Status: Finished and Available.

6.2.6 Security and Privacy

Type: Lecture.

Module: E

Presenter: Edwin Naroska.

Goals: The lecture makes the audience sensitive to the security problems and shows the core elements techniques that are used to implement secure systems nowadays. The audience shall learn about the key approach that is used within Amigo to enable security.

Description: This course part will give an overview over today's security threats and introduces threats to a connected home. Beside of the example driven introduction the participants will get first ideas of defending strategies like data encryption using private and public keys. Further, it will be briefly explained how messages that are send across an unreliable channel can be authenticated using public key techniques. Finally, the Kerberos protocol can be used to authenticate clients to multiple servers in a secure manner.

Versions: There is a 20 minutes short version as well as a 45 minutes long version available. For both versions the appropriate slides in PowerPoint format are available. For the long version also an video has been recorded.

Status: Finished and Available.

6.2.7 Semantic Modelling of Context Information

Type: Lecture.

Module: D

Presenter: Ioanna Roussaki.

Goals: Attendees will gain knowledge on the ontology tools and languages and how they can be used to represent context information in AmI applications.

Description: An introduction on ontologies will initially be provided. This will focus on their advantages and shortcomings as well as on the languages and tools used for ontology modelling. Then, various popular context ontology solutions that have been proposed by the research community will be presented. Subsequently, the Amigo semantic framework will be presented, focusing on the context ontologies introduced for the AmI home. The context semantics range from a context ontology vocabulary, which provides a taxonomy of the various context parameters involved in pervasive service provision, to a context ontology language that is adequate for the representation of all the distinct and heterogeneous contextual parameters identified in the vocabulary. Additionally, the most important ontology-based context management systems paradigms will be briefly presented, while the advantages and disadvantages of these various approaches will be identified. Finally, a short demonstration on how a context ontology can be built using a popular ontology editor will be provided.

Versions: A 45 minutes long version is planned.

Status: Under development.

6.2.8 Building adaptable user interfaces

Type: Lecture.

Module: C

Presenter: Not defined yet.

Goals: Attendees will learn how to build adaptable user interfaces using the Amigo middleware.

Description: The lecture explains how user interfaces that adapt to the user's needs can be build using the Amigo middleware. Beside of the feature to modify the behaviour and structure of the graphical user interface according to the user's preferences, another important aspect of the Amigo user interface is its ability to seamlessly integrated various kinds of devices and services into a single homogeneous UI. In this lecture, the means and techniques to implement these features are explained. Further, the information that must be provided by the devices or services so that they can be integrated automatically are discussed.

Versions: A 45 minutes long version is planned.

Status: Under development.

6.3 Seminar handouts

Beside of the actual presentations the attendees are provided with handouts. The handout material consists of the slides augmented with additional information and a more in-depth explanation of the key topics. As a result, the handouts provide a valuable extension to the oral presentations.

6.4 Development process and feedback

The development process of each seminar block includes several feedback steps where content as well as the performance of the presenters are checked and improved. In detail, the following steps are done:

1. Determining block content. In order to develop a comprehensive set of seminar blocks that are well aligned, the content of each block is determined in collaboration with the partners from WP10. This ensures that all important topics are covered and there is no unintended overlap in the contents between the blocks.

2. Slide and content layout guidelines. In order to provide a consistent look and feel among the seminar blocks, a template for the slides have been created. This template is used by all the presenters which defines layout, font style, size and colour. It can be downloaded from the Amigo Quickplace project web site. Further, a guideline for developing the slides and the content has been designed. The rules are presented in Section 6.4.1.

3. Early style and content alignment. In order to fine tune alignment between the seminar blocks, preliminary versions of the slides are reviewed at the meetings and suggestions to improve the presentations are generated. Further, the partner check the content against their own presentation in order to find overlapping parts, inconsistencies or gaps. This process ensures that the content as well as the style is consistent among the different blocks which are typically coming from different partners.

4. Dry run. After the seminar blocks are developed, the close to final seminar versions are presented to the partners in order to obtain some final feedback information. Feedback information covers slides as well as presentation style.

5. User feedback. At the end of each seminar users are requested to fill out a feedback form in order to provide improvement comments. The feedback forms are collected, analyzed and the results are send to the partners in order to help improve the seminar blocks. If required, the feedback data is discussed at the regular partner meetings.

Note that some of the steps listed above are done only once (e.g., steps 1 and 2) and others must be repeated for each seminar block that is developed.

6.4.1 Presentation / slide guidelines

In the following a set of guidelines shall be used during block development to align the style of the presentations accordingly:

Slide style:

- Use the seminar PPT file available from Quickplace as a template and stick to the font style and font size requirements. Ensure that the font size is always big enough to be readable even at a larger distance.

- Do not use complete long sentences (if there are no good reasons to do so). Text should be short and to the point. Any further explanation may be provided in the notes section of the PPT slides.

- To not cram too much information into the slides. Use the slides as a guide to your talks rather than a complete picture of the content.

- Use a meaningful outline for each slide. The outlines help the audience to navigate through the presentation.

- Use bullets to structure the slides. Do not use more than 2 lines per bullet and more than 4 to 5 bullets per page.

- Use colours and font style variations *carefully* to point out some important statements.

- Do not use "All Caps" for body text.

Slide content:

- Do not forget to add a title page to the presentation. See template file for further information.

- Add a outline page at the beginning of the presentation. It is not required to repeat (this holds especially for short presentation) the outline page at each topic change during the talk.

- Use graphics to illustrate complex topics. Use examples to explain theoretical content. This will help the audience grasp what you are talking about.

- Keep in mind what the goal of the seminar is. Note that the seminar addresses both: decision makers as well as developers.

- Conclude with a summary. A summary slide is recommended but not required.

Presentation:

- Face the audience, do not talk to your screen or note cards. Speak slowly and project your voice.

- If needed, use laser pointers to emphasis specific points on the slides.

- Make sure that you stick to the time limit. As a rule of thumb each slide takes about 1.5 minutes.

- Leave enough time for discussion (typically 5 minutes per presentation). Repeat questions that are coming from the audience so that everybody can listen to them.

- Present from memory, do not read text from cards.

6.4.2 Feedback form template

In order to collect some feedback from the attendees of the seminars, appropriate feedback forms are used. The form is provided along with the handouts and users are requested to take the time for filling up the form. The feedback forms are then collected and analyzed to extract information that may be useful for improving the seminar blocks. In the following a template for the feedback form is given. It can be modified accordingly to match the specific needs of the seminar.

Anonymous Feedback Form

Thank you for participating in the Amigo-Seminar. Your opinions are of value to the program administrators to maximize the learning experience for future seminars and courses. Please take a few minutes to evaluate the Seminar.

Your responses are absolutely anonymous.

In general, this Seminar has been:	O excellent	O very good	O good	O fair	O poor

Organization of the Seminar	O excellent	O very good	O good	O fair	O poor	O not applicable
Content of the Seminar	O excellent	O very good	O good	O fair	O poor	O not applicable
Usefulness of the Seminar information	O excellent	O very good	O good	O fair	O poor	O not applicable
Did the seminar address your current needs	O excellent	O very good	O good	O fair	O poor	O not applicable
Seminar slides	O excellent	O very good	O good	O fair	O poor	O not applicable
Seminar handouts	O excellent	O very good	O good	O fair	O poor	O not applicable
Performance of the presentations	O excellent	O very good	O good	O fair	O poor	O not applicable
Did the presenters answer questions properly?	O excellent	O very good	O good	O fair	O poor	O not applicable
Did you plan to use middleware	O yes	O probably	O did not	O probably	O no	O not

technology before attending the seminar		yes	think about it	not		applicable
Will you now use middleware technology	O yes	O probably yes	O perhaps	O probably not	O no	O not applicable
Do you plan to use Amigo software in the future	O yes	O probably yes	O perhaps	O probably not	O no	O not applicable
Are you interested in further information about Amigo	O yes	O probably yes	O perhaps	O probably not	O no	O not applicable
Quality / quantity of food and beverages	O excellent	O very good	O good	O fair	O poor	O not applicable

What did you like about the seminar?

What did you dislike about the seminar?

What suggestions do you have for improving the seminar?

What would you like to have learned more about?

Further comments:

Thank You!

7 Training

In contrast to the seminar blocks which consists of purely lecture type parts, the training blocks contain both, theoretical parts and practical parts. However, the only purpose of the theoretical parts is to provide the attendants with the knowledge needed for the following practical parts.

7.1 Didactic approach

For the training course a traditional didactic approach is used. It comprises the following stages (steps): awareness, acquisition, application, utilization and maintenance. The first five steps are applied during the training course while the last step is intended to be done outside of the training session (e.g. at home). Further, where possible and useful a spiral approach is taken. Each training block consists of several phases:

1. **Awareness and acquisition:** Training starts with an traditional passive lecture based part where the knowledge required for the following practical parts are explained. This lecture part is based on the appropriate seminar blocks where the general problem and solution technologies have been introduced. The lecture part in the training approach just adds some basic information about the Amigo approach that is required in order to start with the practical part. After the theoretical part is finished, training continues with the practical part.

2. **Application:** In the next phase the participants use a computer to implement a set of simple tasks. Task assignment and the steps required to fulfil the task are explained in the documentation. The task in the second phase are just designed to help people get familiar with the Amigo solution. Hence, each step needed to fulfil the assignment is detailed described in the documentation so that participants can easily find out how to perform a specific operation.

3. **Utilization:** Once people became familiar with the Amigo framework and the libraries that are needed for the specific training block, the next training phase starts. During this phase participants practise their knowledge and techniques learned in the previous phase. To this end, they are assigned a set of medium complex task. Note that for these assignment not detailed procedural steps are provided (in contrast to phase 2). Instead, participants are provided with a reference solution so that they can compare their approach or solution with the reference implementation.

4. **Maintenance:** The final phase doesn't actually belong to the training course. It is a kind of homework that is assigned to the participants. The goal of this trainings phase is to help people get used to the framework and the corresponding libraries. The assignments that are provided during this phase are intended to cover a wide variety of different features and components of the corresponding library.

Another didactic component that is used is the spiral approach. That is, training cases start out with a simple test case. This test case is revisited from time to time making it more and more complex. Due to this approach, participants do not have to deal with complex interfaces and functionalities of the framework and the libraries in the first place. Instead, their full functionality is discovered step by step giving people enough time and opportunity to get used to it.

A summary of the training phases is provided in Table 4.

Phase	Purpose	Goals	Type	Training approach
1	Aware-ness and acquisition	Obtain all required information in order to start with the practical parts.	Theoretical	Lecture
2	Application	Get used to the Amigo framework and the libraries that are needed for the specific training block.	Practical, on site	Solution is explained step by step in the documentation. Trainer gives direct feedback and help.
3	Utilization	Practise the knowledge and techniques learned in the previous phase by developing more complex solutions.	Practical, on site	Medium complex assignments are given to participants. Only a complete reference solution is provided for a final check / comparison. Trainer gives direct feedback and help.
4	Mainte-nance	Widen knowledge about Amigo technology	Practical, off site	Complex assignment are given to the participants. These assignment use advanced features of the specific component or technology. These assignments are typically not done during the training but are intended for homework. No trainer support is provided for this phase.

Table 4:Training phases

7.2 Training blocks

As Amigo supports two deployment frameworks (one .NET based and another based on OSGi), the training courses also contain two versions of the assignment and explanations. Moreover, examples for .NET and OSGi are explained side by side (with some exceptions where this would become too complex and hard to read). There are two reasons for this. First, having examples for both deployment framework side by side easily shows the interoperability of the approach, which is one of the key features of Amigo. Second, attendees which are only familiar with either .NET or Java may be interested to see how a specific operation or solution is done within the counterpart framework giving some additional motivation to follow the training course. However, note that this approach is only used where side by side examples do not clutter the overall documents too much.

The training blocks are summarized in Table 5.

Titel	Goals	Time	Prerequisites	Module
Making devices Amigo compatible	• Use Amigo's deployment frameworks • Understand and design simple ontology based knowledge bases • Make a device Amigo aware or compatible.	Theory: 45 min Practice: 135 min		B
Creating context sources and context clients	• Teach how to create Amigo context sources • Teach how to create context-aware applications	Theory: 45 min Practice: 135 min	Training block "Making devices Amigo compatible"	D
Developing Amigo services	• Teach how to create Amigo based services and • Teach how to create user interfaces based on the Amigo middleware • Show how to use ANS	Theory: 45 min Practice: 135 min	Training block "Making devices Amigo compatible"	A, C
Using Amigo security services	• Teach how to secure services by applying the Amigo security services	Theory: 30 min Practice: 90 min	Training blocks "Making devices Amigo compatible", "Developing Amigo services"	E
Multimedia in Amigo	• Teach how to use Amigo for creating multimedia application • Teach how to use Amigo data storage services • Teach how to use Amigo's content distribution	Theory: 30 min Practice: 90 min	Training blocks "Making devices Amigo compatible", Developing Amigo services" and "Creating context sources"	B, C

Table 5:Training blocks

In the following sections the various training blocks are explained in more detail.

7.2.1 Making devices Amigo compatible

Type: Training.

Module: B.

Prerequisites: None

Presenter: Not defined yet.

Goals: Attendees will learn how to apply the basic technologies that are used within Amigo. After the training session attendees will be able to use Amigo's deployment frameworks. Further, they will be able to understand and design simple ontology based knowledge bases. Finally, they will know how to make a device Amigo-aware or compatible.

Description: This training block will teach attendees about the basic technologies that are used in the Amigo middleware, e.g. web services, .Net, OSGi as well as ontologies. In order to use the Amigo system, people must know these core technologies and learn how to apply them in the Amigo context. In detail the training block will introduce the .NET and OSGi based deployment frameworks among some general introduction into C# and Java based programming. Semantic descriptions of entities with the help of the OWL language is shortly discussed. Further, attendees will learn what is needed to build an Amigo compatible devices. This includes designing and implementing all required descriptions and services based on the deployment frameworks. This training block is a prerequisite for all other blocks.

Versions: The theoretical part is planned for 45 minutes, the practical part will run for 135 minutes.

Status: Under development.

7.2.2 Creating context sources and context clients

Type: Training.

Module: D.

Prerequisites: "Making devices Amigo compatible"

Presenter: Jörg Schmalenströer

Goals: After the training course attendees will be able to create Amigo compatible context sources and context clients.

Description: Context awareness is a major building block of Amigo. Hence, a separate training block has been chosen to cover this topic. The training block will teach attendees what is needed to implement a context source as well as a context client using the aforementioned source. They will learn which methods have to be implemented in order to use the Amigo context management system. To this end, they will practically design a context source and a context client using the Amigo deployment framework and services. This block is based on the block "Making devices Amigo compatible".

Versions: The theoretical part is planned for 45 minutes, the practical part will run for 135 minutes.

Status: Under development.

7.2.3 Developing Amigo services

Type: Training.

Module: A and C.

Prerequisites: "Making devices Amigo compatible"

Presenter: Not defined yet.

Goals: After the training course attendees will be able to create Amigo based services and how to create user interfaces based on the Amigo middleware. Further, they will know how to apply ANS.

Description: The training block will teach attendees what is needed to setup a Amigo service. Similar to context sources, services are at the heart of a Amigo system. Hence, a separate training block has been devoted towards this topic. Further, ANS will be introduced. ANS is a powerful building block of Amigo to process context information and derive decisions or create additional information from it. By using ANS, developing context-aware Amigo services can be eased in many cases. Finally, the training session shows how to use UIS to create user interfaces. This training block is based on the block "Making devices Amigo compatible".

Versions: The theoretical part is planned for 45 minutes, the practical part will run for 135 minutes.

Status: Under development.

7.2.4 Using Amigo security services

Type: Training.

Module: E.

Prerequisites: "Making devices Amigo compatible", Developing Amigo services" and "Creating context sources"

Presenter: Not defined yet.

Goals: After the training course attendees will be able to secure services by applying the Amigo security mechanisms.

Description: The training block will teach attendees how to use the Amigo security service in order to secure an Amigo system. This includes securing Amigo services as well as Amigo context sources. To this end, attendees will be provided with a simple context source example as well as a service that uses this context source. These components are then extended to implement a mutual authentication as well as encryption of any message exchange between the components. The training block is based on the training blocks "Making devices Amigo compatible", Developing Amigo services" and "Creating context sources".

Versions: The theoretical part is planned for 30 minutes, the practical part will run for 90 minutes.

Status: Under development.

7.2.5 Multimedia in Amigo

Type: Training.

Module: B and C.

Prerequisites: "Making devices Amigo compatible", Developing Amigo services" and "Creating context sources"

Presenter: Not defined yet.

Goals: After the training course attendees know how to use Amigo for creating multimedia application, how to use Amigo data storage services and how content distribution is handled.

Description: The training block will teach attendees how to use the Amigo services for building multimedia applications. Training covers content distribution as well as data storage using the corresponding Amigo services. The block is based on the training blocks "Making devices Amigo compatible", Developing Amigo services" and "Creating context sources".

Versions: The theoretical part is planned for 45 minutes, the practical part will run for 135 minutes.

Status: Under development.

7.3 Training documents

For each theoretical part of a training block there is an appropriate document to be delivered as handout. Further, for each practical part of a training block there is a corresponding "coding document" which contains the assignment as well as a step-by-step description of the solution(s). Note that if available the description of the .Net and OSGi based solutions will be shown side by side.

Further, a source code package is associated with the documents. This package contains supporting source code for the assignments as well as the final solutions.

In order to ensure that the documents are having the same structure as well as design, the following procedure is applied for training block development.

7.4 Development process and feedback

The development process of each training block includes several internal feedback steps where content as well as the performance of the presenters are checked and improved. Further, a feedback step where the training blocks are rated from the attendees are included as well. In detail, the following steps are done:

1. Determining block content. In order to develop a comprehensive set of training blocks that are well aligned, the content of each block has been determined in collaboration with the partners from WP10. This ensures that all important topics are covered and there is no

unintended overlap in the contents between the blocks. Further, the experience with internal training sessions that were given from Amigo partners to Amigo partners are incorporated. While these session are not representative for designing training courses that target at SMEs, valuable information can be still derived from it.

2. Content and layout guidelines. In order to provide a consistent look and feel among the training blocks, templates for the slides of the theoretical parts as well as for the actual coding document have been created. These templates define layout, font style, size and colour (in case of the slides). Further, for the coding document it also defines the overall structure of the document. It can be downloaded from the Amigo Quickplace project web site. For the slides of the theoretical part, the rules from section 6.4.1 apply. For the coding part, the rules are shown in section 7.4.1.

3. Early style and content alignment. In order to fine tune alignment between the training blocks, preliminary versions of the theoretical slides as well as the actual coding documents are reviewed at the meetings and suggestions to improve the presentation are generated. Further, the partner check the content against their own training blocks and their assigned seminar blocks in order to find overlapping parts, inconsistencies or gaps. This process ensures that the content as well as the style is consistent among the different blocks.

4. User feedback. At the end of each training block users are requested to fill out a short feedback form in order to provide hints about what can or should be improved. The feedback forms are collected, analyzed and the results are send to the partners in order to help improve the training blocks. If required, the feedback data is discussed at the regular partner meetings.

Note that some of the steps listed above are done only once (e.g., steps 1 and 2) and others must be repeated for each training block that is developed or course that is given.

7.4.1 Coding document guidelines

In the following a set of guidelines shall be used during coding block document development to align the style of the documents accordingly:

Document style:

- Build a document title using the following template: "Amigo Training Document: <Topic of the block>".

- Use the "coding template file" available from Quickplace as a template and stick to the font style and font size suggestions.

Document content:

- Use the structure of the document template document and fill in the content to each section. The coding document contains the following information

  1. A short description on what topic is addressed by the training. For example: "The training block teaches how to use UPMS. After finishing the course, users will be able to add new items to the UPMS service and store/retrieve user profile information to/from the UPMS service.".

  2. A list if common prerequisites for this training block. Here, general (non Amigo specific) requirements are listed, e.g. "Requires basic programming skills".

  3. A list of Amigo related prerequisites that are needed in order to process the training block. Along with the requirement, a recommendation is given how to gain the

corresponding knowledge. Typically this will be a link to another seminar or training block. Example: "The training block requires that the user is familiar with ANS. Information about ANS is available from document X. Further, a training block on how to use ANS can be downloaded from Y".

4. A list of recommended training blocks to continue with. This shall provide the user with information on how to continue in a most efficient way. By following the recommendation the user will eventually have a complete overview over the Amigo middleware.

5. A list of software components that are needed to do the training block. Along with the list, a link where to obtain the appropriate components is given.

6. A link to the source code package that is associated to the training blocks (e.g., predefined blocks of code that shall be modified by the user).

7. An introduction to the training block explaining the what is going to be done. Further, the introduction explains the features of the Amigo components that are introduced in this training block. Please note that not a complete description of a Amigo component is provided here. Instead, only the basic information is provided that is needed to proceed with the training block. Additional information is given when they are needed to fulfil the assignment.

8. The actual training block that contains the assignments along with a step-by-step explanation of the solution for the basic assignments. Note that a detailed step-by-step solution is only provided for the basic assignments. For the extended ones only the final solution is explained and also provided as source code.

- The actual practical part of each training block shall be separated into several steps. Each step should be started by providing additional information about the Amigo component that is going to be used next. Instead of providing a complete description of the component, the knowledge about it is extended by revisiting it, i.e. iteratively extending the feature set that is used (spiral approach).

- Do not dump long sections of source code to the document. Instead show only the relevant sections and point to the source code package that is associated with each training block for further reference.

- Whenever useful and possible the coding document shall contain the code for .Net (C#) and OSGi (Java) side-by-side. This will allow users to compare both implementation version with each other. Further, it will help users that are familiar with one version to learn about the other framework.

- Make sure that the files in the source code package are commented sufficiently. Further, the package shall contain two files:

  o README: contains some general information about the provided source code as well as a link to the training block the package belongs to.

  o INSTALL: instructions of how and where to install the package content.

7.4.2 Feedback form template

In order to collect some feedback from the attendees of the training blocks, appropriate feedback forms are used. The form is provided along with the handouts and users are requested to take the time for filling up the form. The feedback forms are then collected and analyzed to extract information that may be useful for improving the seminar blocks. In the following a template for the feedback form is given. It can be modified accordingly to match the specific needs of the training block.

Anonymous Feedback Form

Thank you for participating in the Amigo-Training Course. Your opinions are of value to the program administrators to maximize the learning experience for future courses. Please take a few minutes to evaluate the course.

Your responses are absolutely anonymous.

In general, this Course has been:	O excellent	O very good	O good	O fair	O poor

Organization of the Course	O excellent	O very good	O good	O fair	O poor	O not applicable
Content of the Course	O excellent	O very good	O good	O fair	O poor	O not applicable
Were the provided introductory information sufficient	O Yes, absolutely	O acceptable	O fair	O could be better	O insufficient	O no opinion
Training slides	O excellent	O very good	O good	O fair	O poor	O not applicable
Performance of the presentations	O excellent	O very good	O good	O fair	O poor	O not applicable
Overall rating of the Handout material	O excellent	O very good	O good	O fair	O poor	O not applicable
Rating of the explanations in the handouts	O excellent	O very good	O good	O fair	O poor	O not applicable
What do you think about the complexity of the examples	O Just right	O Ok for most cases	O Mostly ok	O Sometimes too complex or too simple	O Often too simple or too complex	O no opinion
Enough examples	O excellent	O very good	O good	O fair	O poor	O not applicable
Did the presenters answer questions	O excellent	O very good	O good	O fair	O poor	O not applicable

properly?						
Did you plan to use middleware technology before attending the course	O yes	O probably yes	O did not think about it	O probably not	O no	O not applicable
Will you now use middleware technology	O yes	O probably yes	O perhaps	O probably not	O no	O not applicable
Do you plan to use Amigo software in the future	O yes	O probably yes	O perhaps	O probably not	O no	O not applicable
Are you interested in further information about Amigo	O yes	O probably yes	O perhaps	O probably not	O no	O not applicable
Quality / quantity of food and beverages	O excellent	O very good	O good	O fair	O poor	O not applicable

What did you like about the training course?

What did you dislike about the training course?

What suggestions do you have for improving the training course?

What would you like to have learned more about?

Further comments:

__Thank You!__

_____