



TA2

Together Anywhere
Together Anytime

www.ta2-project.eu



Abstract

This brochure provides an easy-to-read overview of the TA2 project, its objectives, structure, architecture, methodologies, productions and partners.

The overall goal of TA2 is to make communications and engagement easier among groups of people separated in space and time. Hence the project will explore how technology can support group-to-group communication.

In brief

How can technology help to nurture relationships between households? This is the question asked by the collaborative project “Together Anywhere, Together Anytime” (TA2).

Many of our enduring experiences, holidays, celebrations and moments of fun and laughter are framed as group, often family events. This is something that current technology does not address well: modern media and communications serve individuals best, with phones, computers and electronic games devices tending to be individually owned and providing individual experiences. TA2 seeks to redress this imbalance, by exploring how technology can support group to group communication.

Social letters will be read by many members of a household; games are often played between families working as teams. Memories in the form of videos and photographs are often shared within families. TA2 wants to enhance and support these processes; enabling people to

share their stories, pass digital photos and videos around, add comments to them, and to pass them back. TA2 wants to build systems that allow people to play games with each other, seeing and hearing each other as they laugh with, and at, each other, as they struggle with games like Ludo®, Labyrinth® or Pictionary®. And TA2 also wants to find ways in which modern sensors and IT equipment can give people in one household a better awareness of activity in another, whilst maintaining each individual's right to privacy.

TA2 media and communication experiences will be characterised by their naturalness; clear relaxed voice communication and intelligently edited video. Through the TA2 system, stories are automatically generated from home-related content, the personal home video or from the antics of a lively game.

The TA2 vision:

Making communications and engagement easier among groups of people separated in space and time



Objectives and results

The overall objective of TA2 is to enable new media experiences that are attractive and profitable, and through which people who know each other well can nurture and develop their relationships. TA2 will model five media experiences through the five concept demonstrators described on page 8. These are enabled by improvements in a number of key developments in standards, technology, human and business understanding as represented in figure 1:

- Interaction modelling language, to describe, model and author control systems that will orchestrate the capture and transmission of audio and video signals between groups involved in a dynamic interaction.
- Multimedia composition and transmission standards required to meet the needs for incremental augmentation and enhancement of content while at the same time protecting the integrity of underlying media objects.

- Scene analysis and interpretation of interacting groups of people, in order to identify, for the purpose of real time shot framing, and audio segmentation the region of interest within an interaction scenario and so help in the better audio visual representation of the interaction.
- Audio capturing, encoding, processing and transmission particularly in end-to-end multi-speaker, multi-microphone environments with a particular focus on delay, subjective quality, echo and spatial representation.
- Model software architectures within which the technology components can efficiently operate.

- Simplified narrative representation in order to automatically generate simple pre-authored narrative structures that generate narrative based media from amateur video footage.
- Experience design, the ability to design enjoyable social experiences based on the new constraints and opportunities afforded by open audio visual communication including disciplines such as gameplay.

TA2 will advance the state of the art in three distinct areas:

- In providing new user experiences that help in the nurturing of social relationships.
- In representation and modelling, in order to improve the new media experiences through the combination of better real-time communication and the use of stored media representation of the experience.
- In multimedia processing in support of the objectives in the previous two bullet points.

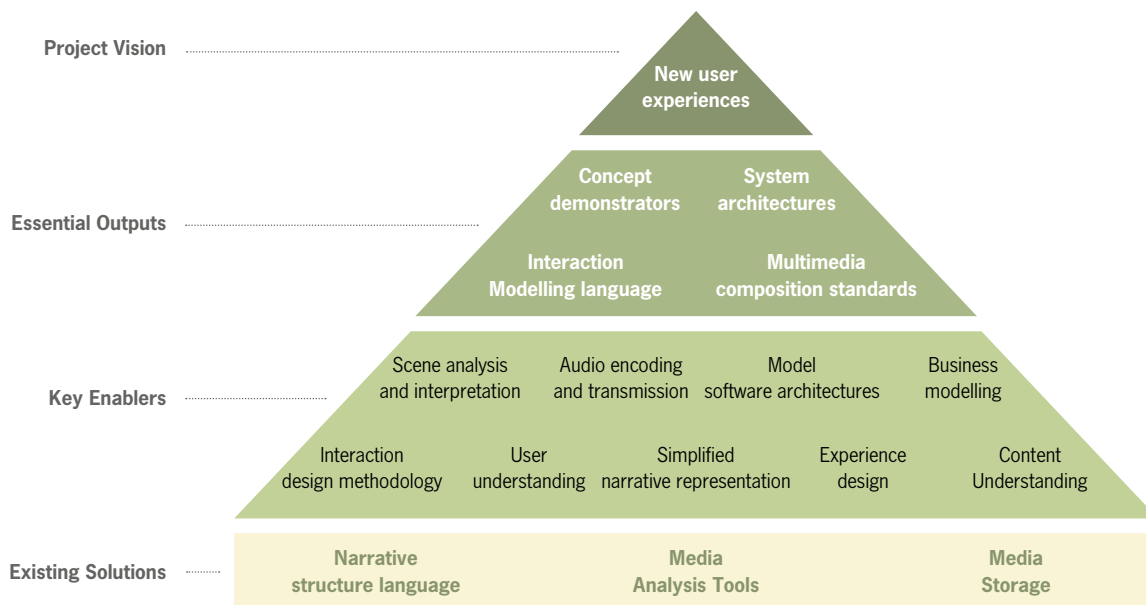


Figure 1: Overview of TA2 goals and enablers

Family interaction: today and tomorrow

Good Friends – Today's Snapshot

The Martin family and the Smith family are good friends. Mrs Smith and Mrs Martin have known each other since school and their husbands and children have got to know each other through taking holidays together, and through the regular but infrequent visits each makes to the other's home.

Living 300 km apart now, they see each other about twice a year. One of those occasions is the weekend holiday they take together each year with other college friends. The other meeting is more ad hoc – a stolen weekend away.

In between times there may be an occasional, but long and relaxed phone call, but only following a string of "sorry I missed you" voice messages, and of course postcards from their respective holidays and birthday cards and presents arriving by post for the children – with the corresponding "thank you", generated under duress, returning some days later.

When together, they like to 'catch up'. The children go and play, as only children can, whilst the grown-ups sit around the kitchen table chatting,

admiring each other's holiday snaps, viewing each others videos, discussing the joys of bringing up children and of course reminiscing. As the children begin to argue, the parents have to step in and take more active part and even coordinate a game that keeps them all happy.

At Christmas, they exchange cards and round-robin letters with photos giving a summary of their year. This is normal. This is the way people live and the way people keep in touch and nurture valuable relationships.

As they leave for their own homes they always comment: "We must do this more often." "We must" comes the eager affirmation ...

Communication in the future Internet will be much more natural than today. Users will not have to care about the underlying technology and just enjoy communicating with their friends and relatives.

Peter Stollenmayer, TA2 Coordinator



Good Friends – The TA2 Vision

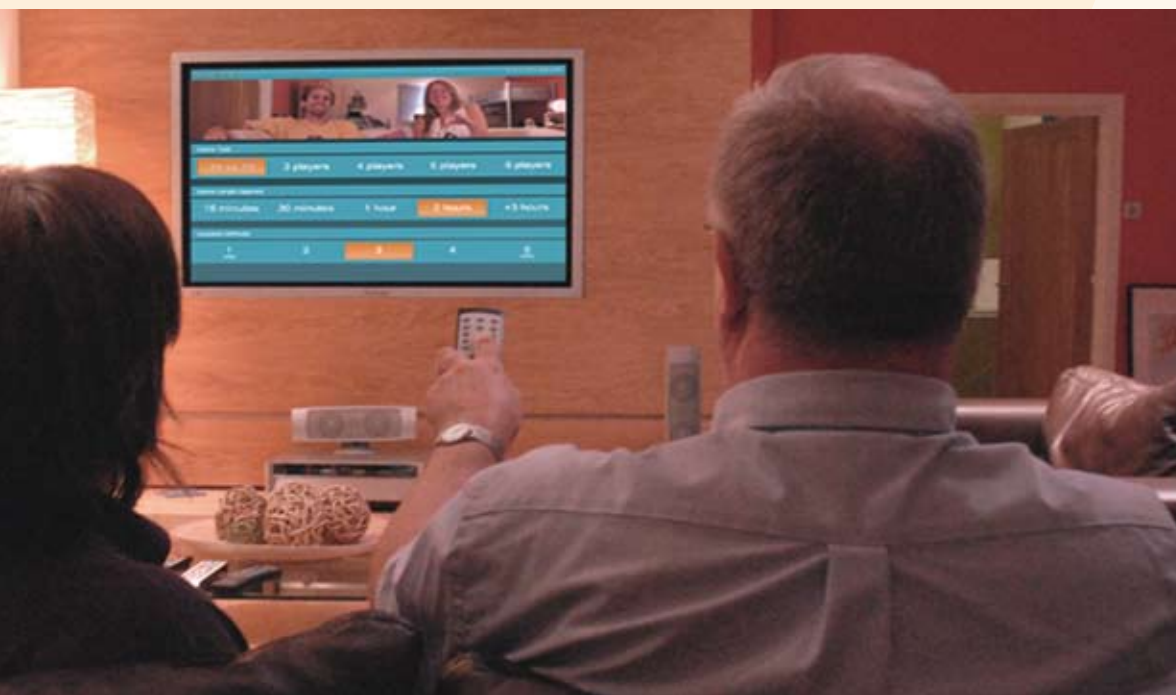
The Martin family and the Smith family still meet about twice a year; but when the time comes for them to leave for their own homes, they no longer feel that the physical separation will unplug their social connection.

The Martin's Christmas letter is now augmented by a video. Edited by the system this two-minute catch-up video is assembled from a range of video and photographs that the Martin family uploaded onto their family's digital vault. The simple and semi-automated addition of metadata, as the files were saved, enables the system to pull out and construct a simple but effective narrative of the year which the Martin's can then share.

The occasional phone calls are more frequent, equally relaxed but are not preceded by the string of "just-missed you" messages or "can't talk now" apologies. The awareness systems that each is happy to activate gives a subtle and gentle indication of whether they are available for a phone call. The discreet indicators, in each house, allow phone calls to be made at appropriate times. This makes the communication process less stressful and more effective.

Game playing, a staple in the arsenal of 'things to do', is now something the two families can enjoy whilst separated. Since they both now have large wide-screen flat panel TVs and both have broadband, the two families are able to play familiar board games whilst each is in their own house. The large screen gives them eye contact with each other, and the wideband spatialised sound means the two parties can chat and tease each other casually, as if they were in the same room.

The youngest children, the only ones who are actually the same age have developed their friendship, whilst apart, by playing simple games together on their interactive easels – devices that also allow them to show Daddy their pictures whilst he is at work.



The TA2 architecture

The figure below shows the functional architecture which is envisaged for the TA2 project. Except for the capturing and presentation functions, the functional architecture doesn't state where the modules are implemented in a phy-

sical realisation of the TA2 solution. The distribution of functional components over client devices and network service platforms will be determined during the project.

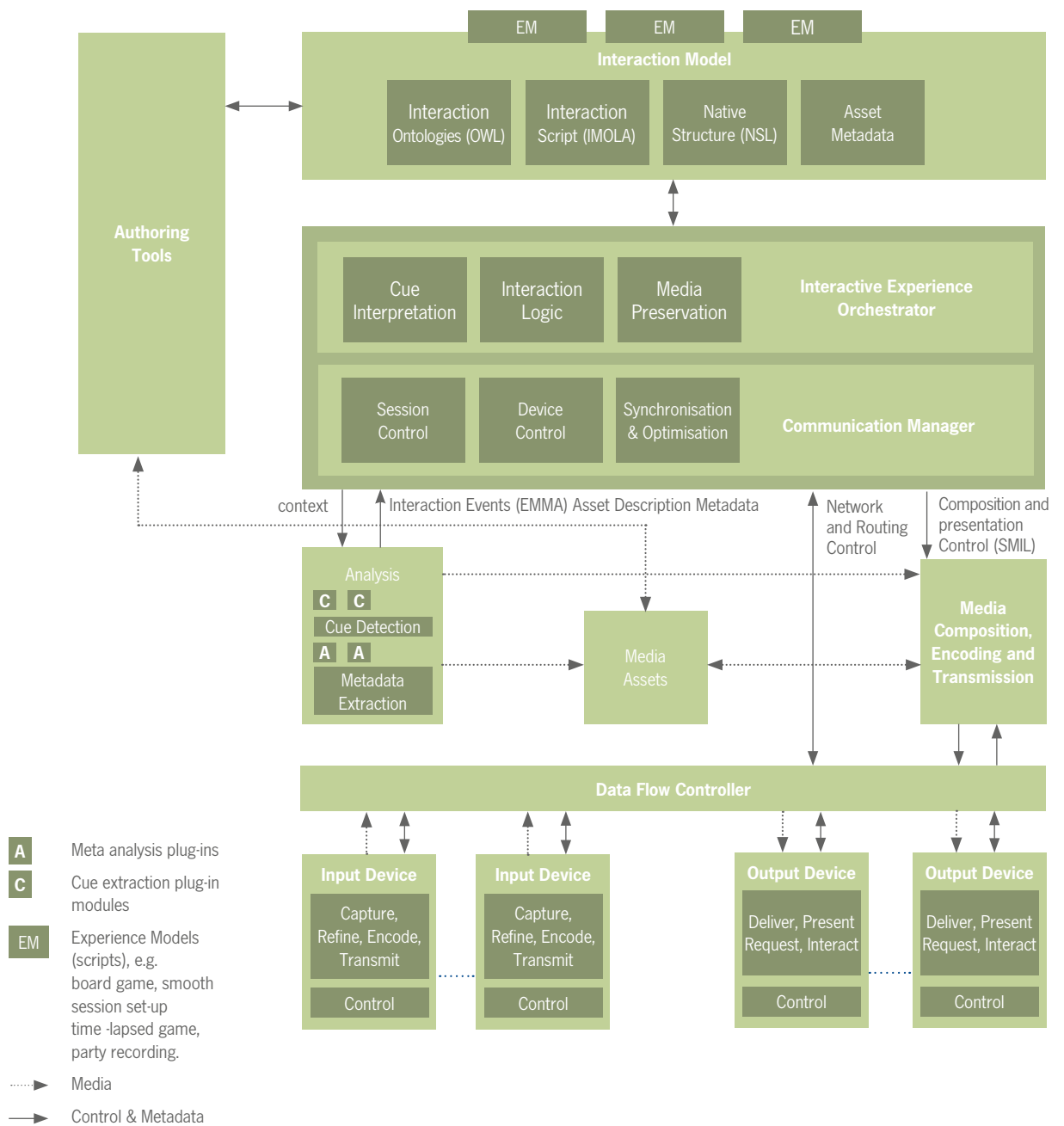


Figure 2: TA2 functional architecture

The base-line architecture includes the following functional components:

- **Input devices** comprising capturing devices like audio microphones and video cameras, sensors detecting player movement, RFID readers, remote control devices. Input devices contain encoding and packaging functions to prepare the captured data for network transmission.
- **Output devices** comprising shared TV and video screens, projectors, surround audio systems, lighting systems, remote actuators, personal devices like mobile phones and PDAs.
- The **Analysis** functional block subjects the captured data to media analysis to extract metadata in case the multimedia streams will be stored for later usage, and to detect cues that will serve as triggers to modify the editing of the multimedia content. An example of cue detection is a person that starts speaking, identifying her as the next player in the game and triggering a switch of camera input.
- The **Media Assets** functional block represents a repository for media objects and their associated metadata. It stores (parts) of recorded input flows and output flows (results of the media composition, encoding and transmission block) and media uploaded via the authoring interface. Media assets are used realise more complex combinations of media and to enrich the output flows in the media composition block (e.g. background images and audio snippets).
- The **Media Composition, Encoding and Transmission** functional block assembles live media streams and stored content from the Media Assets repository into an output multimedia stream that is delivered to the output devices. Supported media formats include video and audio, animations, text, pictures and scalable vector graphics.

- The **Interaction Manager** contains the service logic to control the media treatment functional blocks discussed above. It contains the **Interactive Experience Orchestrator** that executes the scenario scripts that describe the TA2 applications. The Interactive Experience Orchestration makes abstractions of the media flows and the connected devices, depending on the **Communication Manager** for this awareness.

The Communication Manager groups the following media control functions:

- **Session Control** sets up and manages the communication and media consumption sessions between the devices in the connected homes.
- **Device Control** translates focus and action instructions into commands to physical devices, like camera zoom control.
- **Synchronisation and Optimisation** generates the layout of the presentation to be realised by the Media Composition block, and manages synchronisation of the multiple media input and output streams.

The Communication Manager furthermore makes use of the Data Flow Controller that routes the media flows between input devices, output devices and the media treatment blocks.

The Interactive Experience Orchestrator contains

- **Cue Interpretation**, translating detected cues into events as they are described in the interaction scenarios.
- **Media Preservation** governing the recording and storage of media flows into the *Media Assets* repository.
- **Interaction Logic** executing the interaction scripts for the TA2 experiences.

The **Interaction Model** block contains the ontologies for the shared experience interactions and the media assets, and the experience model for a specific TA2 application, expressed in Interaction Script Language (IMOLA) and Narrative Structure Language (NSL).

The **Authoring Environment** is used for:

- Creation of Experience Models for a specific TA2 application using IMOLA and NSL.
- Smart media creation for 'MyVideos' and 'Improving social communications' TA2 scenarios.
- Creation and management of stored media for combination with live media in 'Family Game', 'Child's Play' and 'Sixth age' TA2 scenarios.

What we'd like to enable is easy open communications between groups of people who can see and hear each other. This is really difficult using current technologies and protocols and connections – this type of usage was never envisaged for the current Internet.

Doug Williams, TA2 Technical Project Manager

The TA2 concept demonstrators

The technology developed for the TA2 project will be framed in terms of five representative concept demonstrators that offer significant insights into the requirements for new media experiences among (groups of) users. The concept demonstrators will be supported by a suite of componentised capabilities including technology related to audio, video, image processing, and speaker identification in informal settings; they will consist of content packaging, augmentation and adaptation systems for personalised and scalable information sharing. In all of these cases, technology will be developed to serve the needs of TA2's users: these users hold a central role in the project, as is evidenced by the concept demonstrator descriptions sketched below. These descriptions are presented, for simplicity, as point to point connections, as opposed to point to multipoint. These concept demonstrators will be evaluated through field trials.

Remote Playing of a Family Game

One common form of inter-personal social interaction in a home setting is the playing of a multi-person game. These games include familiar "parlour games" such as Monopoly®, Labyrinth® or Pictionary®, but also "traditional" player-centric interaction games such as charades. The TA2 project will develop a game environment that will support game play between two or more teams of players who are situated in different physical locations.

Interactively Sharing and Enriching My Videos

Recognising the importance of looking at media together as a cornerstone for the sharing of family experiences, the second TA2 application will provide tools and an infrastructure to help people develop and share short home movies with simple but meaningful interactive narratives automatically generated by the TA2 system. These movies (which may also contain text, audio and image augmentations) will be shared within a controlled group setting, with viewers within the group being able to add comments and their own media objects to non-destructively enrich the base content in the videos. The TA2 system will facilitate this functionality through the use of automatic capabilities that will help users to identify, select and annotate clips that are most likely to generate meaningful and attractive narrative based home videos.

Child's Play

In this application we focus our attention on more unstructured forms of creative, communicative and cooperative play for young people, families and friends. This includes providing young children the opportunity to be creative and to communicate safely, easily and effectively with their friends and family. Young children can paint pictures together in real time on a virtual "work desk/whiteboard" using various creativity tools while using integrated video and audio communication during the creativity process to discuss their aims and ambitions. The application features group discussions on decisions to be made during the process, such as the tools or techniques available during the game. By explicitly limiting resources, a framework can be developed that require children to cooperate and share in order to achieve the best possible creativity results. This framework is based on shared remote experiences that are so natural that the children feel they are playing together, even when they are remote.

Sixth Age

In order to respond to demographic developments, new support and communication paradigms will be studied with a focus on those in the "sixth age". This generation is using computer games more, though the game types that prove attractive are usually different to those enjoyed by younger hardcore gamers. There is some evidence supporting the idea that games can stimulate the brain and improve older people's cognitive abilities. In any case, games can be fun for all ages. As with other age groups, a significant opportunity exists in coupling games with on-line communication and sharing, both with friends and with members of an extended family. Here again, ease of communication and interaction form key components of a successful application that is geared to keeping all members of the family engaged.

Improving social communication

The concepts of shared communication and 'remote-togetherness' in a trusted environment of family and friends provides a useful framework for studying social communication between families. By working with groups that are well known to each other, we will build an application that can make communication easier, more frequent, appropriate and effective. The application will consider using a range of sensor inputs, including those from video, from passive infrared detectors, and from cell location to develop a predictive picture of a person's preparedness to begin casual conversations.

The TA2 approach

TA2 will operate practise-based research, developing solutions against requirements driven by scenarios developed with games experts and service providers. The technology challenges will be strongly driven by needs placed upon the technology teams from the application developers.

The project progression can be described in 5 steps as illustrated below. The main outputs from the first year of the project will be non functional illustrations of the application scenarios represented using sketches and storyboards, together with well-specified requirements for the technology and software architecture. The project will be guided by the business context within which such applications may exist, taking into account developments in games media and service provider domains.



We are working on projects that will make communications and engagement easier between groups of people separated in space and time. And to do that we really need to stretch, possibly to breaking point, the capabilities of the current Internet.

Doug Williams, TA2 Technical Project Manager

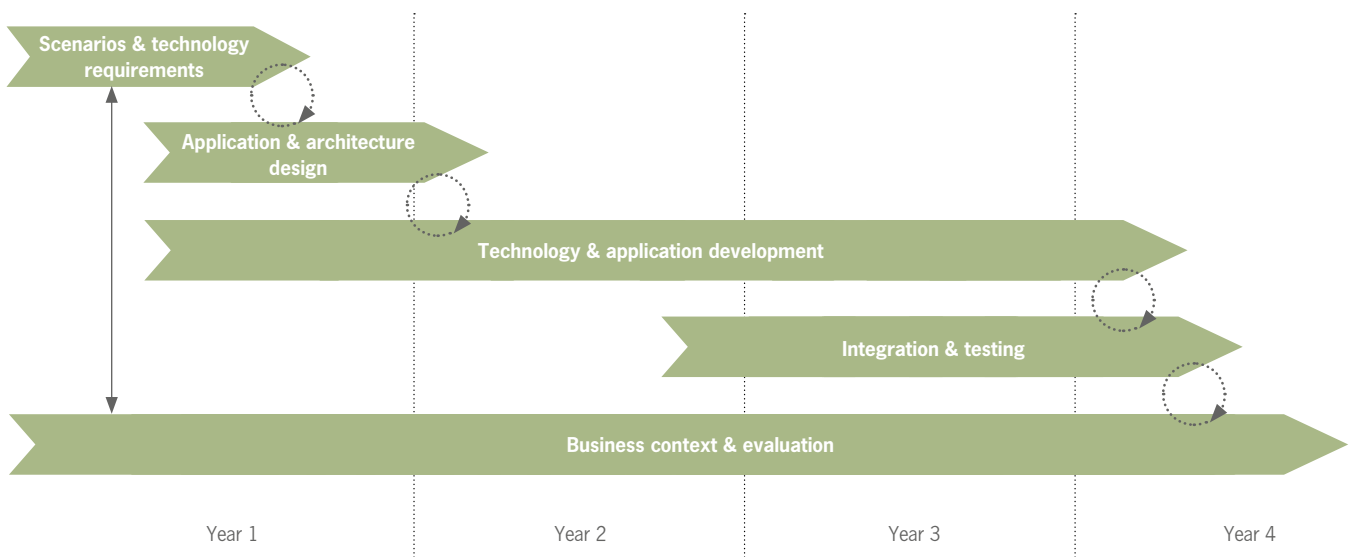


Figure 3: TA2 development phases

The structure of TA2

The work within TA2 is organised into ten work packages. Seven of these are research and technology development (RTD) work packages. There is one over-all management work package, one demonstration work package and one responsible for coordinating dissemination, exploitation and training.

As an Integrating Project and in line with the project principle of integration, there are numerous strong inter-dependencies between the different work packages.

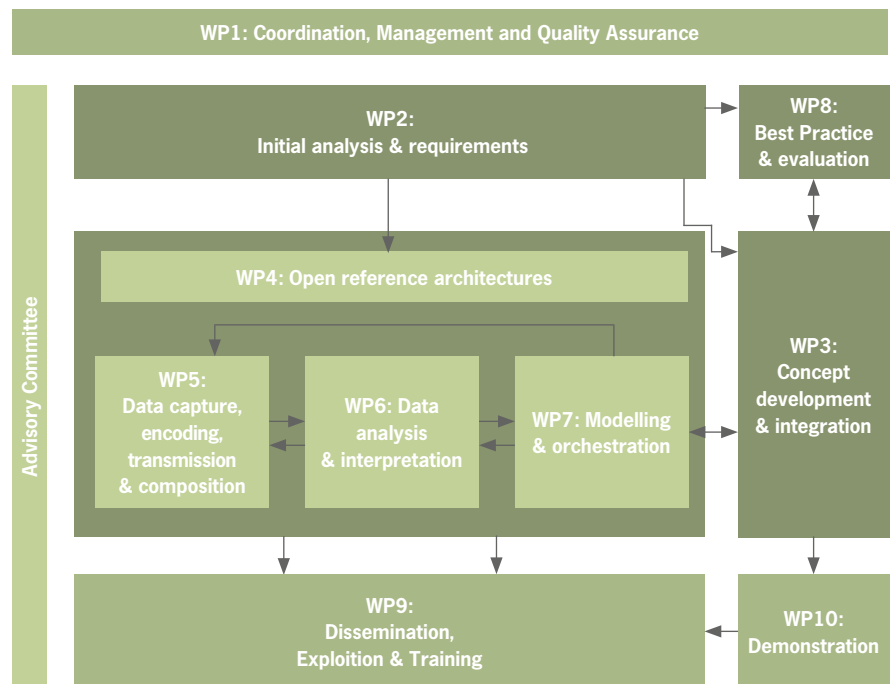


Figure 4: TA2 work package structure



Industry

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Administrative and financial project
co-ordinator

British Telecommunications plc UK
Technical project manager

Alcatel-Lucent Bell NV Belgium

Philips Consumer Electronics BV The Netherlands

Ravensburger Spieleverlag GmbH Germany

Limbic Entertainment GmbH Germany

Academic and Research Institutes

The Interactive Institute – II Sweden

Stichting Centrum voor Wiskunde en Informatica – CWI The Netherlands

Netherlands Organisation For Applied Scientific Research – TNO The Netherlands

Fraunhofer-Institut für Integrierte Schaltungen IIS Germany

Goldsmiths, University of London UK

IDIAP Research Institute Switzerland

JOANNEUM RESEARCH Forschungsgesellschaft mbH Austria

TA2 – Together Anywhere, Together Anytime

Large-Scale Integrating Project,
FP7, ICT Work Programme

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About TA2

TA2 is a large-scale Integrating Project of the ICT (Information and Communications Technologies) Work Programme under the European Community's 7th Framework Programme (FP7). It was submitted to the first call of FP7 and addresses objective 1.5 ("Networked Media") under challenge 1 ("Pervasive and Trusted Network and Service Infrastructures"). The project is partly funded by the European Commission.

TA2 is running from February 2008 to January 2012. Its overall budget is about 18 million euro.

13 partners from 7 European countries are involved in the project.

TA2 website: www.ta2-project.eu

About EU Framework Programme 7

The Seventh Framework Programme (FP7) bundles all research-related EU initiatives together under a common roof playing a crucial role in reaching the goals of growth, competitiveness and employment; along with a new Competitiveness and Innovation Framework Programme (CIP), Education and Training programmes, and Structural and Cohesion Funds for regional convergence and competitiveness. It is also a key pillar for the European Research Area (ERA).

The broad objectives of FP7 have been grouped into four categories: Cooperation, Ideas, People and Capacities. For each type of objective, there is a specific programme corresponding to the main areas of EU research policy. All specific programmes work together to promote and encourage the creation of European poles of (scientific) excellence.

EU FP7 website

http://cordis.europa.eu/fp7/home_en.html

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