

Bringing benefits to the disadvantaged by providing flexibility for all

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Abstract

At the 18th HFT Symposium ETSI reported work on a Universal Communications Identifier (UCI) that addressed some basic human needs including:

- control of personal communications;
- choice of how to communicate;
- support for achieving personal communication goals.

These needs are, in some form, requirements that everyone who wishes to communicate shares. Every aspect of the design of UCI, was intended to be of value to all users and therefore UCI can be considered as an example of "Design for All". Despite this universal approach, many people saw highly mobile professionals with a heavy communication load as the most likely users. Organizations pursuing UCI (and equivalents) are targeting these users.

As work on UCI progressed it was seen that the Design for All approach resulted in significant opportunities for UCI to help those at the other end of the communications usage spectrum. Those most often experiencing difficulties are elderly people, people with disabilities and the very young.

Before UCI emerges as a service, the eEurope funded ETSI Specialist Task Force STF230 used face-to-face interviews and widely distributed questionnaires to help to identify communications barriers that elderly people, people with disabilities and the very young experience. Some of these barriers and ways that they are currently overcome are reported. Suggestions have been made as to how UCI can help elderly people, people with disabilities and the very young overcome these barriers and improve their communications experience.

Key words: Universal Communications Identifier, Design for All, people with disabilities, elderly people, young people, user requirements

1. From requirements to a UCI

The Universal Communications Identifier (UCI) was reported to the 18th HFT Symposium [Pluke, Pollard (2001)] and a very brief description of UCI also appears in this years Symposium [Clarke et al, 2003]. Full documentation of the UCI concept and examples of its use are given in ETSI documents [ETSI (2001), ETSI (2002a), ETSI (2002b), ETSI (2002c), ETSI (2003a), ETSI (2003b)].

Before ETSI decided that a single communications identifier was what was required, a wide range of user requirements related to person-to-person communication were gathered. These

requirements were exposed to a large range of people within the communications industry and it was remarkable that the final set of requirements, adapted in the light of feedback obtained during this exposure, has remained unchallenged - even by those who have been reluctant to fully subscribe to the UCI concept. Furthermore, various telecommunications companies have admitted to carefully studying and using the requirements that were developed for UCI. The conclusion reached within the work on UCI was that a solution based upon a single communications was the only way to satisfy the majority of the identified user needs.

A main premise during the development of the UCI concept was that users should be in full control of their own communications environment. It emerged that a network-based Personal User Agent (PUA) that adapted the user's communications environment to meet their current communications requirements was the best method to provide such control. The PUA is able to adapt the way that people make or receive communications by interpreting their personal preferences (held in a "Personal Profile") and by being aware of the identity of the person with whom the communication is to take place. The UCI was specified as a uniquely effective means to ensure that identity can always be known (where the person is happy for it to be known) and that any identity given can either be fully trusted or clearly identified as an alias.

No current communications identifier can be trusted as strongly as a UCI. In fact many communications identifiers mislead the unwary into trusting identity information that is easily falsified - such as the "From" field of an email. Also, the effectiveness of many current communications identifiers decays as people change and abandon services and service providers. Evidence of this decay exists in all our address books. We can be certain that a number of telephone numbers and email addresses that once worked will now generate calls to the wrong person or bounced emails.

Although methods for managing multiple communications services already exist, they lack the sophistication provided by UCI. Current systems that use rules to handle communications from different callers differently will never work reliably because the identification information available cannot be relied upon (either because it is not delivered or, if delivered, it cannot be trusted). Also, few systems designed to help users manage their communications employ a negotiation process like the one behind many of UCI's powerful capabilities.

2. Is the UCI development process "Design for All"?

There are many definitions of "Design for All", but a simple interpretation of its meaning can be obtained by looking at the alternative - "Design for Some". In developing products, many companies look at a potentially profitable market segment and concentrate their requirements capture and prototype testing on addressing that group, and that group only. This is a pure case of "Design for Some". This can be a very effective method of producing a product that is well suited to a specific, hopefully lucrative, range of potential users. The problem with this approach is that anyone not inside the targeted group may be unable to use the product easily or at all. One thing that drove the "Design for All" approach was a reaction to the way people were accidentally excluded from successful use of products because the products were designed for niche markets. Designing a product without any concept of the intended users might appear to be an alternative to designing for specific target groups, but such an approach can be very dangerous as it can easily lead to a product that is not well suited to anyone - although intended to be "Design for Everybody" it might be better called "Design for Nobody"!

User requirement gathering for UCI considered all users and not a specific subset. On the contrary, most of these user requirements addressed fundamental issues related to the basic wish to communicate, the need to know who one is communicating with, the need for privacy, the need to retain control, difficulty in memorizing many identifiers, and maintaining accurate records of communication contacts. A full list of the requirements is contained in [ETSI (2001), ETSI (2002a)] and some high-level examples are contained in [Pluke, Pollard (2001)].

Any of the user requirements developed for UCI could apply to anyone communicating, but the relevance of any requirement to different individuals at different times could vary considerably. It should be clear from the above that during the user requirement assembly phase the approach taken was "Design for All" - even though adopting this approach was not explicitly identified as a key objective. If the UCI approach works as intended, the control provided by UCI, arising from "Personal Profiles" and negotiating PUAs, should ensure that a user's individual requirements are met. This should prevent UCI being "Design for Nobody".

3. Likely UCI users

UCI provides the potential for very sophisticated management of a person's communications across a wide range of communications services (including audio and video telephony, email, internet chat, and multimedia messaging), with services from a wide range of service providers, using a wide range of different types of terminals and taking into account a wide range of different roles that the person may adopt throughout their day (e.g. family member, individual, company director, sports club secretary). The ability to provide control over such complex and sophisticated means of communications automatically leads people to suppose that UCI would be of maximum value to busy "road warriors" in large corporations and small enterprises. These people already use many ways of communicating, they have busy and complex lives, they have long lists of potential contacts and they place a high value on things that make their lives easier and more efficient. People in this category either feel they spend longer managing their communications than they want or they adopt strategies that don't always act in their own best interests. Many busy people adopt a strategy of not answering phone calls and not reading emails. Although this prevents them being overwhelmed with communications, it may also prevent them from receiving vital communications that they eventually discover would have been in their best interest to receive. Anything that helps such busy people could be a potentially lucrative product. Those in industry that take a serious interest in UCI and in solutions that share many of UCI's capabilities see major corporate customers, who have many communications overloaded employees, as their potential market.

Had UCI been designed specifically to address this "road warrior" market it would have been a clear case of "Design for Some" - but it was not. As work on UCI progressed, it became apparent that UCI might bring significant benefits to people who are dramatically different to these "road warriors". There are many people who have very simple communication requirements, who may only want to use one or two types of communication service (voice telephony and/or SMS) and who may only need one or two types of communication terminal (e.g. a fixed or mobile telephone and a PC for reading email).

Amongst these people with simple communications requirements there will be some who find it difficult to achieve the little that they require because the systems currently available will not allow them to. People who have impaired abilities (e.g. people with disabilities and some elderly people) and those whose abilities have not yet developed (very young children) may

not be able to successfully operate communications products and services that have been designed for people of "average" or better abilities - "Design for Typical". Some of these people may have other people who can assist them in their electronic communications or they may be able to make use of sophisticated assistive devices, but even those that adopt such solutions lose the independence necessary to make precisely the communications that they desire at a time and place that suits them.

4. Communication issues for young children, elderly people and people with disabilities

4.1 How communication issues were identified

The ETSI Specialist Task Force (STF230) was set up to investigate the value that UCI could potentially bring to three groups of users:

- people with disabilities;
- elderly people;
- and young children (up to 12 years of age).

[Clarke et al (2003)] describes the interviews and questionnaires that were used to elicit requirements from people in, or representing, these categories. The interview process and the relatively small number of returned questionnaire responses meant that a detailed statistical analysis of the results was inappropriate. Therefore, a content analysis of the data was performed and only where a clear agreement or disagreement with the questions was observed was a topic considered as a major issue.

The ETSI report (TR 103 073) due for publication before the end of 2003 will give a comprehensive discussion of the findings of the interviews and questionnaires. The issues discussed in this section have emerged from examining the comments made in the interviews and the results obtained from the questionnaires. In this paper, only a small number of the large number of communications issues has been described. Potential UCI-related solutions to this subset of issues are described in section 5.

4.2 Online threats to children

Children tend to be unaware of the potential dangers of revealing their age unless carefully advised by adults. This simple fact, and the general naivety associated with their stage of development, can mean that children may be in genuine danger from exploitation by unscrupulous adults when using communications services.

Many parents/guardians are afraid of public listings that reveal their children's age, due to fears that revealing such information would expose them to unwanted communications from sources ranging from toy marketing campaigns to paedophiles.

4.3 Contacting the emergency services

Many people from the groups considered in this study are likely to experience significant difficulties in successfully contacting and communicating with emergency services. The speed dialling capabilities of special terminals enable emergency numbers to be selected quickly and

accurately. But other devices such as most mobile terminals do not usually have emergency or “panic” buttons. Numbers must either be keyed in or selected from the “phonebook”.

Despite the special training of operators, it can be difficult to elicit important information from anybody contacting an emergency service. The person may be in a state of distress or shock and be incoherent. If the person calling is a very young child, somebody with a cognitive disability or somebody who is hard of hearing then the problem of extracting important, critical information could increase significantly.

4.4 Providing a reminder and reassurance call facility

Many useful services which could be provided by future communications services were proposed by interviewees during the interviews:

- Keeping track of children. Knowing where they are or if they have strayed from an agreed location
- Knowing if elderly parents suffering from dementia were “wandering”
- Checking on an elderly parent on a regular basis i.e. ringing to see if they were OK several times per day.
- Reminding an elderly person to check that all the gas taps on a cooker were turned off every night.

4.5 Making urgent communications to a partner/carer/parent

Providing a capability for communication with a partner/carer/parent was identified as one of the most important issues by all of the groups in the study. There will inevitably be circumstances where an elderly, disabled or young person has an urgent need to communicate with their carer or parent. Only email can currently be labelled as “urgent” but email's use in a truly “urgent” situation is limited. Text based telephony is far more likely to be used by those unable to use speech but this can still be a slow process and SMSs do not have guaranteed delivery. In most cases, real-time voice communication will be required.

Single button alarms work well where the called party is a monitoring service which is constantly manned. But in other circumstances, where the person being called may not be at the particular terminal specified or is already using that terminal for another communication, it could be difficult to establish a communication. If the carer or parent is physically away from the terminal specified then there is little that can be done except for the person trying to contact them to try alternative numbers.

4.6 Personal preferences are more important than impaired abilities

A very strong message arising from the study was that everyone has their own individual preferences about how they wish to communicate. This applies whether people are of average age, very young, very old, whether they have full functional abilities or whether some abilities are impaired or not yet developed.

Although personal preferences may be influenced by an individual's cognitive or functional impairments, it is unreasonable to infer communication preferences from knowledge of those impairments. For this reason, any attempt to enhance people's communications by giving them a single solution addressing specific impairments may not be welcomed by many of the intended users. It is not that this solution will not work; it is simply that the users **prefer** something completely different.

5. Potential UCI solutions

5.1 Many UCI-based solutions

UCI-based solutions to many of the communications issues identified during the analysis of the interviews and questionnaires will be developed and published in an ETSI Guide that will be published in 2004. In this section a small selection of the potential solutions are listed to show that UCI can provide very positive benefits for the target groups.

5.2 Using UCIs to protect children on the internet

UCI offers perhaps the most powerful solution to a very serious and topical threat to children - the “grooming” of children by paedophiles in chat rooms. Previous UCI documents [ETSI (2002a)] have identified the need for an “authentic label” as a way to show that the name a person uses when communicating is certified by a trusted authority as a name the person is entitled to use (e.g. the name on their birth certificate or passport). The publication of [ETSI (2003c)] identified the problem that adults who pretend to be children can threaten children in chat rooms. A newly proposed addition to the UCI concept that should solve the internet grooming problem is “authentic age”. A UCI user’s “authentic age” could be certified when the trusted authority certifies the “authentic label”. Whereas the “authentic label” would be visible during normal communications, the “authentic age” would not be.

Anyone who wanted to run a totally safe internet chat room for children could set and advertise their own maximum age for participation. They would then place three requirements on those joining the chat room:

- all participants must use a UCI;
- all participants must allow the chat room application to check the “authentic age” details associated with the UCI;
- participants should not use their “authentic label” but should use an “alias” name field to protect their true identity.

A UCI and a privacy policy would be associated with the chat room application to ensure that the chat room itself was not gathering age information for illicit use.

Children who had a UCI would, if they were aware of the potential danger, also be able to challenge other UCI users contacting them by email, instant messaging or the telephone to prove that they were the age that they claimed to be. This would involve a child requesting a challenge to the other person that would allow the child's PUA to check the other person's "authentic age" data. For privacy reasons, the other person would always retain the right to refuse such a challenge, but doing so would be likely to greatly increase any suspicions that the child (or the child's parents) already had.

5.3 UCI aiding successful contact with emergency services

In UCI, the PUA can hold a lot of personal information about a UCI user. This would frequently include name, age, address, disability description, types of communication that the user can use and current location (either from GPS data or the user's current GSM cell location). This information would normally be highly protected and only ever released to another party with the explicit agreement of the UCI user. However, it is possible to envisage

a situation where, when the UCI user contacts an emergency service, the emergency service would have the right to access that information if necessary. An emergency operator could, for the first time, gain access to this important information without the need for time consuming questions and answers. Examples of where accessing the information might save lives is where the person trying to get help is a very young panicking child, a profoundly deaf person, someone with severe cognitive impairments or an elderly person with advanced dementia. In all of these cases the person contacting the emergency services might not be able to clearly specify the nature of the emergency or give details of its location.

In some circumstances the information presented, if it included home address or current GPS location, could be comprehensive enough to allow the automatic dispatch of an emergency service once the nature of the emergency had been ascertained. Knowing the age of a child or the nature of a disability could also help the emergency services to connect the caller to an emergency operator specially trained to get information out of such a caller.

5.4 Keeping an eye on the vulnerable UCI user

UCI may also have a useful part to play in systems that ensured that children, dementia suffers and people with certain cognitive impairments remain in places where they are safe. As the PUA can “know”, to a reasonable degree of accuracy, the location of the UCI user and it also has a detailed “understanding” of the needs of the user it would be a simple step to build into the system rules which stimulated simple reminder and check calls when the user travelled to “unexpected” locations. These check calls could be to the user or to another nominated individual such as a parent or carer.

5.5 Urgent communications to important contacts

Use of UCI by very young children and their parents/grandparents, or by elderly people and their children and carers, should provide the best possible solution to ensuring that, when urgent help or reassurance is needed, these important people can be reached immediately wherever they may be and irrespective of the communication devices they have available at the time. The worries that a very important call will fail because someone is in the wrong place or doing the wrong thing at the critical time should almost disappear.

5.6 Supporting individual preferences

UCI enables people to choose to use services that best suit their preferences or abilities, and will aid them in negotiating with others to use such services. Alternatively UCI can invoke services on the user's behalf that convert between their preferred service and the service that the other person wishes to use. It should thus be possible for UCI to help those people who are restricted in the communication methods that they can use to effectively communicate with a much wider range of people than those that they are currently able to communicate with.

This can be achieved by ensuring that the "additional information" fields of the UCI contain information about the UCI user's preferred services. Where the UCI user's UCI is stored in other people's address books they will be informed of these preferences. In other circumstances, the UCI user's PUA can try to negotiate the use of an appropriate service with the other party's PUA or it can try to use a media conversion service such as text-to-speech.

6. Assessment of whether UCI has been designed for all

This paper describes a few of the many ways in which UCI can improve communications for very young and elderly people and people with disabilities. Many people in these groups may have quite undemanding communications needs but, without UCI, they may have great difficulty in satisfying those needs. As UCI has already been identified as a valuable asset for people with demanding and complex communication requirements, this ability to meet the needs of such very different people illustrates how UCI appears to have been truly designed for all.

The approach taken in developing UCI seems to have been the key to the successful achievement of this hard to attain "Design for All" goal. This approach is:

- gathering user requirements that address very basic user needs;
- expressing user requirements in a completely technology-free way;
- using the requirements to design the user experience;
- designing a system that provides the maximum opportunities for users to tailor the system behaviour to their individual needs;
- and identifying the technology components that can deliver the abstract system design.

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