ETSI TR 1DD DDD V1.0.1 (2022-03)

Smart identity : user digital clone

Release #1

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**TECHNICAL REPORT**

Reference DTR user 0047

Keywords

User-Centric, Smart Interface, Smart Identity; digital Clone

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# Foreword

This Technical Report (TR) has been produced by {ETSI Technical Committee|ETSI Project|<other>} <long techbody> (<short techbody>).

# Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](https://portal.etsi.org/Services/editHelp%21/Howtostart/ETSIDraftingRules.aspx) (Verbal forms for the expression of provisions).

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# Executive summary

# Introduction

STF 626 will produce two Technical Reports defining the Smart Identity (as a User Clone) for the User-Centric Approach and providing a PoC (Proof of Concept) demonstrating the feasibility of this User Clone in different chosen Use cases.

The work to be performed is:

1. The definition of a “User Digital Clone” based on the information model defined in the documents produced by STF 543 and published. The Smart Identity has a sufficient knowledge for the user interface to anticipate and respond to the user's needs and expectations, with a more in-depth analysis of the digital ecosystem.

STF 626 will produce

* Analysis of the user profiles including Sociological and psychological context, non-functional requirements, digital maturity, usage evolution and user profile and context for different use cases.
* New technologies for smart identity (technology trends and system approach)
* Knowledge database (ACIFO Model – Informational model-, data categorization, data collection and data processing)
* User digital clone (definition and Smart ID Model)

2. Based on the definition of the User digital clone, STF 626 will propose a Proof of Concept (PoC) for identified use cases. The Proof of Concept will be presented through a short movie, giving a fine way to disseminate the results of the STF 626.

# 1 Scope

The present document is the first deliverable of the STF and contains the result of studies relating to the analysis of the user requirements, the new technologies contribution for smart identity, and a digital clone definition

# 2 References

## 2.1 Normative references

Normative references are not applicable in the present document.

## 2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non‑specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI TR 103 438: User Group; User centric approach in Digital Ecosystem

[i.2] ETSI EG 203 602: User Group; User Centric Approach: Guidance for users; Best practices to interact in the Digital Ecosystem

[i.3] ETSI TR 103 603: User Group; User Centric Approach; Guidance for providers and standardization makers

[i.4] ETSI TR 103 604: User Group; User centric approach; Qualification of the interaction with the digital ecosystem

[i.5] ETSI TR 103 437 : Quality of ICT services; New QoS approach in a digital ecosystem

# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the [following] terms [given in ... and the following] apply:

## 3.2 Symbols

For the purposes of the present document, the [following] symbols [given in ... and the following] apply:

## 3.3 Abbreviations

For the purposes of the present document, the [following] abbreviations [given in ... and the following] apply:

# 4 Analysis of the user profiles

Smart products and services that adapt to aspects of the users’ activity, context or personality are starting to appear in the market. Now, users often expect the emerging of products or services which act intelligently with them more like they would among themselves, as humans. In the first decades of the 21st century, technical limitations keep us from being able to create smart interface that fully live up to those expectations. But now the progress and partial trivialization of artificial intelligence gives new possibilities, and consequently, it is absolutely essential to manage the users’ expectations as we are moving through the design process for a smart interface.

There are four approaches to mix in order to completely cope with the whole users’ needs, requirements and expectations:

> The first is to understand the basic psychology of how people interact with smart products and services

> the second is to have an overlook of the non-functional requirements

> The third to take into consideration the user experience and his level of maturity in the use of digital.

> The fourth is to have an overview of digital usage evolution, and a view on the future, both for personal and professional matter.

## 4.1 Sociological and psychological context

When we meet something that seems to be intelligent, such as another person or a dog, we know how much intelligence to expect because we can base it on past experience. When we meet a smart product that behaves intelligently and does things by itself, we don’t have much experience to base our expectations on; so, anticipating exactly how much to expect is a hard task. This causes different challenges when designing interaction with smart services. Consequently, considering how expectations for smart services can cause challenges is especially important.

Research in psychology, from scholars such as Byron Reeves and Clifford Nash [b.1], tells us that users tend to treat smart products or services as though they are intelligent and intentional.

We can all think of examples where we have treated technology more like an intelligent social being than a tool. We get angry at our computers because we feel misunderstood or because they do not do what we want them to do. We know that technological products are just objects, but in certain situations we treat them as if they had intentions, feelings and sophisticated intelligence. In a series of experiments, Stanford professors Byron Reeves and Clifford Nash found that even though people consciously think of computers as objects rather than persons, their immediate behaviour towards those computers sometimes resembles their behaviour towards another person.

For thousands of years, differentiating between inanimate objects and social intelligent beings was relatively straightforward. But now with technological development, the line has become more blurred.

One amazing consequence is as products or services become more intelligent and behave as though they were intentional, they cannot always live up to the users’ expectations. If the personal voice-controlled assistant on my iPhone can answer questions about the weather and which restaurant I should go tonight, why can’t it have personal opinions or feelings? Rationally, I know that it cannot because it is not conscious, but it is difficult to know what the upper limit of its ability is.

Not understanding what a product or service is or is not doing and not understanding is capable of creates a negative user experience. In a review of research on how people perceive and interact with intelligent environments, researcher Eija Kaassinen and her co-authors stated that users [b.2] lose trust and satisfaction with intelligent products if they do not understand them. You could have the most sophisticated and lifelike app or device, but the customer needs to understand it in order for it to become successful.

We should also consider the social rules that apply to a smart product or service use case in order to anticipate deviating or unsuitable uses and avoid user disappointment. Just think of the failure of connected glasses for the general public, or a useful feature like autocorrect function that automatically corrects words in users’ text messages (SMS or email), but can turn the sentence into very embarrassing or offensive words if you trust it too much.

## 4.2 Non-functional requirements

Non-functional requirements cover cross-cutting needs such as: QoS, security, privacy, usability, portability, customization…)

The survey conducted for the STF 543, sought to know the expectations of users for non-functional but essential services for a good digital experience.

First, we can see that there is a clear willing to use new services if their benefit are clear. For example, on the side of households, it is still difficult to evaluate the real value of some domestic connected object.

Secondly, we asked a set of questions about some new possible services able to improve the digital experience on a smart and flexible network (NGN).

People would like:

- to be informed when they are risking entering an area with low or without coverage and lose continuity of service. For 90% of people losing the continuity of mobile service on move is a problem. This shows that communication everywhere and even on move is a standard request today for users

- more control on the battery life

- more control on the location data of their device

- to find their professional configuration on different devices (for those how are in employment)

- 44% of people would appreciate a service of bandwidth on demand fixe line and 38% on mobile line. The level of people interesting and not interesting are quite le same on this question.

Of course, security and privacy issues are in the heart of the confidence in the future on the digital ecosystem. If the data are the new “fuel” for the digital society, trust is the “money”

The survey shows there is a very large majority of people how would like to be able to challenge their provider on what we can call “essential characteristics” of the contract, i.e. privacy, security, quality and price.

### 4.2.1 Security

Security is both a feeling and a reality, and they’re different. An individual or a company can feel secure even though they’re not, and they can be secure even though they don’t feel it. The feeling of security matters because humans sometimes make seemingly irrational decisions that have reasonable explanations, and because sometimes emotions play a more significant role than logic. That's what makes us human.

In the context of IT, even if an individual take actions that make their organization more secure, that might not be enough. They need to pay attention to making sure their actions also allow the relevant constituents (employee or customers) to feel secure.

Examples:

1. A user of an overly quiet antimalware tool might assume that the tool is ineffective and switch to a product that makes the person feel more secure. Even if a company have a great security tool, they need to find a way to ensure that its users recognize its benefits.
2. A corporation may have a Chief information security officer (CISO) who is very effective at strengthening the company’s security posture and managing IT risk; however, the management may feel insecure unless the CISO captures the right metrics and offers meaningful reports. Part of this includes ensuring compliance with certification e.g., ISO/IEC 27001or regulation e.g., UK Data Protection Act or EU GDPR.
3. A client who commissioned a security assessment may have received competent service. However, unless the deliverable includes a comprehensive review of the findings and methodology, the client may be feel unsatisfied.
4. A company may select a security service provider that meets the firm's requirements based purely on polished sales interactions and marketing documents. Such collateral can make the prospect feel security, regardless of the vendor’s actual capabilities.

Those are just a few examples that remind us not to underestimate the importance of not only being secure, but also feeling secure. These two concepts are distinct yet interrelated. Both require an individual and companies’ attention. [b.3]

### 4.2.2 Privacy

Privacy is the ability to control who can access information about our private life and our activities. It is important because it gives users the power to choose their thoughts and feelings and who they share them with, for example to sites or services with a social and/or messaging function. It protects their information they do not want shared publicly for example such as health or personal finances. Also, it can help to protect an individual physical safety for example if their real time location data is private or shared with chosen family members or friends. [b.4] As part of a company or service providers obligation under the EC ePrivacy regulation for example will have to ensure certain rules are met. For the user keys rules include:

1. Communications content and metadata: privacy should be guaranteed for communications content and metadata. Metadata — data that describes other data, such as author, date created and location etc. — has a high privacy component and should be anonymized or deleted if users did not give their consent, unless the data is needed for billing.
2. Simpler rules on cookies: the cookie provision, which has resulted in an overload of consent requests for internet users, will be streamlined. The new rule will be more user-friendly as browser settings will provide an easy way to accept or refuse tracking cookies and other identifiers. The proposal also clarifies that no consent is needed for non-privacy intrusive cookies that improve internet experience, such as cookies to remember shopping-cart history or to count the number of website visitors.
3. Protection against spam: this proposal bans unsolicited electronic communications by email, SMS and automated calling machines. Depending on national law people will either be protected by default or be able to use a do-not-call list to stop marketing phone calls. Marketing callers will need to display their phone number or use a special prefix that indicates a marketing call.

### 4.2.3 Usability

The main reasons why it is so hard to create usable products is that there is a conflict between a high-usability level and great user-experience. This might seem to be a contradiction, but there is an important difference between the two. Usability is about the "ability to use" something. The aim for a usable product or service is to make it easy to use.

A product or service can be considered to have a high level of usability when:

1. It requires less mental effort to use.
2. The frequency of mistakes using it is less, or when the mistakes are less disastrous.
3. It is more powerful, where "more powerful" means that it can be used to do more or do it faster.
4. It is more learnable, that is, when a user can figure it out quicker.

There are many guides and tools which can provide metrics to measure the usability if a product or service. While user-experience is not like usability - it is about feelings. The aim here is to create satisfaction. The product or service provider want the user to feel satisfied before, during and after they have used their product or service. To do that they need to take all kinds of things into consideration. These can include:

1. Environment
2. Colors moods
3. Smell
4. Touch
5. Audio feedback
6. Visual feedback
7. Trust
8. Branding
9. Show-off effect
10. Usefulness
11. Practicality
12. Coexistence
13. Emotional effect
14. Etc...

This is much harder to achieve. None of these things can be accurately analyzed for example when it comes to the user providing feedback one user might have a high satisfaction from particular design choice but another user could have low satisfaction from the design choice. The reason why there have so few great products is because of this difference. Most developers try to find the right balance between high usability and high user-experience. This is not easy. It requires a bit of luck, intuition, a sense of humble pride, and something called "usable happiness (is a product that is simple to use, and makes the user smile every time they use it)". This means the user should never ever feel helpless or stupid when using a product or service This equally applies to all kind of products, including software ones – mobile or web apps, websites, etc. When it comes to the usability, there is a big difference between our assumptions and reality therefore testing, reviewing, and applying feedback is important in ensuring the balance between useability and the user experience.

## 4.3 Digital maturity

In the Digital world, users have the ability to access a large number of digital services applications and contents covering almost every time and everywhere a big part of their daily life activities, personal or professional.

So, the question is: are they able to master all these services by themselves, in other words what is their skills level?

To assess this, the European Commission has been surveying each year since 2015 on the level of skills of the European population.

Persons that have been using internet during last 3 months are attributed a score on four digital competence domains: information, communication, content-creation and problem-solving, depending the activities they have been able to do. The scores in each domain are basic, above basic and below basic. There is one more gap with the ability to have software skills, meaning manipulate features such as word processing, advanced spreadsheet functions, created a presentation, or written code in a programming language. It can be shown that these software skills can be of importance on the professional side of the life.

In the last release, while 84% of European people used the internet regularly in 2021, only 56% possessed at least basic digital skills. 31% with above basic digital skills and 58% of individuals having at least basic software skills.

With no surprise, the survey show that the skills indicators are strongly influenced by socio-demographic aspects.

For example, only 48% of individuals living in rural areas possess at least basic digital skills, in contrary to the ones living in the cities (62%).

It should be noted that youth is not a determinant of digital skills and growing up in a digital world does not automatically make one digitally competent. As demonstrated by the International Computer and Information Literacy Study (ICILS), which assesses digital skills of 8th-graders based on a competence test, rather than self-reporting, young people do not develop sophisticated digital skills just by growing up using digital devices.

The 2030 target of the Digital Compass is that at least 80% of citizens have at least basic digital skills. But the current growth is only around 1%.

The conclusion is that alongside the efforts to make to acculturate the population to digital, usability improvements can be a big help. That is globally the way consumer focused groups are exploring with the digital user centric approach, the smart identity and the smart interface program of the user group.

In the survey conducted for the STF 643 part of the goal was to try to understand if, regardless of their skills, users are properly informed of what they can do with their subscriptions and equipment, have enough knowledge about the services available, and if they know how to activate them, how to configure them, how to control them, and can easily do that.

Currently, setting up a smartphone is far from easy according to most respondents. More than half of them say that they do not know how to fully configure their smartphone, of which 15% say they do not really know how to do it.

According to responders, some cellular parameters are difficult to set, from Bluetooth, WIFI, to voice over 4G (VoLTE), Wifi call (VoWifi) etc.

34% of people change the setting of their smartphone less than once a year.

-56% of responders get online to the personal page of their fixe subscription never or rarely and it is quite the same for the mobile (53%). Obviously, for these people, it is difficult to have a good level of knowledge and control.

A lot of people (42%) do not really know the differences between the successive generations of GSM technologies, and 5G and is different level of implementation is not to simplify the situation.

Developing the adoption and use of digital in business is a specific challenge. To succeed in its digital transformation, a company must ensure the large adoption of digital uses by its employees. However, they often find themselves confused by the gap between their digital experience in the private sphere and that which they know at work.

Therefore, it is interesting to note that an emerging market has recently appeared under the name of Digital Adoption Platform (DAP), which are solutions that guide the user step by step, over the application, a bit like a GPS.

The concept is not new. Almost twenty years ago, tooltips were offered to democratize integrated management software packages and office suites. However, by using artificial intelligence (AI), DAPs offer an approach that is no longer static but dynamic and contextualized. They come to the user's aid precisely when he needs it.

Developing user maturity is one of the keys to success for digital transformation. It is one of the components of digital inclusion. So, the aim of wanting to see the maturity increase rapidly and prevent the widening of the digital divide, it is important to develop smart interface, based on the smart identity concept.

## 4.4 usage evolution

Firstly, some global data to draw the background:

World population stood at 7.85 billion at the start of April 2021

At this date, there are 5.27 billion unique mobile phone users worldwide, which means that more than two-thirds of people on the planet now own a mobile phone, and the number of Internet users reach 4.72 billion, more than 60% of the total world population (increasing by 7.6% in one year)

More than 6 out of 10 people in the world are now online on internet, and the growth is of 7,6% in12 month.

Social media continues to be a key driver of internet adoption, and GWI's latest research indicates that nearly 99% of internet users worldwide between the ages of 16 and 64 use every month a social network or messaging platform connected to the Internet. More than half a billion new users have joined social media platforms in the past 12 months, bringing the global total to 4.33 billion in April 2021.

3.8 million searches are performed on Google Search every minute.

Clearly, the digital technology is revolutionizing our uses in terms of communication, learning and social relations. It is a whole ecosystem that is part of and reinvents our daily lives, in our private and professional lives.

If defining the digital transformation as a dematerialized economy based on the exchange of data, shows the rise in the past 10 years of the advent and quick development of :
e-commerce ; e-administration ; e-payment ; e-learning ; music streaming and video on demand ; telework…etc.

All this faculties of online interaction contributes to the inclusion of everyone in the social and economic life in our modern society. That is why the EU included in its 2018 electronic communications code [b5] in its article 84 the obligation for Member States to ensure everywhere on their territory broadband access to the Internet at an affordable price and with sufficient speed to allow the use of the main online services defined as :

1) E-mail

2) search engines enabling search and finding of all type of information

3) basic training and education online tools

4) online newspapers or news

5) buying or ordering goods or services online

6) job searching and job searching tools

7) professional networking

8) internet banking

9) eGovernment service use

10) social media and instant messaging

11) calls and video calls (standard quality)

People are also now able to move easily with GPS application, and they can monitor their house, or their health thanks to miscellaneous connected devices.

All these new usages introduce the question of the definition (content and scope) of digital identity(ies)

Civil identity, real identity, personal identity, biological identity, professional identity, sovereign identity. These multiple possibilities of identities, of fact or desired, shows us the importance of establishing precisely or surely depending on the context that a person is what they claim to be [b6].

By determining that digital identity does not correspond to a transposition of civil identity into cyberspace. The exponential increase in the types of attributes allowed by dematerialization highlights the need to speak not of a digital identity but of digital identities.

Our work on smart digital identity may need to integrate part of the personal identity but at the right level required to deliver the service based on the knowledge of the context of use and the wishes of the user.

That is what we call the user profile, as define below

## 4.5 user profile and context (use cases)

*Médical, transport, work, bank…*

# 5 new technologies for smart identity

## 5.1 technology trends

## 5.2 system approach

# 6 Knowledge database

## 6.1 ACIFO model: informational model

## 6.2 data categorization

## 6.3 data collection and data processing

# 7 user digital clone

## 7.1 user digital clone definition

## 7.2 smart ID model

Annex A:
Title of annex

Annex:
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Annex:
Change History

| Date | Version | Information about changes |
| --- | --- | --- |
| <Month year> | <#> | <Changes made are listed in this cell> |
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# History

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| **Document history** |
| <Version> | <Date> | <Milestone> |
|  |  |  |
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*Latest changes made on 2019-01-29*