



**User Group;
User centric approach;
Qualification of the interaction with the digital ecosystem**

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Foreword

This Technical Report (TR) has been produced by ETSI User Group (USER).

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](#) (Verbal forms for the expression of provisions).

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Introduction

The present document has been produced by the STF 543 experts.

The concept of the full Project is to define 5-dimension model called "**ACIFO**". **The 5-dimension model is based on 5 sub-models defined as:**

- Architectural Model "Acifo": defines the global structure, including semantics and is optimized for the stated objectives.
- Communication (Relational) Model aCifo: defines the exchange protocols, including HMIs (User) and APIs (provider) exchange and management protocols over three planes:
 - Management (Monitoring).
 - Control.
 - Usage.

- Information Model acIf_o: defines the different Profiles (User, device, service). The information covers the whole ecosystem (equipment, network, applications, services, HMIs, User, etc.) from the offer to the resource's availability for Users, Providers and any other partners. It is a knowledge data base representing the whole ecosystem.
- Functional Model aciF_o: defines services and service composition. The functionalities (the process) to compose any service based on "micro-service".
- Organization Model aciF_o: defines the role of any actor and which actor is responsible of each action. ("Who is doing what?").

These five dimensions should be shared by the user and the supplier/provider. For the user, it should be possible to define (or to choose) the level of autonomy and control for the personalized composition of services.

The four deliverables produced by STF 543 define the different dimensions:

- ETSI TR 103 438 [i.1] focuses on the Architecture and the Organization:
It includes the use cases and the results of the survey.
- ETSI EG 203 602 [i.2] focuses on the information and the functionalities:
It is dedicated to the user. It provides analysis and recommendations from the information and functionalities.
- ETSI TR 103 603 [i.3] addresses all the dimensions to the supplier, in order to produce the APIs according to the user expectations and whatever the number and types of additional suppliers.
- ETSI TR 103 604 (the present document) focuses on the communication and in particular on the HMIs.

For example, for Energy (production, distribution, consumption), the supplier will create an API for the user. The information will be exchanged between the supplier and the user but will not be used only by the supplier: the user will have access to all the information and will be able to use this information to optimize their energy consumption. This data base is a source to provide new services and new applications (for the user and for the supplier). One major challenge and constraint is to ensure that all the private data may be checked and monitored by the user (the contract needs to define clearly these points). The data are not used only by the supplier, the user should have access to the data and may refuse that the data be used or known → an interaction "cursor" between the user and the supplier defines the freedom (GDPR [i.4]).

1 Scope

The present document describes the service provision to be addressed by designers and implementers of the digital ecosystem to ensure that the means by which users interact with the digital ecosystem is consistent across device types, and meet the preferences of the user. The present document addresses the role of the user accessing services in the digital ecosystem with multiple formats of device.

For the purposes of the present document the digital ecosystem refers to those business sectors that interact with each other, and their consumers, using digital means. The application of the recommendations made in the present document encourage a unified approach across all elements of ecosystem that together impact the user experience (referred to as Quality of Experience) and aim to ensure continuity of customer experience across the entire eco-system. Specifically the present document identifies the elements of service interaction that should be made personal to the user.

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] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).
- [i.5] ETSI EN 301 549 (V2.1.2): "Accessibility requirements for ICT products and services".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the following terms apply:

blockchain: digital record of transactions, in which individual records, called blocks, are cryptographically linked together in single list

chatbot: robot able to speak and imitate human behaviour, whether written or spoken

choreography: scenario where each service knows a subset dependencies

orchestration: scenario where all global dependencies between services are known by at least one service

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACIFO	Architecture, Communication, Information, Functionality, Organization
AD	Advertisement
AI	Artificial Intelligence
API	Application Programming Interface
BPEL	Business Process Execution Language
BREAD	Browse, Read, Edit, Add, Delete
CRAP	Create, Replicate, Append, Process
CRUD	Create, Read, Update, Delete
DAVE	Delete, Add, View, Edit
DDS	Data Distribution Service
DNS-SD	Domain Name System-based Service Discovery
GDPR	General Data Protection Regulation
HMI	Human Machine Interface
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ICT	Information & Communication Technology
IoT	Internet of Things
NSD	Network Service Discovery
QoE	Quality of Experience
QoS	Quality of Service
REST	Representational State Transfer
SCRUD	Search, Create, Read, Update, Delete
SMS	Short Message System
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
SQL	Structured Query Language
SSO	Single Sign On
STF	Special Task Force
UG	USER Group (ETSI Special Comittee)
UX	User eXperience
VoWi-Fi	Voice Over Wireless Fidelity
Wi-Fi	Wireless Fidelity
WSCl	Web Service Choreography Interface
WSDL	Web Service Description Language

4 User needs

4.1 Results of the survey

The initial survey is available as attachment to ETSI TR 103 438 [i.1] and the additional survey is available as attachment to ETSI EG 203 602 [i.2].

Initial survey has questioned user maturity, behaviour and expectations. In 2018 it appears that more than half of the panel struggle to configure their smartphones or internet boxes. This means that a lot of users do not know the potential settings and the way to change them. This reduces significantly the capacity for users to interact with equipment, applications or services. Even if the users are not willing to increase these interactions, it appears needed to reduce the complexity of settings and to offer a simplified set of actions.

Respectively 70 % and 79 % of users are able to configure Bluetooth and Wi-Fi on a smartphone and less than half of users know how to configure cellular networks when they are abroad. However, even if the configurations of Bluetooth and Wi-Fi may be done by most of the users, the combinations of different questions of the survey indicate that existing or future services (e.g.: VoWi-Fi) may be difficult to be used.

A lot of potential services in smart cities, at home, or during travels will be available for the users. However, the survey indicates that less than 40 % of respondents are able to easily set up these equipments and almost 30 % do not know. It also appears that, for the time being, a lot of users' answers "do not care" to the question "would you have connected sensors/things in your house?" This is particularly true for Voice assistant, but on the other hand, half of respondents have or wish to have "light control (smart energy)", "heating control (smart energy)" and "Access control and video monitoring".

It also appears that only 16 % of users change the parameters of personal smartphone several times a month and 34 % change less than once a year. Personal on-line accounts are little consulted both on fix and mobile subscription. It is assumed that users prefer to call the hot line instead of accessing the personal account page when a problem occurs. However, as most users have a package, the possibility to access options or customized services is very limited.

The survey indicates that 85 % of users are using security softwares on their personal computers and only 38 % on their mobile. This does not mean that they do not wish security, but it is assumed that they are confident in the tools provided by the vendors when they buy a personal computer and do not have perceived that a smartphone may also need security softwares as for personal computers. Similar disparity appears for AD blockers.

For other potential tools (device optimization, quality measurement, back up services), there are no differences between personal computers or smartphones, and the percentage of used tools is lower than for security.

Customer expectations about the missing setting today on a smartphone and what they would like in the future was collected by an open question in 4 categories:

- **Control:** Ability to manage the device or the subscription i.e. connection priority, control of applications in the background, battery life, etc.
- **Privacy:** Need of transparency and privacy mastery i.e. cookies control, localization control, hide the text of SMS received, etc.
- **Customization:** Need of more customization i.e. setting according to the location, smart synchronization, senior apps or parameters, etc.
- **User eXperience (UX):** Ergonomics and affordance i.e. clarity of menu, tree logic, technical vocabulary, more help notice or bubble information, etc.

Concerning the control by the user of the device location, there is a quasi-equal spread between the users who think that they can control, users thinking that they can control but do not find it easy, and users who do not think that the control is possible. But a large majority of users (87 %) would like to hide their locations (when they wish).

The respondents have been asked about the possibility to change remotely smartphone settings: 43 % think that they may change settings of their smartphone, whereas 61 % think that the providers have this possibility (several answers were possible). So, it can be assumed that there is a large range of "progress" for users to become mature actor.

A large majority of users would like to challenge their providers, on privacy respect, security level, quality or price. This expectation should be achieved as long as the evolution towards a user-centric approach could be implemented.

The final question of the initial survey gave the opportunity to users to express their views about digital future. One of the major challenge will be to ensure safety and individual privacy, as a majority of users express their doubt about this. They are more confident about the possibility to customize services and that services, equipments, etc., will be easiest to be used and more user friendly.

The additional survey, available as attachment to ETSI EG 203 602 [i.2], was focused on the user place in the new digital ecosystem and user expectations. The additional survey had the objectives to:

- better understand the consumer relationship with digital
- identify the main expectations and fears
- look at the confidence drivers
- collect reactions on the perspectives opened up by new technologies

The main concern for users about digital ecosystem is identity theft. This concern arrives clearly first (nearly 50 %). The second concern (20 %) is the loss of privacy due to the collection of data for commercial purposes without the knowledge of the surfer. The other concerns (10 %) are the loss of personal data, the loss of freedom to choose, and the collection data by governments.

Over 60 % of users consider good or rather good new technologies: "biometric access" and "electronic signature".

Conversely the "blockchain" and the use of "APIs" receive less than 50 % of positive opinions, but it can be seen that the level of knowledge about these two technologies is low (respectively 28 % and 23 % of no opinion).

The additional survey provides the following results.

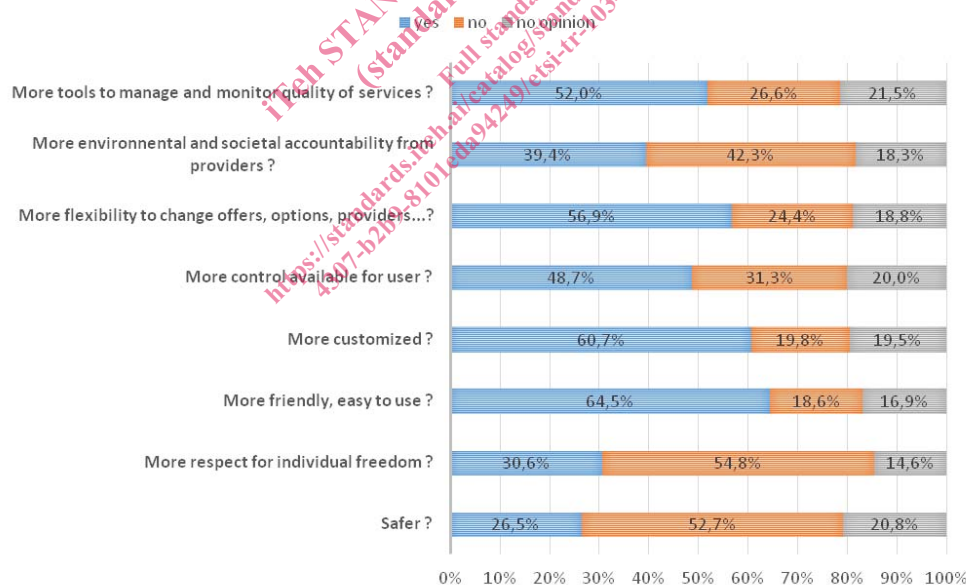


Figure 1: Results of the additional survey: user needs

4.2 Identification needs for the communication dimension

The consumers search for the desired services in a directory, even if the services are physically distributed over several platforms. Then the service consumers may call on these services. According to their wishes or needs the users need an interface (a language, a protocol, etc.) to design the dynamic composition of the services called on, in order to access the expected personalized service.

The present document considers the communication dimension of the digital ecosystem related to the user (the service consumer) and the service provider.

The service provider is responsible for creation of a service, to document the functional descriptions in the directory and to provide the interface.

Depending on the level of "freedom wanted by the user" (according to figure 2 Illustration of the user "cursor") the composition may be called on in an autonomous way (step by step) or globally (only the final result is provided to the user).

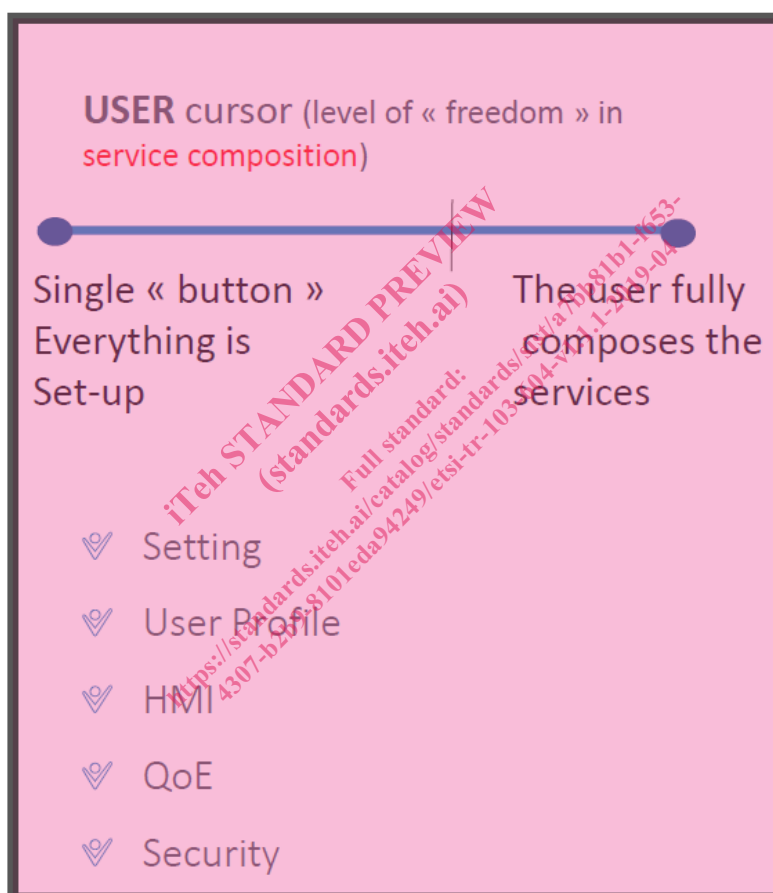


Figure 2: Illustration of the User "cursor"