



**ETSI
TECHNICAL
REPORT**

ETR 055-6

April 1995

Second Edition

Source: ETSI TC-NA

Reference: RTR/NA-070211

ICS: 33.080

Key words: UPT, subscription, service

**Universal Personal Telecommunication (UPT);
The service concept
Part 6: UPT subscriptions, service profiles and information model**

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Foreword

This ETSI Technical Report (ETR) was produced by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status. An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

This ETR describes the Universal Personal Telecommunication (UPT) subscriptions, service profiles and information model.

This ETR consists of 11 parts as follows:

- Part 1: "Principles and objectives".
- Part 2: "General service description".
- Part 3: "Service aspects of charging, billing and accounting".
- Part 4: "Service requirements on security mechanisms".
- Part 5: "UPT terminals and UPT access devices".
- Part 6: "UPT subscriptions, service profiles and information model".**
- Part 7: "User procedures and user states".
- Part 8: "Man-machine interface aspects".
- Part 9: "Service requirements on numbering, addressing and identification".
- Part 10: "Supplementary services".
- Part 11: "Service requirements on protection of third parties".

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1 Scope

This ETSI Technical Report (ETR) describes the UPT subscription and the service profile, its structure, the information contained, the operations allowed on it and the possible restrictions for the involved parties in the access. Furthermore, the UPT information model is presented informally. This information model is split into entities, each entity modelling one of the aspects of the UPT service; also the attributes attached to each of the entities are described.

2 References

This ETR incorporates by dated and undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] ETR 055-4: "Universal Personal Telecommunication (UPT); The service concept; Part 4: Service requirements on security mechanisms".
- [2] ETR 055-7: "Universal Personal Telecommunication (UPT); The service concept; Part 7: User procedures and user states".
- [3] ETR 055-10: "Universal Personal Telecommunication (UPT); The service concept; Part 10: Supplementary services".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETR, the following definitions apply:

UPT subscription: In order to have available the UPT service, the UPT subscriber has to subscribe to it with the service provider; the UPT subscription is independent from any other bearer or supplementary service subscription.

Furthermore, in order to make any modification to the service profiles associated to the subscription, the UPT subscriber has to subscribe with the service provider the possibility of access to his own data¹⁾; the kind of access restrictions for the UPT users is decided at subscription time between the service provider and the UPT subscriber.

UPT service profile: The UPT service profile is a record containing all the information related to the UPT user and the personal rules for handling his mobility, in order to make available to him the UPT service.

In fact, the key object of UPT is to increase the user mobility across any networks; focusing on this purpose, the service profile becomes an efficient way to support the user mobility: it contains a lot of information related to the user's location and to the dynamic management of the calls; it's then important to allow both a user-friendly access and operation on the service profile.

The possibility to access the service profile has great implications on the security aspects, because the access procedure should be protected from disallowed accesses or user's mistakes.

The following assumptions are required:

- the possibility of access to the service profile information has to be subscribed with the service provider;
- each user can have access only to his data, and can modify only the data allowed.

1) A subscriber profile can be used for administrative purposes, not described in this ETR.

Furthermore, each UPT service provider can decide which parameters the UPT user/subscribers are allowed to modify: so the categorisation provided in this recommendation can be changed by the service provider, which should have the flexibility to decide the exact way to include a given parameter into the service profile.

3.2 Abbreviations

For the purposes of this ETR, the following abbreviations apply:

ARA	Access Registration Address
ISDN	Integrated Services Digital Network
PIN	Personal Identification Number
PSTN	Public Switched Telephone Network
PUI	Personal User Identity
SPIN	Special Personal Identification Number
UPT	Universal Personal Telecommunication

4 UPT subscriptions and services profiles

4.1 Access to the service profile

The information contained in the service profile may need to be modified following the user needs and his requests.

In order to modify the service profile or to make any other operation on it, it is necessary to have an access procedure, which may be different for the various parties invoking it.

4.1.1 Involved parties

The possibility to access to the service profile is available for the following categories of UPT users:

The **service provider** has a guaranteed access to all the information without any restrictions; the UPT subscriber has to agree with him, at the subscription time, which kind of access is permitted to himself and to the eventual UPT users associated. For any modification to the access modality agreed at the subscription, the subscriber has to contact the service provider.

The **UPT subscriber** can access only the information allowed by the service provider on subscription contract basis; furthermore, some information can only to be displayed to him and not modified (e.g. the UPT number). Anyway, he can ask to modify some parameters via administration procedure with the service provider.

The **UPT user** can access the service profile if this possibility has been given to him by the subscriber at the subscription time; however, the UPT user may have some restrictions in the access, fixed by the service subscriber (e.g. he could not modify the restrictions on permitted callers).

Each information item may have one of three degrees of access, corresponding to each level of access that is defined for the UPT service profile:

- a) no access;
- b) interrogation access (read only);
- c) modification access (read and write).

4.1.2 Access procedure

The access procedure to the subscriber/user data has to be user-friendly and in the same time has to guarantee the security of communication.

The UPT service profile is accessed using the service profile management procedures described in the ETR 055-7 [2].

4.1.3 Operations on the service profile

The following operations can be performed by the subscriber/user on his service data:

- service profile modification: this operation is made using the profile modification procedure and allows to change the variable information;
- service profile display: this operation is made using the profile interrogation procedure and allows the subscriber/user to obtain information on the current status of the service profile.

Furthermore, the system has to validate the service profile after any modification made by the subscriber/user.

4.2 Structure of the service profile

4.2.1 Fixed information

This subclause describes the fixed information from the user's point of view: these can be divided into information managed only by the service provider, and information changeable by the **subscriber**Information classification can depend on the service provider.

4.2.1.1 Information fixed at subscription time

These information are fixed at the subscription time and can be modified only by the service provider; they could however be displayed to the UPT users and subscriber, if agreed at the subscription time.

If changes are wanted by the UPT subscriber, administrative procedures must be used with the UPT service provider for agreement on a new UPT subscription.

Examples of fixed information are:

- UPT number;
- Personal User Identity (PUI);
- SPIN (special PIN for unblocking);
- subscriber identity;
- default Access Registration Address (ARA) of the UPT user;
- services provided by the service provider (access independent services);
- basic services subscribed;
- supplementary services subscribed;
- profile services subscriber;
- default charging reference;
- maximum number of failed authentication attempts, before disabling access to the UPT service;
- types of authentication mechanisms subscribed;
- authentication information (secret keys, public keys, etc.);
- security options subscribed (e.g. user event control, user identity confidentiality; for more information see ETR 055-4 [1]);
- charging options subscribed;
- subscriber location restrictions (e.g. whether remote registration is limited to the list of terminal accesses subscribed, forbidden ARAs for incoming and outgoing calls).

4.2.1.2 Information changeable by the subscriber

This information can be modified only by the subscriber; it can however be displayed to the UPT users if agreed by the subscriber; all this information may be on a per basic telecommunication service basis:

- charging options allowed;
- security options allowed;
- types of authentication mechanisms allowed;
- profile access parameters (read/write privilege) for the UPT user;
- maximum credit allowed to the user (cost related or number of local/long distance);
- restrictions on roaming, if any;
- maximum number of terminal accesses for group registration for incoming calls;
- maximum number of terminal accesses for group registration for outgoing calls;

- allowed procedures for the UPT user;
- allowed basic services;
- allowed supplementary services.

4.2.2 Variable information

The information described in the following are defined "variable" from the user's point of view; they can be changed using the service profile modification procedure or the personal mobility procedures only.

The variable information are divided in service related and mobility related information and may be on a per basic telecommunication service basis.

4.2.2.1 Service related information

The following parameters are changeable by the user or the subscriber:

- information modified by the change PIN procedure only:
 - PIN;
- information modified by the profile modification procedure:
 - type of authentication mechanisms activated;
 - customized announcements;
 - type of charging options activated;
 - type of security options activated;
 - activation status for each UPT supplementary service;
 - preferred language for UPT specific announcements.

4.2.2.2 Mobility related information

Information modified by UPT service profile management procedures only:

- default terminal accesses for incoming calls on a per service basis;
- default terminal accesses for outgoing calls on a per service basis;
- list of terminal accesses for registration²⁾;
- default duration for registration for incoming calls;
- default duration for registration for outgoing calls;
- default duration for linked registration;
- information related to UPT supplementary services³⁾ (e.g. call forwarding unconditional, call forwarding on busy, call forwarding on no answer, call forwarding on not reachable, variable routeing, including routeing by calling line identity, routeing by call originating area, time dependent routeing);
- whether or not a simplified authentication mechanism shall be used for outgoing UPT calls during the registration for outgoing calls;
- whether or not any other UPT user shall be allowed to deregister the UPT user for outgoing calls from a terminal access by override.

²⁾ It contains the translation between short numbers defined by the UPT user and Access Registration Addresses (ARAs).
³⁾ For more information, see ETR 055-10 [3].

Information modified by UPT personal mobility procedures only:

- current terminal accesses for incoming calls and duration of the registration;
- current terminal accesses for outgoing calls and duration of the registration;
- current terminal accesses for linked registrations and duration of the registration.

4.3 Table on allowed accesses

Table 1 provides a global view of the parameters included in the service profile and accessible by the various entities; in each table all the parameters are reported, with the indication about an access being "write-only" (W), "read-only" (R) or "read and write" (R/W). Only subscriber and user rights appear in the table, since by definition the service provider has all rights on the subscriber and user profiles. However, the service provider is bound by their contractual agreement with the subscriber and is submitted to the European laws on the protection of privacy.

Table 1

Attribute	Access rights	
	Subscriber	User
UPT number	R	R
PUI	R	R
SPIN	R	R
Default ARA location	R/W	R
Basic services subscribed	R	R
Supplementary services subscribed	R	R
Maximum number of failed authentication attempts	R	R
PIN	R/W	R/W
Types of authentication mechanisms subscribed	R	R
Types of security procedures subscribed	R	R
Types of charging procedures subscribed	R	R
Subscriber location restrictions	R	R
Maximum credit allowed	R/W	R
Default charging reference	R	R
Types of authentication mechanisms allowed	R/W	R
Types of security procedures allowed	R/W	R
Types of charging procedures allowed	R/W	R
Basic services allowed	R/W	R
Supplementary services allowed	R/W	R
Type of authentication mechanism activated	R	R/W
Type of security procedure activated	R	R/W
Type of charging procedure activated	R	R/W
Activation status for each UPT supplementary service	R	R/W
Default terminal access for incoming/outgoing calls	R	R/W
List of terminal accesses for registration	R	R/W
Default duration of incoming/outgoing/all registrations	R	R/W
Information related to supplementary services	R	R/W
Current terminal access for incoming/outgoing/all calls and duration	R	R/W

5 UPT information model

5.1 General description

The UPT information model is presented informally, using a method loosely based on the Entity-Relationship methodology. The relationships between the entities of the model are represented by lines in figure 1.

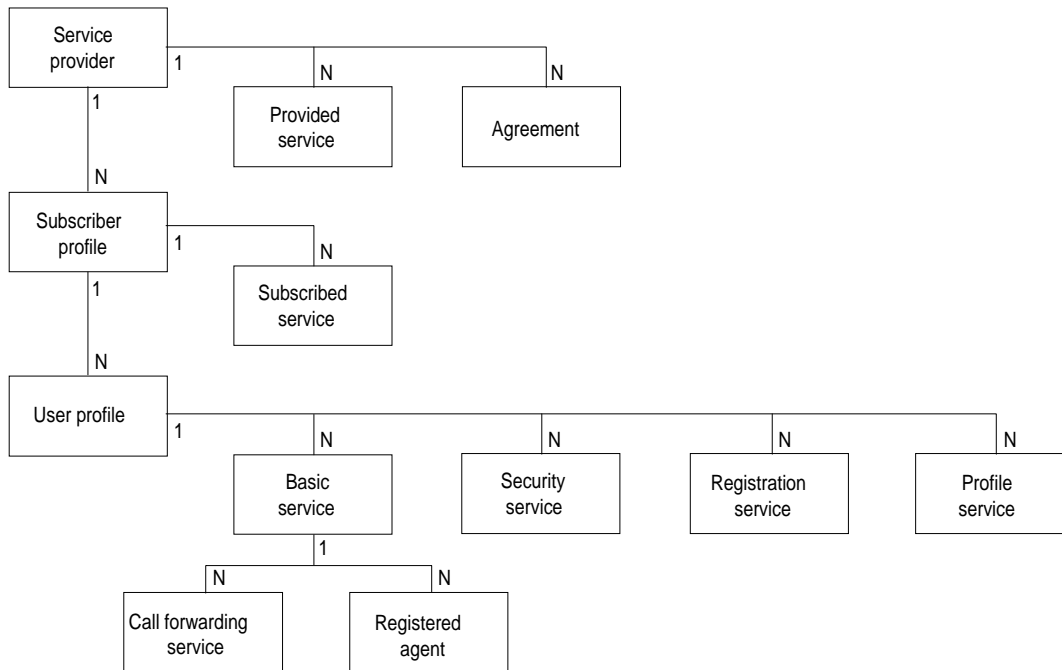


Figure 1

Information is attached to each entity of the model, in the form of attributes. These attributes are described in the following subclauses for each entity in the model. Entities have been grouped logically into three classes: service provider related entities, subscriber related entities and user related entities.

Three actors require access to the subscriber and user related entities of the model: the service provider; the subscriber; and the user. Access rights to each entity and to each attribute within an entity are therefore defined. By definition, the service provider has all rights on all the information. The subscriber's and the user's rights to read and/or modify an attribute, however, depend on its nature and purpose and have to be specified for each attribute. In order to do this, an annotation of the following form is added to each attribute description: "sub: R/W; user: R", meaning that the subscriber may see the contents of the attribute and modify it, while the user may only see the contents of the attribute. If no annotation appears in the attribute definition, "sub: R; user: R" is implied.

5.2 Service provider related entities

Only the service provider has access to these entities.

5.2.1 Service provider

The **service provider** entity is simply used as an anchor point for instances of the **provided service** and **agreement** entities. It has only one attribute attached to it:

- **service provider identity**: Identifier for the service provider. It will be extracted from the PUI and may include, for example, a country code and a network code.

5.2.2 Provided service

The **provided service** entities describe the services offered by the service provider to its subscribers. One instance of this entity per provided service is attached to the **service provider** entity. The attributes attached to it are:

- **service identity**: identifier for the service. Services are grouped into classes, for the convenience of the implementation. Valid identifiers for each class are:
 - basic services:
 - Integrated Services Digital Network (ISDN) telephony;
 - Public Switched Telephone Network (PSTN) telephony;
 - registration services:
 - InCall registration;
 - profile services:
 - profile modification;
 - profile interrogation;
 - security services:
 - weak authentication;
 - strong authentication;
 - charging services:
 - credit limit checking;
 - call forwarding services:
 - call forwarding unconditional;
 - call forwarding on no answer;
 - call forwarding on busy;
 - call forwarding on not reachable;
 - variable routing;
- **locations**: list of locations where the service may be used. A location is expressed as either:
 - a country code;
 - a country code + an operator code;
 - a country code + an operator code + a local area code.

For most service types, those two attributes are enough to describe the service provided. For call forwarding services, however, an extra attribute is required to describe the provision parameters supported:

- **call forwarding parameters:** may allow either of the following three provision parameters:
 - **notify activation:** indicates that the UPT user should be notified when the service is activated;
 - **notify forwarding:** indicates that the forwarded to party should be notified that the incoming call has been forwarded;
 - **notify calling party:** indicates that the calling party should be informed that a call forwarding takes place.

5.2.3 Agreement

The **agreement** entities describe the services offered by the service provider to visiting users. One instance of this entity per provided service and per foreign service provider is attached to the **service provider** entity. It has the same structure as the **provided service** entity, with the addition of one attribute:

- **service provider identity:** identifier for the home service provider of the visiting users.

5.3 Subscriber related entities

The UPT subscription defines the nature of the contract binding the service provider to one of its customers. One UPT subscription may cover one or several UPT users. A service profile is attached to each of the users in the subscription (see the description of the user related entities in the subclause 5.4) and contains information specific to each user.

The information held in the subscriber related entities is common to all users in the subscription and is fixed at subscription time. It may subsequently only be modified by a request to the service provider, using administrative procedures.

5.3.1 Subscriber profile

The **subscriber profile** entity is simply used as an anchor point for instances of the **subscribed service** entities. It has only one attribute attached to it:

- **subscriber identity:** unique identifier for the UPT subscriber;
- **subscribed authentication procedures⁴⁾:** list of authentication procedures subscribed;
- **subscribed security options:** list of security options subscribed;
- **subscribed charging options:** list of charging options subscribed;
- **subscribed basic services:** list of basic services subscribed.

4) A naming convention is introduced here. For several aspects of the service, there is a need to express three things: what has been subscribed by the subscriber, what is allowed to each user of the subscription (chosen among what has been subscribed to), and what each user has activated (chosen among what is allowed to the user). A three tier description of these aspects of the service is therefore adopted: a **subscribed ...** attribute is associated to the **subscription** entity, an **allowed ...** attribute is associated to the subscriber-controlled part of the **user profile** entity, and an **activated ...** attribute is associated to the user-controlled part of the **user profile** entity.

5.3.2 Subscribed service

The **subscribed service** entities describe the services subscribed. One instance of this entity per subscribed service is attached to the **subscriber profile** entity. It has the same structure as the **provided service** entity (q.q.v.), with the following restrictions:

- **service identity**: only services for which a corresponding **provided service** entity exists in the subscriber's home service provider definition are allowed;
- **locations**: only locations defined in the corresponding **provided service** entity are allowed.

In addition, the following restrictions apply to call forwarding services:

- **call forwarding parameters**: each of the three provision parameters (**notify activation**, **notify forwarding** and **notify calling party**) may be specified only if it also specified in the corresponding **provided service** entity.

5.4 User related entities

The user related entities defines the service information attached to one of the users in a subscription. This information may differ from one user to another, in the same subscription.

5.4.1 User profile

The **user profile** entity is mainly used as an anchor point for instances of the service entities described in the remainder of this subclause.

- **personal user identity**: unique identifier for the UPT user;
- **UPT number**: dialable number through which the user may be reached;
- **allowed charging services** (sub: R/W; user: R): selected from the list held in the **subscribed charging options** attribute of the **subscriber profile** entity;
- **charging information**: containing:
 - **default charging reference**: default reference point for charging;
 - **maximum credit** (sub: R/W; user: R): allowed to the user, expressed either as a cost related credit limit or as maximum numbers of local and long-distance calls;
- **activated charging service** (sub: R; user: R/W): selected from the list held in the **allowed charging options** attribute;
- **maximum number of terminal accesses**: allowed for registration services;
- **default language** (sub: R/W; user: R): preferred language for UPT specific announcements;
- **activated language** (sub: R; user: R/W): if set, overrides the preferred language selected by the subscriber in the **default language** attribute.

5.4.2 Security service

The **security service** entities describe the security services allowed by the subscriber to a given user. They also indicate the activation status of each security service.

- **service identity** (sub: R/W; user: R): only services for which a corresponding **subscribed service** entity exists in the subscriber's definition are allowed.
- **activation status** (sub: R; user: R/W): indicates whether the service is active or not. Note that in the case where both weak and strong authentication procedures are allowed to a user, the service

provider may elect to ignore this attribute and to impose the authentication method used. This prevents the use of weak authentication when a safer method is available.

- **locations** (sub: R/W; user: R): only locations defined in the corresponding **subscribed service** entity are allowed.

When the **service identity** attribute indicates **Weak Authentication**, the following attributes are also used:

- **PIN codes** (sub: R/W; user: R/W): the secret code used by the user to prove his identity to the network and the longer secret code used for deblocking the user if too many failed attempts are made. Unlike other attributes, these ones may be queried only by the service provider, for security reasons. They may be changed by using the specific PIN change procedures;
- **maximum number of authentication failures**: before the PUI is blocked.

When the **service identity** attribute indicates **strong authentication**, the following attribute is also used:

- **strong authentication key(s)** (sub: ; user:): for further study.

5.4.3 Registration service

The **registration service** entities describe the registration services allowed by the subscriber to a given user. These services do not use an **activation status** attribute to record their activation status; another entity, **registered agent**, is used instead.

- **service identity** (sub: R/W; user: R): Only services for which a corresponding **subscribed service** entity exists in the subscriber's definition are allowed;
- **locations** (sub: R/W; user: R): Only locations defined in the corresponding **subscribed service** entity are allowed.

5.4.4 Profile service

The **profile service** entities describe the profile interrogation and modification services allowed by the subscriber to a given user.

- **service identity** (sub: R/W; user: R): Only services for which a corresponding **subscribed service** entity exists in the subscriber's definition are allowed;
- **locations** (sub: R/W; user: R): Only locations defined in the corresponding **subscribed service** entity are allowed.

5.4.5 Basic service

The **basic service** entities describe the basic services allowed by the subscriber to a given user.

- **service identity** (sub: R/W; user: R): Only services for which a corresponding **subscribed service** entity exists in the subscriber's definition are allowed;
- **locations** (sub: R/W; user: R): Only locations defined in the corresponding **subscribed service** entity are allowed.

5.4.6 Call forwarding service

The **call forwarding service** entities describe the call forwarding services allowed by the subscriber to a given user.

- **service identity** (sub: R/W; user: R): Only services for which a corresponding **subscribed service** entity exists in the subscriber's definition are allowed;
- **locations** (sub: R/W; user: R): Only locations defined in the corresponding **subscribed service** entity are allowed;
- **allowed parameters** (sub: R/W; user: R): specifies which provision parameters (**notify activation**, **notify forwarding** and **notify calling party**) are allowed to the user. A given parameter may be allowed only if it is also specified in the corresponding **subscribed service** entity;
- **provision parameters** (sub: R; user: R/W): Specifies the actual provision parameters chosen by the user. Each of the three provision parameters (**notify activation**, **notify forwarding** and **notify calling party**) may be specified by the user only if it also specified in the **allowed parameters** attribute;
- **activation status** (sub: R; user: R/W): Indicates whether the service is active or not.

When the **service identity** attribute indicates **call forwarding unconditional**, **call forwarding on no answer**, **call forwarding on busy** or **call forwarding on not reachable**, the following attribute is also used:

- call forwarding registration parameters (sub: R; user: R/W) contains:
 - **forwarded to number**;
 - **no reply condition timer**.

When the **service identity** attribute indicates **variable routeing**, the following attribute is also used:

- **variable routeing registration parameters** (sub: R; user: R/W): List of calling-party dependent or time-dependent variable routeing elements:
 - calling-party dependent elements specify a calling party address, and the number to forward the call to when an incoming call is received from this calling party;
 - time-dependent elements specify a day of week, a time period and the number to forward the call to when an incoming call is received on this day and during this period.

5.4.7 Registered agent

These entities model the registration of a UPT user on a terminal access (contrary to what is shown in figure 1, only one registration for incoming calls per basic service is possible in UPT Phase 1):

- **access point identifier** (sub: R; user: R/W): Address of the terminal access;
- **type of registration**: Permitted value: **InCall**.

History

Document history	
December 1992	First Edition
April 1995	Second Edition
February 1996	Converted into Adobe Acrobat Portable Document Format (PDF)