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Foreword

ETSI Technical Reports (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 application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or I-ETS.

This ETR gives an overview over the relationships between the network entities involved in the various Universal Personal Telecommunication (UPT) procedures, as outlined in ETR 055-7 [1].

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1 Scope

This ETSI Technical Report (ETR) gives an overview over the relationships between the network entities involved in the various Universal Personal Telecommunication (UPT) procedures, as outlined in ETR 055-7 [1].

2 References

For the purposes of this ETR, the following references are used.

[1] ETR 055-7: "Universal Personal Telecommunication (UPT); The service concept Part 7: User procedures and user states".

[2] draft CCITT Recommendation Q.1214: "IN DFP architechture for IN CS-1".

[3] draft CCITT Recommendation Q.1218: "Interface Recommendation for Intelligent Network CS-1".

3 Abbreviations

For the purposes of this ETR, the following abbreviations are used.

IF	Information Flow
IN	Intelligent Network
IP	Intelligent Peripheral
PIN	Personal Identification Number
SCEF	Service Creation Environment Function
SCP	Service Control Point
SIB	Service Independent building Block
SMAF	Service Management Agent Function
SMF	Service Management Function
SRF	Specialised Resources Function
SSP	Service Switching Point
UPT	Universal Personal Telecommunication

4 UPT procedures

There are four categories of basic UPT procedures:

- personal mobility procedures;
- UPT call handling procedures;
- UPT service profile management procedures;
- exceptional procedures.

These procedures generally include "elementary procedures" such as:

- access;
- identification;
- authentication; and
- follow-on.

5 General

5.1 General aspects

By nature, each transaction between a UPT user and a service provider includes identification and authentication procedures to ascertain:

- for the service provider: the identity of the user; and, conversely
- for the user: the identity of the service provider.

Particularly in the early phases of UPT, service implementation authentication is done "manually" i.e. by using a subscription device and guided by prompts.

Dependent on:

- the actual location of the user;
- the service request;
- particular network configuration.

This authentication can be followed by several checks to verify:

- that the user is not trespassing on the subscribed service rights;
- that agreements exist between involved network operators;
- that the user is able to make and receive calls at the specified terminal.

The called user can also be concerned by authentication (e.g. incoming call to a UPT user).

Most UPT procedures include also a dialogue with the user to receive and record his/her particular demands, e.g. registration and deregistration.

The procedures may include charging announcements and negotiations.

All dialogues are guided by prompts.

Prompts are generated by a specialised resource which can be physically located at various places in an Intelligent Network (IN) structured network, according to network configurations:

- embedded in the Service Switching Point (SSP);
- connected to the SSP;
- connected to another SSP but still under the control of the Service Control Point (SCP);
- accessible through the network (e.g. connected to an SSP of another service provider; in some cases the home service provider, see NOTE 1).

The related interactions between a user and the network can be divided into the following operations which are partly run in parallel:

- connection set-up and release to an appropriate Specialised Resources Function (SRF);

- interactive dialogue with the user;

- access to the relevant database(s) (SDF) to read data and, when necessary, to update end user data.

NOTE 1: Using the SRF of the home service provider or home network operator could solve the announcement language problem.

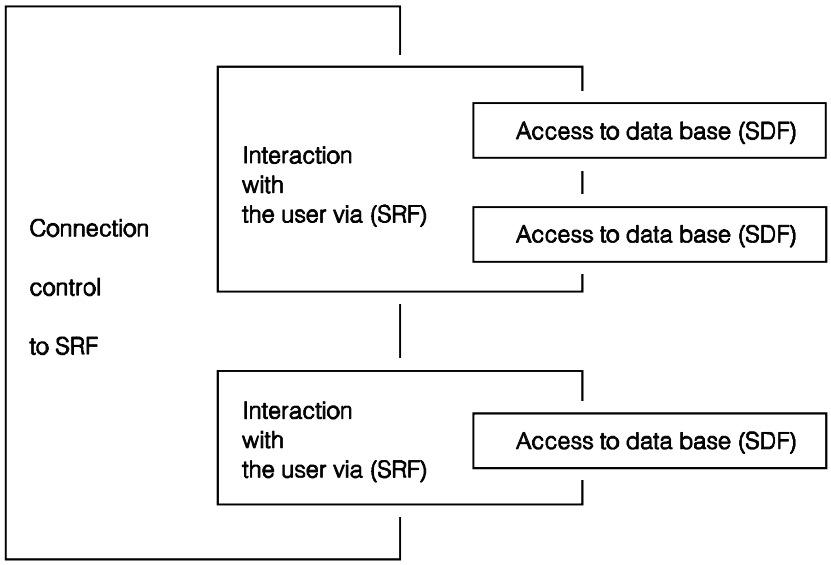


Figure 1: Example of operations run in parallel

These operations can be built up of Service Independent building Blocks (SIBs).

Presently CCITT Recommendation Q.1214 [2] defines:

- a user interaction SIB, which contains the Information Flows (IFs) to set up a connection towards the SRF and to manage the dialogue with the user;

- a screen SIB and a service data management SIB, which provide for the necessary interactions with a database.

These three SIBs can be used in personal mobility procedures.

CCITT Recommendation Q.1214 [2] also includes several other SIBs used in IN call processing. Many of them will be used in UPT call handling procedures.

However, in the sequel, no reference is made to the SIBs since they might need to be modified/expanded following the specification of UPT procedures.

NOTE 2: The entities Service Management Function (SMF), Service Management Agent Function (SMAF) and Service Creation Environment Function (SCEF) have not yet been considered.

5.2 Connection to the intelligent peripheral

Five possible scenarios for mapping the SRF onto the physical plane (as an Intelligent Peripheral (IP)) are described in CCITT Recommendation Q.1218 [3]:

- IP integrated or directly attached to the SSP, which relays the operations between SCP and IP;
- IP directly attached to the SSP, the SCP-IP operations are not relayed in SSP;
- IP integrated or directly attached to another assisting SSP, which relays the operations between SCP and IP, the first SSP retains call control;
- IP directly attached to a different node to the controlling SSP, the SCP-IP operations are not relayed in SSP;
- IP integrated or directly attached to another SSP which relays the operations between SCP and IP, the control of the call being transferred to that SSP (hand-off approach).

6 Personal mobility procedures

At reception of an initial request the SCF initiates a dialogue with the user. The user may invoke one of the following mobility procedures:

- InCall registration (registration for incoming calls);
- InCall deregistration (deregistration for incoming calls);
- OutCall registration (registration for outgoing calls);
- OutCall deregistration (deregistration for outgoing calls);
- AllCall registration (combined registration for incoming and outgoing calls);
- AllCall deregistration (combined deregistration for incoming and outgoing calls).

These procedures generally include the following elementary procedures:

- access and initiation;
- identification;
- authentication.

To each mobility procedure corresponds a particular sequence of actions (sub-procedures) described by the service logic such as:

- reception of the user's feature request;
- service profile check;
- announcements and/or negotiations (e.g. for charging and accounting);
- acknowledgement (or rejection) of the request;
- registration of the request;
- updating of the database(s);
- transfer of data between databases in different networks.

To improve user comfort, a procedure may be ended by a "follow-on" elementary procedure (to avoid multiple identifications and authentications).

Any procedure can be ended by the release of the calling user:

- release initiated by the user; or

- release initiated by the network, as a protection against a user trying to misuse the UPT service.

In either case, a transfer of information between concerned databases may take place (e.g. end-of-call record transfer).

These actions include sequences of exchanges of information between functional entities SSF, SCF SRF, SDF, which depend on network configurations and on options chosen by the service provider(s) e.g.:

- numbering scheme;

- identification of the calling line;

- number of digits of the Personal Identification Number (PIN) code;

- number of allowed attempts;

- security procedures;

- charging options;

- conditions imposed by the user (list of callers, etc.);

- duration and limitation of the current registration;

- number of possible registrations (group registration);

- method of deregistration (timer, counter, on request, etc.);

- agreements between service providers (in different networks);

- etc.

In subclauses 6.1 to 6.6, diagrams are used to depict one possible scenario with the relationships and interactions between the user and the originating network, and between the various network functions that might be involved.

Dependent on network configurations, some of the SDF may not exist.

6.1 Access, identification and authentication

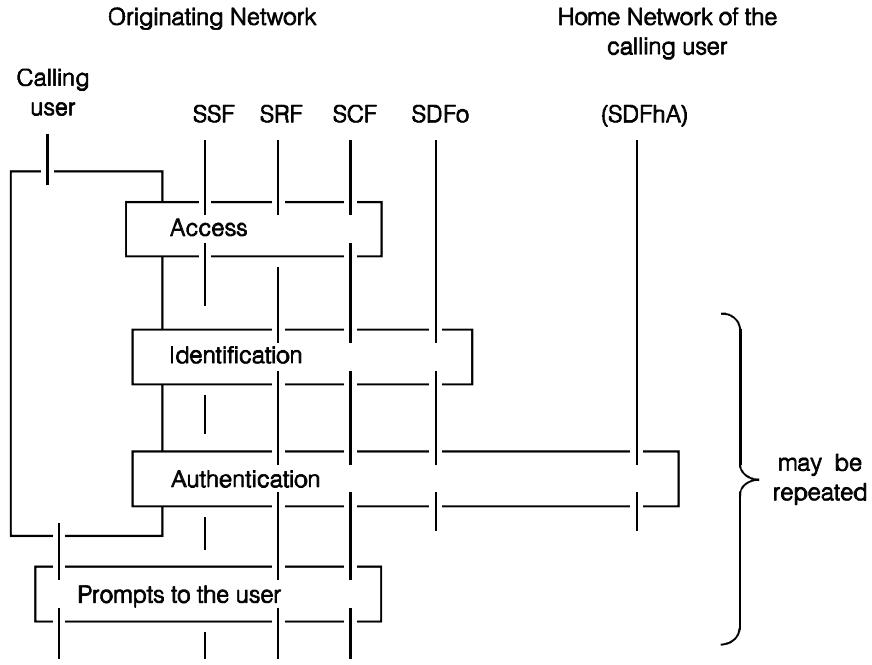


Figure 2: Access, identification and authentication

When authentication fails, a release sequence follows: the user abandons, or a forced release is initiated by the network.

6.2 Release of the calling user

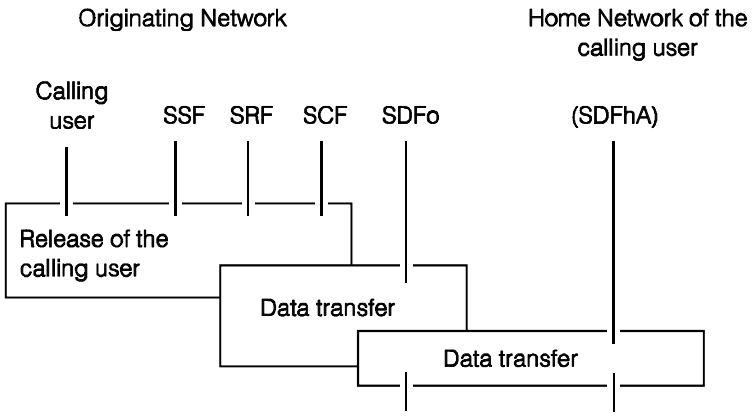
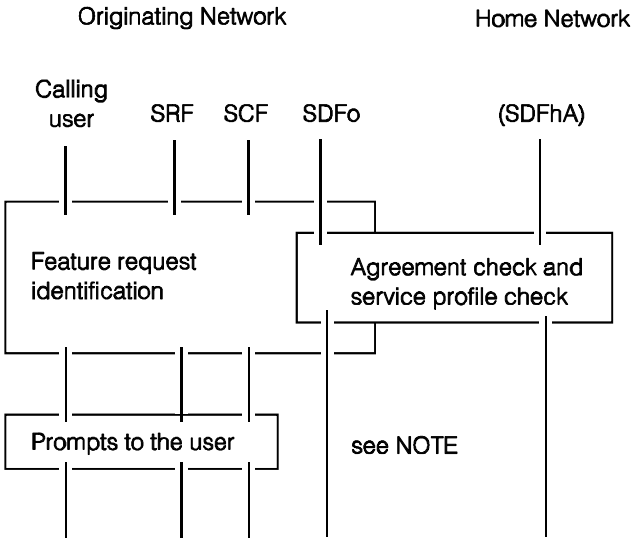


Figure 3: Release of the calling user

6.3 Feature request identification

Feature request identification takes place after a successful "access, identification and authentication".



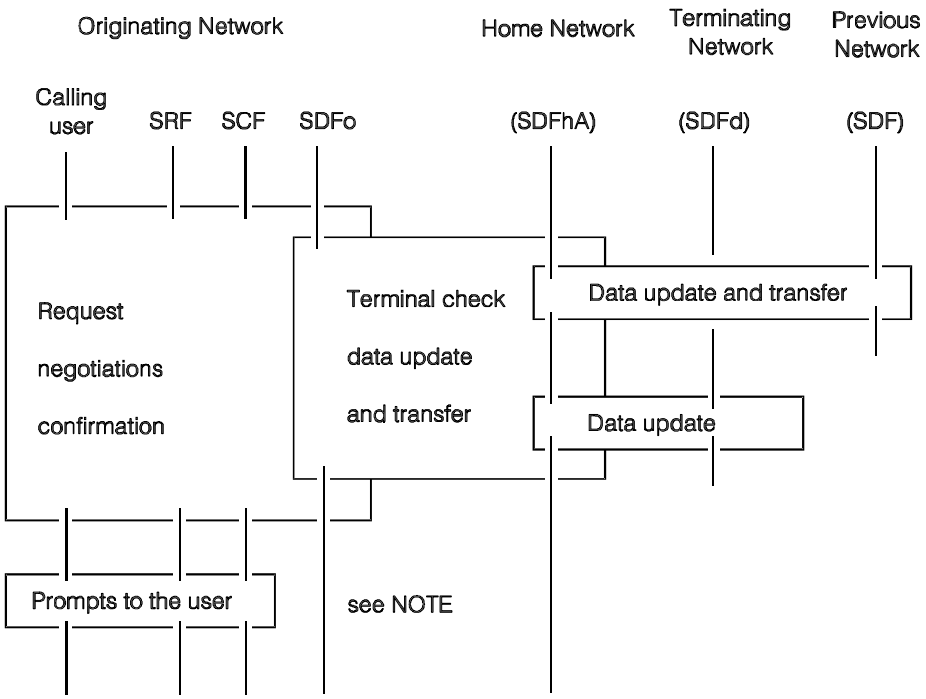
NOTE: Whether the request is successful or not, the "follow-on" procedure can be offered to the user.

Figure 4: Feature request identification

The network may also have the possibility of releasing a user misusing the UPT service.

Therefore, this sequence may be followed by a procedure, another feature request, or by the release of the calling user.

6.4 InCall registration



NOTE: Whether the request is successful or not, the "follow-on" procedure can be offered to the user.

Figure 5: InCall registration

The network may also have the possibility of releasing a user misusing the UPT service.

Therefore, this procedure may end either with a new request, or with the release of the calling user.

Negotiations may imply repetition of user input information, e.g. terminal identification.

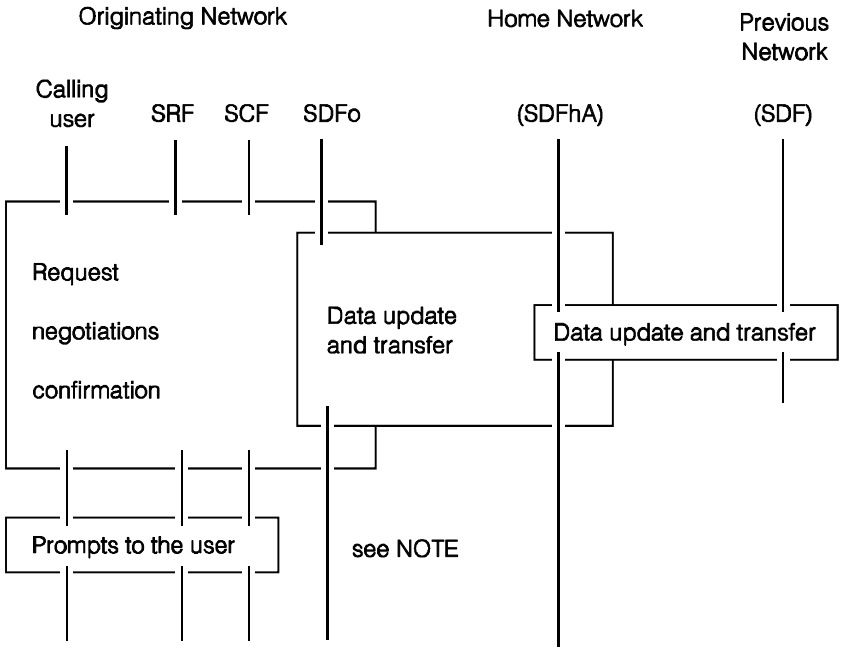
6.5 InCall deregistration

Deregistration does not involve a terminating network.

Otherwise registration and deregistration differ only in the negotiation sequence.

6.6 OutCall registration and deregistration

Registration and deregistration differ only in the negotiation sequence.



NOTE: Whether the request is successful or not, the "follow-on" procedure can be offered to the user.

Figure 6: OutCall registration and deregistration

The network may also have the possibility of releasing a user misusing the UPT service.

Therefore, this procedure may end either with an outgoing call, a new request or with the release of the calling user.

Negotiations may imply repetition of user input information.

6.7 AllCall registration and deregistration

Relationships are identical to those described in InCall registration and deregistration (see subclauses 6.4 and 6.5).

7 UPT call handling procedures

7.1 General

UPT call handling procedures, according to service providers, start with successful "access, identification and authentication".

In the following subclauses, the user is assumed to have already registered with the appropriate registration elementary procedure, as described in Clause 6.

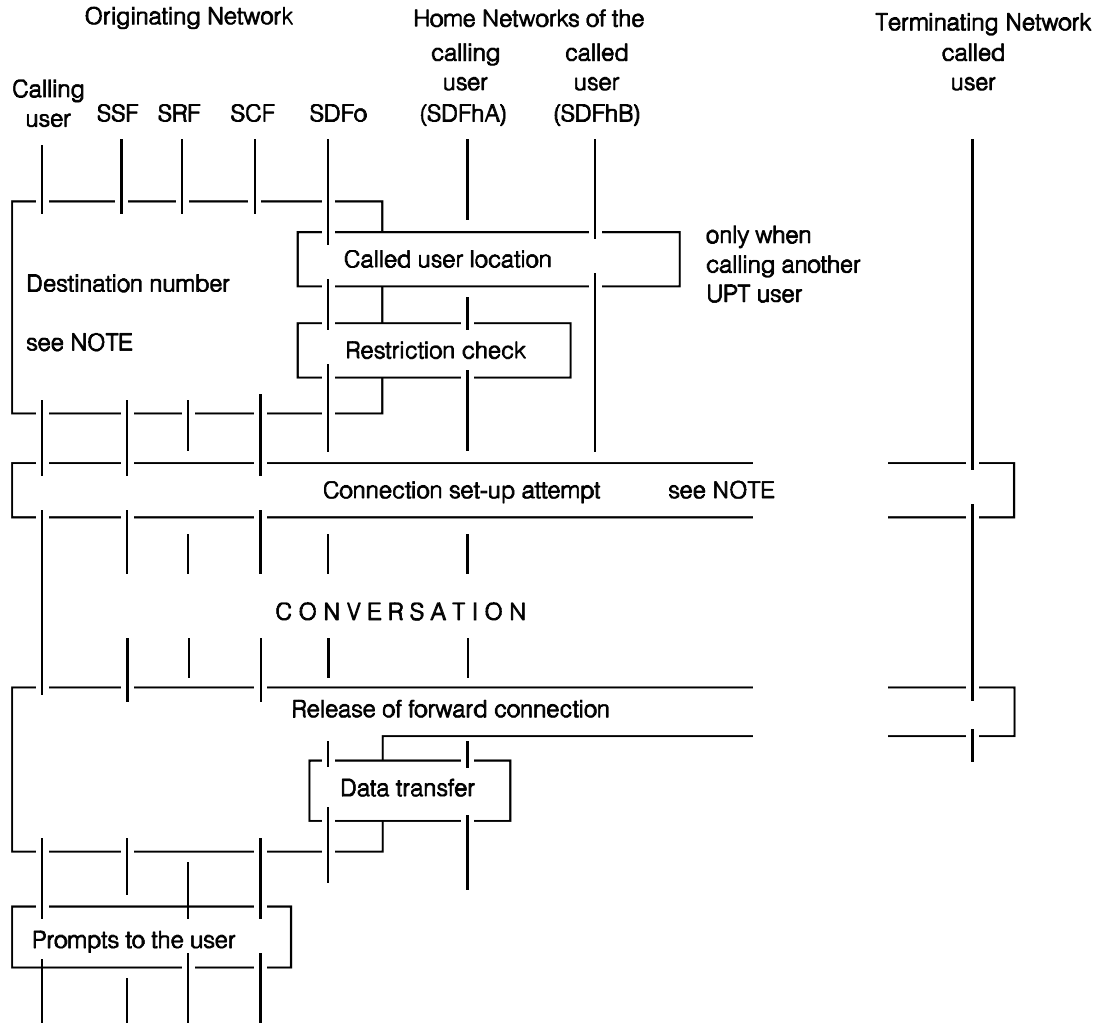
Therefore, the results of agreement checks between network providers and the user's service profile are assumed to be stored in the originating network.

7.2 Outgoing UPT call set-up

An outgoing UPT call procedure may include the following actions:

- personal mobility (see Clause 6);
- outgoing call:
  - the UPT user dials the destination number at the network's request;
  - the network acknowledges or refuses the user's request;
  - the network prompts charging announcements and negotiations possibilities;
  - the network makes a query to the home database of the called user (call to another roaming user, e.g. UPT);
  - the network processes the request and sets up the call;
  - the network charges during the call and indicates the actual charge to the user;
- call release:
  - at the end of the call, a charging record is stored (with calling UPT number, called user number, user locations, etc.);
  - release of the forward connection;
  - charging data (record) is transferred to the home database;
  - the network offers the "follow-on" procedure to the user.

In figure 7, it is assumed that the calling user has already registered for outgoing calls and gone through the identification and authentication procedures.



NOTE: When the request is rejected, the "follow-on" procedure is offered to the user.

Figure 7: Outgoing UPT call set-up

After the call (successful or not), the calling user is also given the opportunity to make another outgoing call (OutCall series) or to make another request (follow-on).

7.3 Incoming UPT call

An incoming UPT call procedure comprises 3 phases:

- alerting for incoming call which includes the following actions:
  - a dialled number is recognised as being a UPT number;
  - the UPT number is used as a basis to determine the location of the UPT user;
  - if necessary, a query is made to the called user's home network;
  - the call is set up to the registered terminal/network access;
  - the call is answered at the terminal;
  - an announcement "incoming call to UPT user" is given;

- answering of incoming call which includes the following actions:
  - identification and authentication of the UPT user;
  - charging advice with negotiations may take place;
  - the call is accepted by the UPT user;
  - the call is through-connected;
  - the call is charged;
- call release:
  - at the end of the call a charging record is stored (with called UPT number, user locations, etc.);
  - release of the backward connection;
  - transfer of charging data (record) when necessary;
  - the "follow-on" procedure is offered to the user.

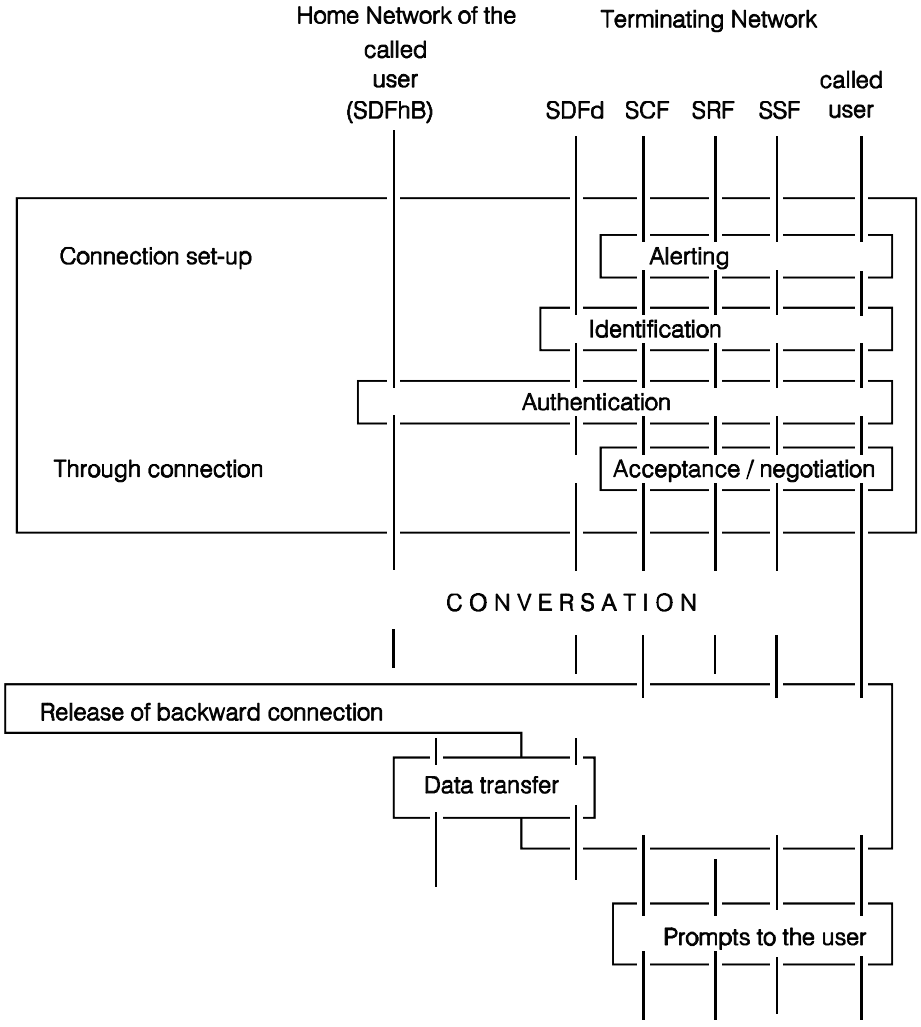


Figure 8: Incoming UPT call

8 UPT service profile management procedures

8.1 General

All service profile management procedures include mandatorily successful "identification and authentication" and "feature request identification" as described in Clause 6.

Therefore, the result of agreement check between network providers and the user's service profile are assumed to be available in the originating network.

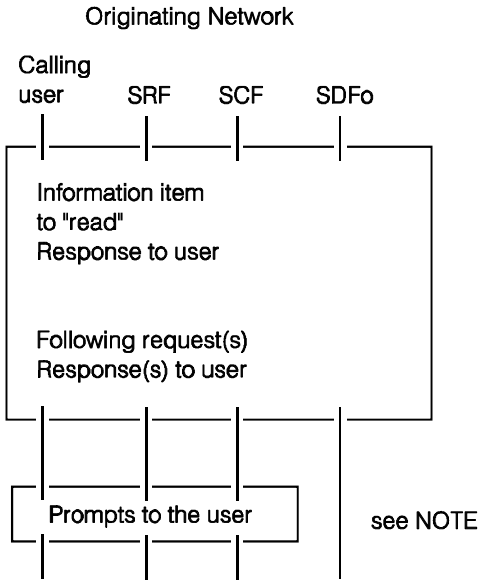
8.2 Profile interrogation

- The UPT user indicates, as an option, which type of information he/she requires (e.g. default parameters, current registrations for incoming or outgoing calls);

- the network responds with the wanted information item;

- the network offers the "follow-on" procedure.

The procedure may include several user requests, all guided by prompts.



NOTE: After the request (accepted or not), the "follow-on" procedure can be offered to the user.

Figure 9: Profile interrogation

The network may also have the possibility of releasing a user misusing the UPT service.

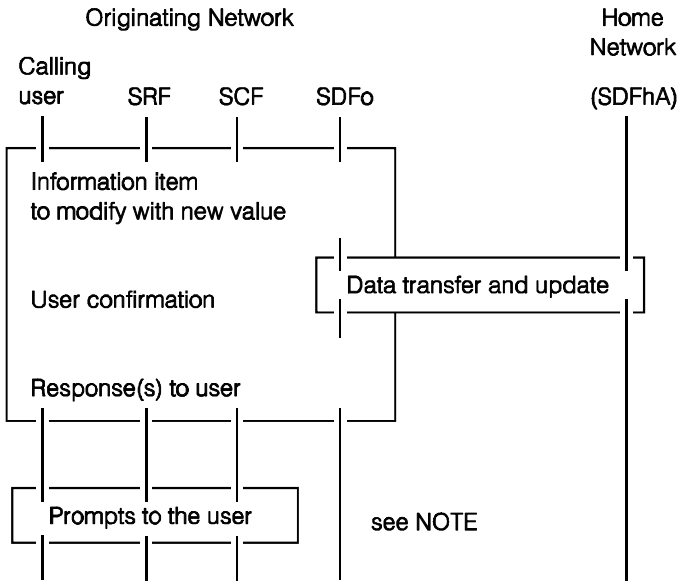
Therefore, this sequence may be followed by another feature request (e.g. a profile modification procedure), or by the release of the calling user.

8.3 Profile modification

This procedure takes place after a successful "feature request identification" and includes a profile interrogation:

- the UPT user indicates, as an option, which type of information he/she wants to modify (e.g. activation or deactivation of supplementary services change of default parameters);
- the user inputs the new value to be stored;
- the network requires confirmation from the user and performs necessary service checks;
- the network indicates to the UPT user if the modification is accepted/registered or rejected;
- the network offers the "follow-on" procedure.

The procedure may include several user requests, all guided by prompts.



NOTE: After the request (accepted or not), the "follow-on" procedure can be offered to the user.

Figure 10: Profile modification

The network may also have the possibility of releasing a user misusing the UPT service.

Therefore, this sequence may be repeated, or followed by another feature request, or by the release of the calling user.

9 Exceptional procedures

9.1 General

Exceptional procedures may be performed by third parties (e.g. subscribers of terminal access), therefore, they do not require identification and authentication.

They include:

- reset of InCall registrations;
- blocking of InCall registrations;
- deblocking of InCall registrations;
- blocking of incoming UPT calls;
- deblocking of incoming UPT calls;
- reset of OutCall registration - suspension of OutCall registration.

History

Document history	
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