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Recommendation I.255

COMMUNITY OF INTEREST SUPPLEMENTARY SERVICES

(Melbourne, 1988)

The purpose of this Recommendation is to provide the stage 1 description of the method defined in Recommendation I.130 using the means given in Recommendation I.210.

Supplementary services are described by a prose definition and description (step 1.1) and by a dynamic description (step 1.3). The application of the attribute technique (ste 1.2), as defined in Recommendation I.140, for supplementary services is for further study.

This Recommendation describes the following Community of Interest supplementary services:

1.255.1 Closed User Group (CUG)

1.255.2 Private Numbering Plan (PNP) (Note)

Note — This service having been identified, now requires further study; its description is not yet included.

1 I.255.1 — **Closed User Group**

1.1 *Definition*

The supplementary service Closed User Group (CUG) enables users to form groups, to and from which access is restricted. A specific user may be a member of one or more CUGs. Members of a specific CUG can communicate among themselves but not, in general, with users outside the group. Specific CUG members can have additional capabilities that allow them to originate calls outside the group, andB/For to receive calls from outside the group. Specific CUG members can have additional restrictions that prevent them from originating calls to other members of the CUG, or from receiving calls from other members of the CUG.

Note — When defining the ISDN networking service, its relationship with CUG needs to be studied.

1.2 *Description*

1.2.1 *General description*

A CUG is a group of users who may be members of one or several public networks; each ISDN member of a CUG is identified by an ISDN number.

A CUG may be defined independently of any basic service, or in relation with one, or a number of basic services.

Note — In the case of ISPBXs some Administrations will accept ISPBX extensions as CUG members. Other Administrations will consider the whole ISPBX as a CUG member. In the former case, it is possible for an ISPBX to establish relations between subsets of its users and public CUGs, but this is not perceived at the user-network interface.

1.2.1.1 *Access arrangements*

A user may be a member of several CUGs. Each service provider may define the maximum number of CUGs which can be allocated to an individual subscriber. When subscribed to at least one CUG, a user may subscribe to one of the following access arrangements (*Note* — This information is held by the provider of the service):

- Closed User Group (c);
- Closed User Group with incoming access (c+i);
- Closed User Group with outgoing access (c+o);
- Closed User Group with incoming and outgoing access (c+i+o).

A user may subscribe to one of two additional access restrictions within each particular CUG:

— incoming calls barred within a CUG (icb);

— outgoing calls barred within a CUG (ocb).

All of these cases are illustrated in Figure 1/I.255.

1.2.1.1.1 *CUG only capabilities*

The user may make calls to, and receive calls from, members of those CUGs of which the user is a member (see case 1 in Figure 1/I.255).

An exception to this is when either incoming calls barred within the CUG or outgoing calls barred within the CUG applies.

a) *Incoming calls barred within the CUG:* this access restriction means that a CUG-user is prohibited from receiving calls from users subscribed to the same CUG. This access restriction is given per CUG-user and CUG (see case 2 in Figure 2/I.255).

b) *Outgoing calls barred within the CUG:* this access restriction means that a CUG-user is prohibited from making calls to users subscribed to the same CUG. This access restriction is given per CUG user and CUG (see case 3 in Figure 1/I.255).

The network shall provide a preferential CUG option whereby one of the user's CUGs (or the only one if a single CUG applies) is used as a preferential CUG request, the network assumes that the preferential CUG is requested (i.e. preferential CUG is the default).

1.2.1.1.2 *CUG with outgoing access*

The user may make and receive calls in the same way, with the same exception as in § 1.2.1.1.1. In addition, this user can make calls to all other non-CUG users, and to those other CUG users who allow incoming access. Incoming calls are only allowed from members of the user's CUG(s). (See cases 4, 5, and 6 in Figure 1/I.255.)

1.2.1.1.3 *CUG with incoming access*

The user may make and receive calls in the same way, with the same exceptions as in § 1.2.1.1.1. In addition, this user may receive calls from any non-CUG user and also from other CUG users who have outgoing access. Outgoing calls are only allowed to members of the user's CUG(s). (See cases 7, 8, and 9 in Figure 1/I.255.)

1.2.1.1.4 *CUG with incoming and outgoing access*

The outgoing access and incoming access can be offered simultaneously to the user by the service provider.

1.2.1.2 *Interaction between the options ''Preferential CUG'' and ''Outgoing Access''*

Both options imply that no subscriber procedures are needed to invoke either of them when placing a call. When a user subscribes to both options, the service provider does not know which option the user is invoking, if no additional subscriber procedures are used when placing the call.

Three ways of operating are recommended:

1) The user has to indicate if a call is intended to be an outgoing access call. If no information (CUG request or Outgoing Call request) is given, the preferential CUG is assumed;

2) The combination of the options is not allowed, i.e. a user cannot have both options allocated at the same time;

3) The caller may make a call and the network will route the call with the preferential CUG and an Outgoing Access request. The call will therefore be connected if the called number is a member of the preferential CUG or is a member of a different CUG and has incoming access, or is a non-CUG user.

The choice of operation is a national option.

Figure 1/I.255, p.

1.2.2 *Specific terminology*

None.

1.2.3 *Qualifications on the applicability to telecommunication services*

None identified.

1.3 *Procedures*

1.3.1 *ProvisionB/Fwithdrawal*

The CUG service is provided on a subscription basis. As a network provider option, CUG can be offered with several subscription options. The subscriber options may apply separately to each ISDN number and basic service, or apply to a particular ISDN number for a set of basic services.

Basic service *Value*

Closed User Groups — List of one or more CUGs *Subscription option* Preferential CUG — None designated (see Note) — CUG value Type of inter-CUG access (in/out of CUG) — None — Outgoing access — Incoming access — Outgoing and incoming access

Intra-CUG restrictions — None — Incoming (terminating) calls barred — Outgoing (originating) calls barred

Note — The user must always specify a preferential CUG when the type of inter-CUG access option is set to none.

1.3.2 *Normal procedures*

1.3.2.1 *ActivationB/FdeactivationB/Fregistration*

Not required.

1.3.2.2 *Invocation and operation*

Normal call set-up procedures will apply to all CUG calls. In addition, the network shall carry out internal checks to determine whether or not the particular call is allowed between the two parties concerned.

1.3.2.2.1 *Outgoing (originating) calls*

At the time of call set-up the user specifies a CUG index to indicate that a service to a particular CUG is requested. The user, includes a request for a CUG service and the relevant CUG index in the setting up of the call. The CUG indices are allocated by prior arrangements with the service provider. Withdrawal of the CUG service, or indices will be an action of the service provider at the request of the user or due to service provider reasons.

When requesting outgoing access capability, the user makes a normal call.

If the user sets up a call without requesting the CUG service and the user has a preferential CUG, the network assumes that the preferential CUG is requested.

The choice of preferential CUG will only be alterable by service provider action.

1.3.2.2.2 *Incoming (terminating) calls*

An incoming call from another CUG member will be indicated to the called CUG user with a CUG indication and the appropriate CUG index.

An incoming call from a non-CUG user, assuming that the called CUG user has incoming access allowed, will contain no CUG related information in the call offering message.

An incoming call from a CUG user using outgoing access, to a CUG user subscribed to a different CUG but with incoming access, will contain no CUG related information in the call offering message.

1.3.3 *Exceptional procedures*

1.3.3.1 *ActivationB/FdeactivationB/Fregistration*

None identified.

1.3.3.2 *Invocation and operation*

Upon receipt of a request for CUG service the network shall check its validity in conjunction with the access capabilities contained in the user profile. If a non-valid request is received or the checks cannot be performed, then the network shall reject the call and return an appropriate indication to the calling user.

If, due to an interworking situation, signalling in the network is not able to carry the information required to provide the service, the call attempt is terminated and an appropriate cause is given to the calling user.

1.3.4 *Alternative procedures*

1.3.4.1 *ActivationB/FdeactivationB/Fregistration*

None identified.

1.3.4.2 *Invocation and operation*

None identified.

1.4 *Network capabilities for charging*

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

It shall be possible to charge the subscriber accurately for the service.

1.5 *Interworking requirements*

A CUG may span over several networks. In this case the responsibility for the management of this CUG is in one of these networks; in addition there is a need for a CUG identification mechanism that would be accepted by all of the encompassed networks. One such mechanism presently exists for CUGs spanning over data networks having X.121 as the numbering plan (see Recommendation X.180 Administrative Arrangements for International Closed User Groups). An equivalent mechanism should be defined for CUGs on networks using the E.164 numbering plan, or on networks which do not use the same numbering plan.

1.6 *Interaction with other supplementary services*

The intention of CUG is to allow some connections and prohibit others. No supplementary service interaction should be allowed which could compromise this intention.

1.6.1 *Call Waiting*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.2 *Call Transfer*

The CUG-restrictions must be met:

— between the callingB/Fcalled party and the transferring party,

— between the transferring party and the transferred-to-party,

— between the callingB/Fcalled party and the transferred-to-party.

If, and only if, all the above statements are fulfilled, the transfer of the call is allowed.

1.6.3 *Connected Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.4 *Connected Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.5 *Calling Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.6 *Calling Line Identification Restriction*

It is an option to allow invocation of CLIR in connection with a CUG call.

1.6.7 *Closed User Group*

Not applicable.

1.6.8 *Conference Calling*

All conferees must belong to the same CUG. When adding a new conferee, the CUG-restrictions must be checked before the new conferee is allowed to enter the conference.

1.6.9 *Direct Dialling-In*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.10 *Call Diversion (Call Forwarding) services*

1.6.10.1 *Call Forwarding Busy*

See Call Forwarding Busy interaction with CUG in Recommendation I.252, § 2.

1.6.10.2 *Call Forwarding No Reply*

See Call Forwarding No Reply interaction with CUG in Recommendation I.252, § 3.

1.6.10.3 *Call Forwarding Unconditional*

See Call Forwarding Unconditional interaction with CUG in Recommendation I.252, § 4.

1.6.11 *Line Hunting*

When a free line of a hunting group has been found, any CUG condition must be met before the connection will be established.

1.6.12 *Three Party Service*

See Three Party Service interaction with Closed User Group in Recommendation I.254, § 2.

1.6.13 *User-to-User Signalling*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.14 *Multiple Subscriber Number*

For further study.

1.6.15 *Call Hold*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.16 *Advice of Charge*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.7 *Dynamic description*

The dynamic description of this service is shown in Figure 2/I.255.1.

2 I.255.2 — **Private Numbering Plan**

This service, already identified, needs further study; its description is not yet included.

Figure 2/I.255 (feuillet 1 sur 4), p.

Figure 2/I.255 (feuillet 2 sur 4), p.

Figure 2/I.255 (feuillet 3 sur 4), p.

Figure 2/I.255 (feuillet 4 sur 4), p.

Recommendation I.256

CHARGING SUPPLEMENTARY SERVICES

(Melbourne, 1988)

The purpose of this Recommendation is to provide the stage 1 description of the technique defined in Recommendation I.130 using the means given in Recommendation I.210.

Supplementary services are described by a prose definition and description (step 1.1) and by a dynamic description (setp 1.3). The application of the attribute technique (step 1.2), as defined in Recommendation I.140, for supplementary services is for further study.

This Recommendation describes the following Charging supplementary services:

I.256.1 Credit Card Calling (CRED) (Note)

I.256.2 Advice of Charge (AOC)

I.256.3 Reverse Charging (REV) (Note)

1 I.256.1 — **Credit Card Calling**

This service, already identified, needs further study; its description is not yet included.

2 I.256.2 — **Advice of Charge**

Advice of Charge is a service allowing the user paying for a call to be informed of usage-based charging information. This service is not meant to replace the charge metering inside the network which is considered to be correct in all cases.

Advice of Charge may be of one or more of the following types:

— charging information at the end of the call (described in § 2.1)

— charging information during a call (described in § 2.2)

— charging information at call set-up time (described in § 2.3).

2.1 *Charging information at the end of the call*

2.1.1 *Definition*

The possibility for a user to receive charging information for a call when the call is released.

2.1.2 *Description*

2.1.2.1 *General description*

This type of Advice of Charge service provides a user with charging information for a call when the call is released. The charging information may consist of a number of elements such as:

a) type of Advice of Charge

— charging at the end of a call

b) type of charging

— free of charge

— information on charged amount

— number of charging units used

— charge used

— duration used

— volume used

— number of times used (Note)

Note — Number of times should be used, for example, to charge a certain number of invocations of a supplementary service.

— information on charging rate

— price per time unit and number of time units

— price per volume unit and number of volume units

— price per number of times unit and number of *number of times* | nits

— duration per charging unit and number of charging units

— volume per charging unit and number of charging units

— *number of times* | nits per charging unit and number of charging units

c) usage charging element

— registration

— call attempt

— invocation

— duration

— volume

— network processing

d) billing identification

— normal charging

— reverse charging

— credit card charging

The selection of these values is a national matter.

2.1.2.2 *Specific terminology*

None identified.

2.1.2.3 *Qualifications on the applicability to telecommunication services*

This supplementary service is applicable to all telecommunication services.

2.1.3 *Procedures*

2.1.3.1 *Provision/withdrawal*

Charging information at the end of a call can be provided on a subscription basis or be generally available. Withdrawal can be at subscriber request or for administrative reasons.

2.1.3.2 | fINormal procedures

2.1.3.2.1 | fIActivation/deactivation/registration

The service is activated/deactivated by the network, and no user procedures for activation/deactivation is needed. When the service is activated, it stays active for calls.

2.1.3.2.2 | fIInvocation and operation

The service may be requested on a per call basis or it may be active for all calls. The charging information is provided by the local exchange at call clearing time. The charging information is transferred to the user in the charge advice information element within a call control message clearing the call.

2.1.3.3 | fIExceptional procedures

2.1.3.3.1 | fIActivation/deactivation/registration

Not applicable.

2.1.3.3.2 | fIInvocation and operation

If the charging information related to a call is not available at call clearing, the reason should be indicated to the user.

2.1.3.4 *Alternative procedures*

None identified.

2.1.4 *Network capabilities for charging*

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

It shall be possible to charge the subscriber accurately for the service.

2.1.5 *Interworking requirements*

This service should be supported across the internetwork interface between ISDNs. Other interworking cases are left for further study.

2.1.6 *Interactions with other supplementary services*

2.1.6.1 *Call Waiting*

No impact i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.2 *Call Transfer*

Original calling user: no impact.

Transferring user: when a call is transferred and the transferring user is charged for the transferred part of the call, the charging information may be sent to the transferring user when the call is cleared, if the transferring user has subscribed to Advice of Charge supplementary service.

2.1.6.3 *Connected Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.4 *Connected Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.5 *Calling Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.6 *Calling Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.7 *Closed User Group*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.8 *Conference Calling*

When the user has made a conference call, the overall charge for the conference call may be included in the charge advice information element

Charges for the use of the conference bridge : this charging information may be sent to the conference controller. However, in some networks no charging information can be given in this case, e.g. due to off-line processing of the charges.

2.1.6.9 *Direct Dialling-In*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.10 | fICall Diversion (Call Forwarding) services

2.1.6.10.1 | fICall Forwarding Busy

Original calling user: no impact.

Forwarding user: when a call is forwarded and the forwarding user is charged for the forwarded part of the call, the charging information may be transferred to the forwarding user when the call is cleared if the forwarding user has subscribed to the Advice of Charge supplementary service.

2.1.6.10.2 | fICall Forwarding No Reply

Original calling user: no impact.

Forwarding user: when a call is forwarded and the forwarding user is charged for the forwarded part of the call, the charging information may be transferred to the forwarding user when the call is cleared, if the forwarding user has subscribed to the Advice of Charge supplementary service.

2.1.6.10.3 | fICall Forwarding Unconditional

Original calling user: no impact.

Forwarding user: when a call is forwarded and the forwarding user is charged for the forwarded part of the call, the charging information may be transferred to the forwarding user when the call is cleared, if the forwarding user has subscribed to the Advice of Charge supplementary service.

2.1.6.11 | fILine Hunting

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.12 | fIThree-Party Service

When the user has made an enquiry call or a three-party conference call, the overall charge for the call may be indicated in the charge advice information element.

Charges for the use of the three-party bridge : this charging information may be sent to the served user. However, in some networks no charging information can be given in this case, e.g. due to off-line processing of the charges.

2.1.6.13 | fIUser-to-User Signalling

No information concerning charges for user-to-user information will be given.

2.1.6.14 | fIMultiple Subscriber Number

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.15 | fICall Hold

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.1.6.16 | fIAdvice of Charge

Not applicable.

2.1.7 *Dynamic description*

The dynamic description of this type of Advice of Charge service is shown in Figure 1/I.256.

Figure 1/I.256, p.

2.2 *Charging information during a call*

2.2.1 *Definition*

The possibility for a user to receive charging information for a call during the active phase of the call.

2.2.2 *Description*

2.2.2.1 *General description*

This type of Advice of Charge provides the user with information that may be either incremental or cumulative and will be sent automatically or on request. The charging information may consist of a number of information elements such as:

a) type of Advice of Charge

— incremental charging during a call, or

— cumulative charging during a call

b) type of charging

— free of charge

— information charged amount

— number of charging units used

— charge used

— duration used

— volume used

— number of times used (Note)

Note — Number of times should be used, for example, to charge a certain number of invocations of a supplementary service.

— information charging rate

— price per time unit and number of time units

— price per volume unit and number of volume units

— price per number of times unit and number of *number of times* | units

— duration per charging unit and number of charging units

— volume per charging unit and number of charging units

— *number of times* | units per charging unit and number of charging units

c) usage charging element

— registration

— call attempt

— invocation

— duration

— volume

— network processing

d) billing identification

— normal charging

— reverse charging

— credit card charging

2.2.2.2 *Specific terminology*

Not applicable.

2.2.2.3 *Qualifications on the applicability to telecommunication services*

This supplementary service is applicable to all telecommunication services.

2.2.3 *Procedures*

2.2.3.1 *Provision/withdrawal*

Charging information during a call is provided on a subscription basis. Withdrawal can be at subscriber request or for administrative reasons.

2.2.3.2 | fINormal procedures

2.2.3.2.1 | fIActivation/deactivation/registration

The service is activated/deactivated by the network, and no user procedures for activation/deactivation is needed. When the service is activated, it stays active for all calls.

2.2.3.2.2 | fIInvocation and operation

The service may be requested on a per call basis or it may be active for all calls. The charging information is provided by the local exchange and is transferred to the user in an appropriate message each time *N* | charging units have been added. *N* | is a number between one and *N*m\da\dx | where *N* | is a number specific to the network. The number of charging information units sent to the user may be limited to *X* | units per minute. The value of *X* | is a number specific to the network. If the charging information is provided only on request, the user must send an appropriate request to the network, which will then transfer the information in the Advice of Charge information element.

When the call is released:

— the remaining number of charging units, since the last transfer of charging information, is sent to the user in one of the call control messages clearing the call (incremental); or

— the overall charge for the call is sent to the user in one of the call control messages clearing the call (cumulative).

2.2.3.3 | fIExceptional procedures

2.2.3.3.1 | fIActivation/deactivation/registration

Not applicable.

2.2.3.3.2 | fIInvocation and operation

If the charging information related to a call is not available during the call, the reason should be indicated to the user.

2.2.3.4 *Alternative procedures*

None identified.

2.2.4 *Network capabilities for charging*

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

It shall be possible to charge the subscriber accurately for the service.

2.2.5 *Interworking requirements*

This service should be supported across the internetwork interface between ISDNs. Other interworking cases are left for further study.

2.2.6 *Interactions with other supplementary services*

2.2.6.1 *Call Waiting*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.2 *Call Transfer*

Original calling user: no impact.

Transferring user: when a call is transferred and the transferring user is charged for the transferred part of the call, no charging information will be sent to the transferring user.

2.2.6.3 *Connected Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.4 *Connected Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.5 *Calling Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.6 *Calling Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.7 *Closed User Group*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.8 *Conference Calling*

Charges for the different connections to the conference bridge: no interaction.

Charges for the use of the conference bridge: this charging information may be sent to the conference controller. However, in some networks no charging information can be given in this case, e.g. due to off-line processing of the charges.

2.2.6.9 *Direct Dialling-In*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.10 | fICall Diversion (Call Forwarding) services

2.2.6.10.1 | fICall Forwarding Busy

Original calling user: no impact.

Forwarding user: when a call is forwarded and the forwarding user is charged for the forwarded part of the call, the charging information may be transferred to the forwarding user when the call is cleared, if the forwarding user has subscribed to the Advice of Charge supplementary service.

2.2.6.10.2 | fICall Forwarding No Reply

Original calling user: no impact.

Forwarding user: when a call is forwarded and the forwarding user is charged for the forwarded part of the call, the charging information may be transferred to the forwarding user when the call is cleared, if the forwarding user has subscribed to the Advice of Charge supplementary service.

2.2.6.10.3 | fICall Forwarding Unconditional

Original calling user: no impact.

Forwarding user: when a call is forwarded and the forwarding user is charged for the forwarded part of the call, the charging information may be transferred to the forwarding user when the call is cleared, if the forwarding user has subscribed to the Advice of Charge supplementary service.

2.2.6.11 | fILine Hunting

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.12 | fIThree-Party Service

Charges for the different connections within the service: no interaction.

Charges for the use of the three-party bridge: this charging information may be sent to the served user. However, in some networks no charging information can be given in this case, e.g. due to off-line processing of the charges.

2.2.6.13 | fIUser-to-User Signalling

No information concerning charges for user-to-user information will be given.

2.2.6.14 *Multiple Subscriber Number*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.15 *Call Hold*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.2.6.16 *Advice of Charge*

Not applicable.

2.2.7 *Dynamic description*

The dynamic description of this service is shown in Figure 2/I.256 to 6/I.256.

Figure 2/I.256, p.

Figure 3/I.256, p.

Figure 4/I.256, p.

Figure 5/I.256, p.

Figure 6/I.256, p.

2.3 *Charging information at call set-up time*

2.3.1 *Definition*

The possibility for a user to receive information about the charging rates at call set-up time and possible change of charging rates during the call.

2.3.2 *Description*

2.3.2.1 *General description*

This type of Advice of Charge provides the user with the possibility to receive information about the charging rates at call establishment. In addition the user will be informed if a change in charging rates takes place during the call. The charging information may consist of a number of elements such as:

a) type of Advice of Charge

— charging rate information

b) type of charging

— free of charge

— information on charging rate

— price per time unit and number of time units

— price per volume unit and number of volume units

— price per number of times unit and number of *number of times* | units

— duration per charging unit and number of charging units

— volume per charging unit and number of charging units

— *number of times* | units per charging unit and number of charging units

c) usage charging element

— registration

— call attempt

— invocation

— duration

— volume

— network processing

d) billing identification

— normal charging

— reverse charging

— credit card charging

2.3.2.2 *Specific terminology*

Not applicable.

2.3.2.3 *Qualifications on the applicability to telecommunication services*

This supplementary service is applicable to all telecommunication services.

2.3.3 *Procedures*

2.3.3.1 *Provision/withdrawal*

The possibility to receive information about the charging rates is provided on a subscription basis or may be generally available.

2.3.3.2 | fINormal procedures

2.3.3.2.1 | fIActivation/deactivation/registration

The service is activated by the network, and no user procedures for activation/deactivation is needed. When the service is activated, it stays active for all calls.

2.3.3.2.2 | fIInvocation and operation

The service may be requested on a per call basis or it may be active for all calls. The charging information is provided by the network during the call establishment phase or, at the latest, at call connection. The information is transferred to the user in the charge advice information element in the call control message.

When there is a change in the charging interval during the call, the network sends information about the new charging interval. This information is sent in the Advice of Charge information element.

2.3.3.3 | fIExceptional procedures

2.3.3.3.1 | fIActivation/deactivation/registration

Not applicable.

2.3.3.3.2 | fIInvocation and operation

If the charging information related to a call is not available, the reason should be indicated to the user.

2.3.3.4 *Alternative procedures*

None identified.

2.3.4 *Network capabilities for charging*

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

It shall be possible to charge the subscriber accurately for the service.

2.3.5 *Interworking requirements*

This service should be supported across the internetwork interface between ISDNs.

2.3.6 *Interaction with other supplementary services*

2.3.6.1 *Call Waiting*

No impact i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.2 *Call Transfer*

Original calling user: no impact.

Transferring user: charging information may be sent to the transferring user at the time he establishes the call to the transferred-to party and when the resulting call is established. This is to inform the transferring user of the charges he will continue to be responsible for.

2.3.6.3 *Connected Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.4 *Connected Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.5 *Calling Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.6 *Calling Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.7 *Closed User Group*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.8 *Conference Calling*

The user should be informed about the charging rate for each leg of the conference call.

Charges for the user of the conference bridge: this charging information may be sent to the conference controller. However, in some networks no charging information can be given in this case.

2.3.6.9 *Direct Dialling-In*

No impact i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.10 | fICall Diversion (Call Forwarding) services

2.3.6.10.1 | fICall Forwarding Busy

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.10.2 | fICall Forwarding No Reply

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.10.3 | fICall Forwarding Unconditional

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.11 | fILine Hunting

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.12 | fIThree-Party Service

The user should be informed about the charging rate for each leg of the call.

Charges for the use of the three-party bridge: this charging information may be sent to the conference controller. However, in some networks no charging information can be given in this case.

2.3.6.13 | fIUser-to-User Signalling

No information concerning charges for user-to-user information will be given.

2.3.6.14 | fIMultiple Subscriber Number

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.15 | fICall Hold

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

2.3.6.16 | fIAdvice of Charge

Not applicable.

2.3.7 *Dynamic description*

The dynamic description of this type of Advice of Charge is shown in Figures 7/I.256 and 8/I.256.

3 I.256.3 — **Reverse charging**

This service, already identified, needs further study; its description is not yet included.

Figure 7/I.256, p.

Figure 8/I.256, p.

Recommendation I.257

ADDITIONAL INFORMATION TRANSFER

(Melbourne, 1988)

The purpose of this Recommendation is to provide the stage 1 description of the method defined in Recommendation I.130 using the means given in Recommendation I.210.

Supplementary services are described by a prose definition and description (step 1.1) and by a dynamic description (step 1.3). The application of the attribute technique (step 1.2), as defined in Recommendation I.140, for supplementary technique is for further study.

This Recommendation describes the following additional information transfer supplementary service.

1 I.257.1 — **User-to-User Signalling (UUS)**

1.1 *Definition*

The User-to-User Signalling (UUS) supplementary service allows an ISDN user to send/receive a limited amount of information to/from another ISDN user over the signalling channel in association with a call to the other ISDN user.

Note — These procedures are applicable to User-to-User Information (UUI) transfer in association with a circuit-switched telecommunication service only. Procedures to permit UUI transfer in association with other types of calls (e.g. packet bearer services) need to be investigated.

1.2 *Description*

1.2.1 *General description*

User-to-User Signalling (UUS) allows the user to send/receive a limited amount of user generated information to/from another user-network interface. This information is passed transparently (i.e. without modification of contents) through the network. Normally, the network will not interpret or act upon this information.

Services 1, 2, and 3 allow the transmission of 128 octets per message as a maximum.

Note — During an interim period of time, some networks may support 32 octets on one or more of the services. After this period, 32 octets will always be supported. Restrictions may apply to calls requesting UUI of more than 32 octets. Limitations are also placed on the amount of information a user is permitted to transfer in a given time period (e.g. limitations can be placed on the number of messages transmitted or on the throughput).

The user can transfer UUI in different phases of the call depending on the service(s) to which the user subscribes. These are:

— *Service 1* : | the transfer of UUI during the set-up and clearing phases of a call, with UUI embedded within call control messages;

— *Service 2* : | the transfer of UUI during the set-up phase of call, transferred independently of call control messages. From the sender's point of view UUI is sent prior to the active phase of the call (i.e. prior to the acceptance of the call at the distant exchange). This same UUI may, as a service provider option, be received by the terminating exchange and delivered to the user during the active phase of the call;

— *Service 3* : | the transfer of UUI during the active phase of a call, transferred independently of call control messages.

In a point-to-multipoint arrangement at the called party the following Service 1 UUI transfer is allowed:

— in the forward direction: UUI will only be accepted if it is contained in either the initial set-up or the first clearing message. In the case of premature clearing, UUI will be delivered to terminals which have at this point in time already acknowledged the call;

— in the backward direction: UUI will only be accepted by the network at the called interface from a terminal which is selected (see Note). This means that a terminal in a multipoint configuration at the called interface is not allowed to send UUI Service 1 information with the alerting indication to the calling party;

— if the call never reaches the active phase (e.g. in case of call rejection), and if multiple responses are received, only one UUI which was sent from the called party will be transferred to the calling party.

Note — A selected terminal is the terminal behind the called interface that the service provider considers or elects as the terminal to be in the active phase of a call.

Preferably, UUS Service 2 should be used in point-to-point configurations. In a multipoint configuration, Service 2 may, from a user's perspective, lead to an incorrect view of the service.

1.2.2 *Specific terminology*

None identified.

1.2.3 *Qualification on the applicability to telecommunication services*

Restrictions can only be identified for telecommunication services which are based on the X.31 packet mode bearer services and their future enhancement.

1.3 *Procedures*

1.3.1 *Provision/withdrawal*

Services 1, 2 and 3 must be subscribed to by the calling user to whom billing will apply. Whether these component services are offered to the user as separate supplementary services or in any particular combination is a service provider option.

1.3.2 *Normal procedures*

1.3.2.1 *Activation/deactivation/registration*

UUS Services 1 and 2, must be requested by the calling user a the set-up of the call if UUI transfer is desired in either direction. Service 3 may be requested by the calling or, as a service provider option, by the called user at call set-up or during the set-up or active state of the call.

Note — Depending on the network connection selected at call set-up, the request for Service 3 during the set-up or active phase of the call may fail.

Once a UUS service is activated (see Note), the network will accept UUI in both directions according to the subscription of the calling user.

Note — Activation means request of UUS. Invocation means submission of UUI.

Services 2 and 3 must be explicitly requested. Service 1 may be explicitly or implicitly requested. The service is implicitly requested when UUI is included in the call request (i.e. the service is requested at the same time it is invoked).

On a per call basis the calling user should be able to specify the desired UUS service(s) according to the service options offered by the service provider.

As an option, at call set-up, users whould be able to specify whether the requested UUS service is required for the call, i.e. if the call should be completed or not if UUI cannot be passed. If the UUI-required indication is given by the user, the call will not be completed if UUI cannot be passed to the destination user. If the UUI-required indication is not given by the user, the call will be completed even if UUI cannot be passed. If UUS Service 3 is requested during the call it cannot be requested as ‘UUI required’.

For Services 2 and 3 the network will confirm the UUS service request. This confirmation is preceeded by an end-to-end check by the network for service availability.

For Services 2 and 3 the network should interrogate the destination user concerning service availability. No response from the destination user is taken as a rejection of the UUS request by the network. The network should explicitly indicate to the origination user whether the requested service(s) has been (are) successfully activated or not. In the case of unsuccessful activation, the network should indicate whether or not the condition is due to unavailability of the destination user (see § 1.3.3).

Note — The terms ‘‘originating’’ and ‘‘destination’’ refer to the origination or destination of the UUS request.

When Service 1 is explicitly requested, the network will inform the destination user of the request. The destination user should accept or reject the activation as described for Services 2 and 3.

1.3.2.2 *Invocation and operation*

A user wishing to send UUI will be informed by the network as part of normal call establishment if there is not sufficient signalling connectivity to allow the transfer of UUI. Confirmation of delivery is not provided by the network. The network does not expect any confirmation of UUI acceptance from the destination.

1.3.2.2.1 | fIService 1

If authorized, an ISDN user may transfer a limited amount of user-generated information when initiating, accepting, rejecting, or clearing a call.

It is possible for a calling user to request UUI transfer with a call set-up and to terminate the call before a connection is established.

1.3.2.2.2 | fIService 2

Any time after the explicit confirmation of the UUS service request is received from the network, an ISDN user may transfer a limited amount of user-generated information (two messages in each direction) to the other user involved in the call.

1.3.2.2.3 | fIService 3

If explicit confirmation of the USS service request has been received from the network, an ISDN user may, during the active phase of a call, transfer a limited amount of user-generated information to the other user on the call.

1.3.3 *Exceptional procedures*

1.3.3.1 *Activation/deactivation/registration*

If the network cannot accept a request for UUI transfer, notification with cause will be returned to the served user. Possible reasons for rejection are:

1) service not subscribed to;

2) calling or called user is not an ISDN user;

3) protocol error;

4) necessary inter-office signalling connectivity does not exist between sending and receiving users;

5) user constraints prohibit activation/invocation of service between calling and called users (e.g. CUG);

6) network congestion.

Note — If UUI contained in a set-up message cannot be transferred for reasons 2) or 5) notification will not be provided until after the network has received a response to the set-up message, since the network does not know *a priori* | whether UUI can be transferred or not.

When the invocation of Services 2 or 3 is not understood by the service provider or by the called user, no explicit rejection is sent to the calling user. This lack of acknowledgement must be interpreted as a rejection.

1.3.3.2 *Invocation and operation*

The user may not be able to interpret incoming UUI. In such a situation, the user should discard this information without disrupting normal call handling. No specific signalling is provided by the network to accommodate this situation.

UUI sent near or at the end of a call may not reach its destination, e.g. if the called party initiates disconnection procedures prior to the arrival of the UUI. At all other times, however, the network offers high probability that messages will be delivered correctly.

Under circumstances of network congestion or failure, the network may discard Service 2 and Service 3 UUI. Users desiring to have confirmed UUI delivery must employ their own end-to-end protocols (i.e. acknowledgement of receipt by another UUI).

In case of excessive UUI length, no truncation is performed by the service provider. UUI information is discarded and the user will be informed.

1.3.4 *Alternative procedures*

1.3.4.1 *Activation/deactivation/registration*

None identified.

1.3.4.2 *Invocation and operation*

None identified.

1.4 *Network capabilities for charging*

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

It shall be possible to charge the subscriber accurately for the service.

1.5 *Interworking requirements*

UUI can be delivered only when both users are ISDN subscribers or when a non-ISDN network provides a means of conveying the UUI.

1.6 *Interaction with other supplementary services*

1.6.1 *Call Waiting*

Calling user: any UUI included in the call set-up message will be delivered with the call waiting indication. UUI can be sent by the calling user to the called user during the call alerting period.

Called user: if a Call Waiting user also uses UUI, he can include UUI with the rejection of the call. UUI can be sent by the called user to the calling user during the call alerting period.

Note — See § 1.2 for restrictions on point-to-multipoint arrangements.

1.6.2 *Call Transfer*

See Call Transfer interaction with User-to-User Signalling in Rec. I.252, § 1.

1.6.3 *Connected Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.4 *Connected Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.5 *Calling Line Identification Presentation*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.6 *Calling Line Identification Restriction*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.7 *Closed User Group*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.8 *Conference Calling*

See Conference Calling interaction with User-to-User Signalling, Rec. I.254, § 1.

1.6.9 *Direct Dialling-In*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.10 | fICall Diversion (Call Forwarding) services

1.6.10.1 | fICall Forwarding Busy

See Call Forwarding Busy interaction with User-to-User Signalling, Rec. I.252, § 2.

1.6.10.2 | fICall Forwarding No Reply

See Call Forwarding No Reply interaction with User-to-User Signalling, Rec. I.252, § 3.

1.6.10.3 | fICall Forwarding Unconditional

See Call Forwarding Unconditional interaction with User-to-User Signalling, Rec. I.252, § 4.

1.6.11 *Line Hunting*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.12 *Three-Party service*

See Three-Party service interaction with UUS, Rec. I.254, § 2.

1.6.13 *User-to-User Signalling*

Not applicable.

1.6.14 *Multiple Subscriber Number*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

1.6.15 *Call Hold*

See Call Hold interaction with User-to-User Signalling, Rec. I.253, § 2.

1.6.16 *Advice of Charge*

See Advice of Charge interaction with User-to-User Signalling, Rec. I.256, § 2.

1.7 *Dynamic description*

The dynamic description of this service is shown in Figure 1/I.257.

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Figure 1/I.257 (Sheet 1 of 3), p.

Figure 1/I.257 (Sheet 2 of 3), p.

Figure 1/I.257 (Sheet 3 of 3), p.