
**Information technology —
Telecommunications and information
exchange between systems — Private
Integrated Services Network —
Specification, functional model and
information flows — Call offer
supplementary service**

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Réseau privé à intégration de services —
Spécification, modèle fonctionnel et débit d'information — Service
supplémentaire d'offre d'appel*



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

International Standard ISO/IEC 14841 was prepared by ECMA (as Standard ECMA-191) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Introduction

This International Standard is one of a series of International Standards defining services and signalling protocols applicable to Private Integrated Services Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards for Open Systems Interconnection as defined by ISO/IEC.

This particular International Standard specifies the Call Offer supplementary service.

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Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call offer supplementary service

1 Scope

This International Standard specifies the Call Offer supplementary service (SS-CO), which is applicable to various basic services supported by Private Integrated Services Networks (PISN). Basic services are specified in ISO/IEC 11574.

Call Offer (SS-CO) is a supplementary service which, on request from the calling user (or on that user's behalf), enables a call to be offered to a busy called user and to wait for that called user to accept this call.

Supplementary service specifications are produced in three stages, according to the method described in CCITT Recommendation I.130. This International Standard contains the stage 1 and stage 2 specifications of SS-CO. The stage 1 specification (clause 6) specifies the supplementary service as seen by users of PISNs. The stage 2 specification (clause 7) identifies the functional entities involved in the supplementary service and the information flows between them.

Note 1 - For this International Standard, stage 2 does not consider the split of functionality between a functional terminal and the local PINX. Terminal functions and local PINX functions are included in the same functional entity.

2 Conformance

In order to conform to this International Standard, a stage 3 International Standard shall specify signalling protocols and equipment behaviour that are capable of being used in a PISN which supports the supplementary service specified in this International Standard. This means that, to claim conformance, a Stage 3 International Standard is required to be adequate for the support of those aspects of clause 6 (stage 1) and clause 7 (stage 2) which are relevant to the interface or equipment to which the Stage 3 International Standard applies.

3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

- | | |
|-----------------------|--|
| ISO/IEC 11574:1994, | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows.</i> |
| ISO/IEC 11579-1:1994, | <i>Information technology - Telecommunications and information exchange between systems - Private integrated services network - Part 1: Reference configuration for PISN Exchanges (PINX).</i> |
| ISO/IEC 13864:1995, | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Name identification supplementary services.</i> |
| ISO/IEC 13865:1995, | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call transfer supplementary service.</i> |
| ISO/IEC 13866:1995, | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call completion supplementary services.</i> |
| ISO/IEC 13872:1995, | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call diversion supplementary services.</i> |

- ISO/IEC 14136:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Identification supplementary services.*
- ISO/IEC 14842:1996, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Do not disturb and do not disturb override supplementary services.*
- CCITT Rec. I.112:1988, *Vocabulary of terms for ISDNs (Blue Book).*
- CCITT Rec. I.210:1988, *Principles of telecommunication services supported by an ISDN and the means to describe them (Blue Book).*
- CCITT Rec. I.221:1988, *Common specific characteristics of services, Definition of par. 3 "busy" in an ISDN (Blue Book).*
- CCITT Rec. Z.100:1988, *Specification and Description Language (Blue Book).*

4 Definitions

For the purposes of this International Standard, the following definitions apply.

4.1 External definitions

This International Standard uses the following terms defined in other documents:

- Basic service (CCITT Rec. I.210)
- Connection (CCITT Rec. I.112)
- Network Determined User Busy (CCITT Rec. I.221)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated Services Network Exchange (PINX) (ISO/IEC 11579-1)
- Service (CCITT Rec. I.112)
- Signalling (CCITT Rec. I.112)
- Supplementary Service (CCITT Rec. I.210)
- User (ISO/IEC 11574)
- User Determined User Busy (CCITT Rec. I.221)

This International Standard refers to the following basic call functional entity (FEs) defined in ISO/IEC 11574:

- Call Control (CC)
- Call Control Agent (CCA)

This International Standard refers to the following basic call inter-FE relationships defined in ISO/IEC 11574:

- r1
- r2
- r3

This International Standard refers to the following basic call information flows defined in ISO/IEC 11574:

- Release request/indication
- Release response/confirmation
- Report request/indication
- Setup request/indication
- Setup response/confirmation.

4.2 Other definitions

additional network feature : A capability, over and above that of a basic service, provided by a PISN, but not directly to a PISN user.

automatic call offer invocation timer : A timer governing the time after which SS-CO is automatically invoked after the calling user has been informed that a call has failed because of busy at the destination. The duration of the timer is an implementation option.

busy : A property of a user for whom either a Network Determined User Busy or User Determined User Busy condition exists.

call, basic call : An instance of the use of a basic service.

consultation timer : A timer governing the time in which the calling user is allowed to request invocation of SS-CO after being informed that a call has failed because of busy at the destination. The duration of the timer is an implementation option.

offered call : A call that is in a waiting condition as a result of invocation of SS-CO against a busy called user.

path retention : The retaining of the network connection between the Originating CC and the Destination CC so that a supplementary service (such as SS-CO) can be invoked without establishing a new connection.

5 List of acronyms

ANF	Additional Network Feature
CC	Call Control (functional entity)
CCA	Call Control Agent (functional entity)
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CD	Call Deflection
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling/Connected Line Identification Restriction
CNIP	Calling Name Identification Presentation
CNIR	Calling/Connected Name Identification Restriction
CO	Call Offer
COLP	Connected Line Identification Presentation
CONP	Connected Name Identification Presentation
CT	Call Transfer
DND	Do Not Disturb
DNDO	Do Not Disturb Override
FE	Functional Entity
ISDN	Integrated Services Digital Network
PR	Path Replacement
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network

SDL Specification and Description Language

SS Supplementary Service

TE Terminal Equipment

6 SS-CO stage 1 specification

6.1 Description

6.1.1 General description

SS-CO is a supplementary service which, on request from the calling user (or on that user's behalf), enables a call to be offered to a busy called user and to wait for that called user to accept the call, after the necessary resources have become available.

The busy called user is given an indication of the offered call. During the time that the call is offered, the called user may ignore the offered call or may attempt to make the necessary resources available (e.g. by releasing or placing on hold another call). When and if the necessary resources become available, the call shall be completed as a normal incoming call.

6.1.2 Qualifications on applicability to telecommunication services

SS-CO is applicable to all basic services defined in ISO/IEC 11574.

6.2 Procedures

6.2.1 Provision/withdrawal

SS-CO may be provided or withdrawn after pre-arrangement with the service provider (by means of service profile control), or may be available generally to all users. In a PISN that offers more than one way of invoking SS-CO (see 6.2.2.2), one or more of these ways shall be selected at provision time.

6.2.2 Normal procedures

6.2.2.1 Activation/deactivation/registration/interrogation

Not applicable.

6.2.2.2 Invocation and operation

There are four different ways of invoking SS-CO. A PISN shall offer one or more of these ways. These ways are:

1. Network invocation (immediate): the PISN shall automatically invoke SS-CO whenever the calling user makes a call to a user that is busy, if required by the service profile of the calling user.
2. Consultation: the calling user, on being informed that a call has failed because of busy at the destination and that SS-CO may be possible, shall be able, within a defined time period (consultation timer) to request invocation of SS-CO.
3. Immediate invocation: the calling user shall be able to request invocation of SS-CO as part of the initial call set up.
4. Network invocation (delayed): the network, having informed the calling user that a call has failed because of busy at the destination, shall automatically invoke SS-CO unless the calling user initiates call clearing within a defined time period (automatic call offer invocation timer).

Note 2 - If method 1 is provided to a user, methods 2, 3 and 4 will not be available to that user.

For consultation and network invocation (delayed), for those basic services for which ISO/IEC 11574 requires an in-band tone or announcement to indicate progress or otherwise of the call, the information provided by the network that the call has failed because of busy at the destination shall include an in-band tone or announcement.

If the calling user is provided with both consultation and network invocation (delayed), the calling user shall be able to request SS-CO during the period of the automatic call offer invocation timer. If, at the time of expiry of the automatic call offer invocation timer, the calling user has not requested SS-CO and has not initiated call clearing, the network shall automatically invoke SS-CO.

On successful invocation of SS-CO, the called user shall receive an indication of the offered call, and the calling user shall be advised that SS-CO has been invoked. Additional information that would normally accompany an incoming call indication (see ISO/IEC 11574) may optionally be provided to the called user. During the waiting period, for those basic services for which ISO/IEC 11574 requires an in-band tone or announcement to indicate progress or otherwise of the call, an in-band tone or announcement shall be given to the calling user.

If the PISN detects that the necessary resources have become available, it shall transfer an incoming call indication to the called user.

Note 3 - The waiting period for the offered call can be subject to time-out. At time-out, the offered call can be released. Any such procedure is outside the scope of this International Standard.

SS-CO shall be considered completed when any one of the following occurs:

- the called user starts alerting;
- the called user accepts the call;
- the calling user releases the offered call;
- the called user rejects the offered call.

If the called user starts alerting, the calling user shall receive an appropriate indication.

If the called user rejects the offered call, the call shall be released with an appropriate indication to the calling user.

6.2.3 Exceptional procedures

6.2.3.1 Activation/deactivation/registration/interrogation

Not applicable.

6.2.3.2 Invocation and operation

If the calling user requests invocation of SS-CO as part of the initial call request, and immediate invocation is not provided to the calling user, then the request shall be ignored and the call shall proceed as if the request had not been made.

An SS-CO request may be rejected for other reasons, e.g. when the number of calls already offered to the called user is equal to the maximum allowed for this user or when the call fails due to network conditions (see clause 9.3 of ISO/IEC 11574). If the request has been initiated by means of immediate invocation, consultation or network invocation (delayed), the calling user shall be informed that the SS-CO request is rejected.

If consultation applies to the call, the call shall be released either if the calling user does not request invocation within the defined time period (consultation timer) or if the calling user requests invocation within the defined time period (consultation timer) and this request is rejected.

If SS-CO is requested and the called user is found to be not busy, the call shall be treated as a normal incoming call to the called user.

6.3 Interactions with other supplementary services and ANFs

Interactions with other supplementary services and ANFs for which PISN International Standards were available at the time of publication of this International Standard are specified below.

6.3.1 Calling Line Identification Presentation (SS-CLIP)

The called user shall receive, as part of the offered call, the Calling Line Identification of the calling user, unless SS-CLIR applies and the called user has no override capability.

6.3.2 Connected Line Identification Presentation (SS-COLP)

No interaction.

6.3.3 Calling/Connected Line Identification Restriction (SS-CLIR)

When Calling Line Identification Restriction has been invoked, the Calling Line Identification shall not be presented to the called user (as part of the offered call), unless the called user has an override category.

6.3.4 Calling Name Identification Presentation (SS-CNIP)

The called user shall receive, as part of the offered call, the Calling Name Identification of the calling user, unless SS-CNIR applies and the called user has no override capability.

6.3.5 Connected Name Identification Presentation (SS-CONP)

No interaction.

6.3.6 Calling/Connected Name Identification Restriction (SS-CNIR)

When Calling Name Identification Restriction has been invoked, the Calling Name Identification shall not be presented to the called user (as part of the offered call), unless the called user has an override category.

6.3.7 Completion of Calls to Busy Subscriber (SS-CCBS)

While a call is being offered, the calling user may be able to invoke SS-CCBS.

SS-CO invoked against the called user shall have priority over any SS-CCBS requests against that called user, when resources at the called user become available.

6.3.8 Completion of Calls on No Reply (SS-CCNR)

No interaction.

6.3.9 Call Transfer (SS-CT)

It shall be possible for a user, after having successfully invoked SS-CO against a busy called user, to invoke call transfer for transferring a third user to that called user. This shall operate in a similar manner to Call Transfer during the alerting state, except that the call shall continue as an offered call to the called user. The third user may be notified that the call is in a waiting condition against a busy called user. If the called user subsequently enters an alerting phase and a notification that the call is in a waiting condition against a busy called user has been given to the third user, the third user shall be notified that the waiting condition has ceased.

6.3.10 Call Forwarding Unconditional (SS-CFU)

SS-CO, if invoked, shall operate on a busy user that has been forwarded to as a result of one or more invocations of SS-CFU, provided neither SS-CFNR nor Call Deflection from Alert has taken place.

6.3.11 Call Forwarding Busy (SS-CFB)

If SS-CO invocation is requested by the calling user as part of the initial call set up or automatically by the network when a call is made to a user that is busy, and if the called user is busy and has SS-CFB active, SS-CFB shall be invoked. If the SS-CFB forwarded-to user is also busy, SS-CO shall operate on the forwarded-to user. If the call undergoes more than one diversion, at least one of which is SS-CFB, but none of which is either SS-CFNR or Call Deflection from Alert, SS-CO shall operate on the final diverted-to user if that user is busy.

If the calling user is informed that a call has failed because of busy at the destination, and if SS-CO is subsequently invoked, SS-CO shall operate on the SS-CFB forwarding user or on the SS-CFB forwarded-to user. If the call has undergone more than one diversion, at least one of which is SS-CFB, but none of which is either SS-CFNR or Call Deflection from Alert, then SS-CO shall operate either on the first SS-CFB forwarding user or on the final diverted-to user. Choice between the two is an implementation option. An implementation may permit the calling user to make the choice.

6.3.12 Call Forwarding No Reply (SS-CFNR)

SS-CO if invoked, shall not operate on a busy user arrived at as a result of one or more diversions, at least one of which is SS-CFNR. The procedures of SS-CFNR shall apply.

SS-CFNR can apply when alerting a user after completion of SS-CO on that user.

6.3.13 Call Deflection (SS-CD)

SS-CO, if invoked, shall operate on a busy user that has been diverted to as a result of one or more invocations of Call Deflection Immediate, provided neither SS-CFNR nor Call Deflection from Alert has taken place.

SS-CO, if invoked, shall not operate on a busy user arrived at as a result of one or more diversions, at least one of which is Call Deflection Alert. The procedures of SS-CD shall apply.

Call Deflection from Alert can apply when alerting a user after completion of SS-CO on that user.

6.3.14 Path Replacement (ANF-PR)

No interaction.

6.3.15 Do Not Disturb (SS-DND)

If SS-CO has been invoked:

- as part of the initial call setup (i.e. by SS-CO immediate invocation);
- following consultation (i.e. by SS-CO Consultation);

- or by SS-CO network invocation (delayed)

and if, at the time of invocation, SS-DND is active at the destination and has not been successfully overridden then the invocation of SS-CO shall be rejected, and the procedures of SS-DND shall apply.

6.3.16 Do Not Disturb Override (SS-DNDO)

If the called user has SS-DND active, and SS-DNDO is successfully invoked, then:

- if CO network invocation (immediate), immediate invocation or network invocation (delayed) is applicable to the call, then the invocation of CO shall apply to the call after SS-DND has been overridden,
- if CO consultation is applicable to the call, it shall apply after SS-DND has been overridden.

6.3.17 Call Intrusion (SS-CI)

A SS-CO request made after a SS-CI request has been accepted by the PISN shall be rejected.

Note 4 - SS-CI service includes a similar service to SS-CO - wait on busy. This can be used instead of SS-CO.

A SS-CI request made after a SS-CO request has been accepted by the PISN shall be allowed. If the request is rejected due to intrusion not allowed, the SS-CO state shall remain. If SS-CI is accepted by the PISN, the SS-CO request shall be cancelled.

If both SS-CI immediate invocation and SS-CO immediate invocation are requested at call set up, the services shall be rejected, and the call shall proceed as if neither of the services had been requested.

If the served user is provided with SS-CO network invocation (immediate) and the served user requests SS-CI immediate invocation, the network shall not invoke SS-CO.

Note 5 - If a call fails because of busy at the destination, either SS-CI or SS-CO can be applied.

6.4 Interworking considerations

When interworking with another network which supports an equivalent feature, it may be possible to cooperate with the other network in order to provide SS-CO.

If a call is made with invocation of SS-CO to a destination in a network that does not support SS-CO, then the invocation of SS-CO shall be rejected and the call shall proceed normally as if there was no SS-CO invocation.

6.5 Overall SDL

Figure 1 contains the dynamic description of SS-CO using the Specification and Description Language (SDL) defined in CCITT Rec. Z.100 (1988). The SDL process represents the behaviour of the PISN in providing SS-CO to a calling user. Input signals from the left and output signals to the left represent primitives from and to the calling user. Input signals from the right represent either primitives from the called user, or inputs from the basic call process, or inputs from an internal process. Output signals to the right represent primitives to the called user.

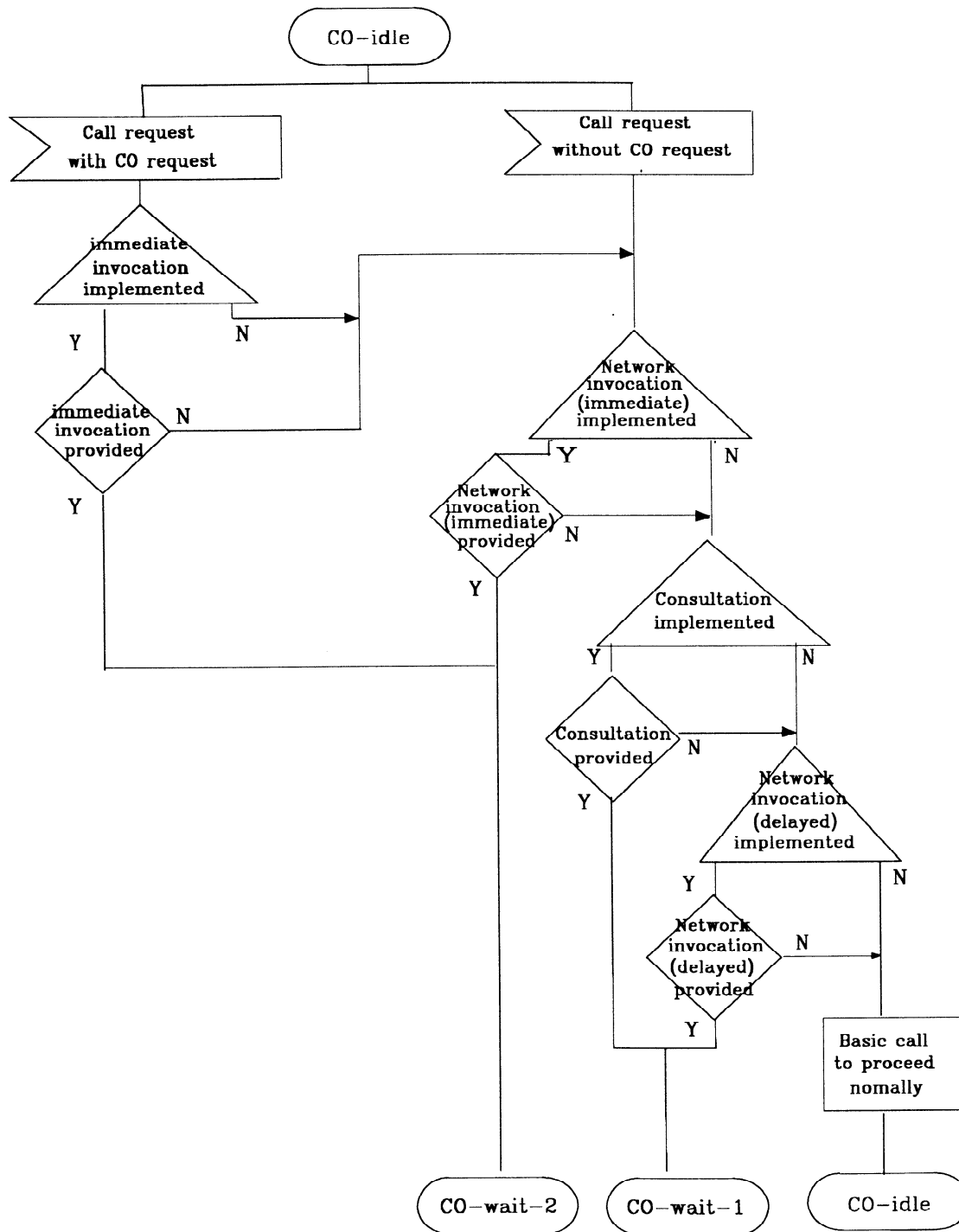


Figure 1 (part 1) - SS-CO, overall SDL