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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Call Priority Interruption and Call Priority Interruption Protection supplementary services

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé à intégration de services — Spécification, modèle fonctionnel et flux d'informations — Services supplémentaires d'interruption de priorité d'appel et de protection d'interruption de priorité 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15991 was prepared by ECMA (as ECMA-263) 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.

This second edition cancels and replaces the first edition (ISO/IEC 15991:1998), which has been technically revised.

Introduction

This International Standard is one of a series of 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 International Standard specifies the Call Priority Interruption (CPI) and Call Priority Interruption Protection (CPIP) supplementary services.

This International Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO/IEC JTC 1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Call Priority Interruption and Call Priority Interruption Protection supplementary services

1 Scope

This International Standard specifies the Supplementary Services Call Priority Interruption (SS-CPI) and Call Priority Interruption Protection (SS-CPIP), which are applicable to various basic services supported by Private Integrated Services Networks (PISN). Basic services are specified in ISO/IEC 11574.

NOTE 1 - This edition of this International Standard does not apply to the circuit-mode Multiple Rate Bearer Service.

SS-CPI is a supplementary service that allows a call request for a priority call to proceed successfully in the case that there is no user information channel available. This is accomplished by force releasing an established call of lower priority.

SS-CPIP is a supplementary service that allows for the protection of calls against interruption from other, priority, calls.

SS-CPI and SS-CPIP are described separately because SS-CPI is a service used by a calling user, and SS-CPIP is a service used by either a calling user or a called user.

Supplementary service specifications are produced in three stages, according to the method described in ETS 300 387. This International Standard contains the stage 1 and stage 2 specifications of SS-CPI. The stage 1 specification (clause 6) specifies the general feature principles and capabilities. The stage 2 specification (clause 7) identifies the Functional Entities involved in the supplementary service and the information flows between them.

2 Conformance

In order to conform to this International Standard, a stage 3 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 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 standard applies.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 11574:2000, *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*

ISO/IEC 11579-1:1994, *Information technology - Telecommunications and information exchange between systems - Private integrated services network - Part 1: Reference configuration for PISN Exchanges (PINX)*

ISO/IEC 13863:1998, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Path replacement additional network feature*

ISO/IEC 13865:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call Transfer supplementary service*

ISO/IEC 13866:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call completion supplementary services*

ISO/IEC 13872:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call Diversion supplementary services*

ISO/IEC 15053:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call Interception additional network feature*

ETS 300 387:1994, *Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services*

ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs*

ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them*

ITU-T Rec. Z.100:1999, *Specification and description language (SDL)*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1 External definitions

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

– Basic service (ITU-T Rec. I.210)

– Private Integrated Services Network (PISN) (ISO/IEC 11579-1)

– Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)

– Service (ITU-T Rec. I.112)

– Signalling (ITU-T Rec. I.112)

– Supplementary Service (ITU-T Rec. I.210)

– User (ISO/IEC 11574)

This International Standard refers to the following basic call Functional Entities (FE) 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:

– DISCONNECT request/indication

– RELEASE request/indication

– SETUP request/indication

4.2 Additional network feature

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

4.3 Call, Basic call

An instance of the use of a basic service.

4.4 Call Priority Interruption Capability Level (CPICL)

A parameter indicating the priority of a call.

4.5 Call Priority Interruption Protection Level (CPIPL)

A parameter indicating a level of protection of a call against interruption from other calls.

4.6　Established call

The active call that is selected for interruption.

4.7　Impending priority interruption state

The condition of an established call and a priority call after provision of an Impending priority interruption warning notification and before the release of the established call.

4.8　Impending priority interruption warning notification

A notification provided before the release of the established call.

4.9　Non-priority call

A call that has not been assigned a CPICL value.

4.10　Priority call

A call that has a CPICL value greater than zero.

NOTE 2 - A priority call may also be a protected call.

4.11　Protected call

A call that has a CPIPL value greater than zero.

NOTE 3 - A protected call may also be a priority call.

4.12　Served user

The user who requests SS-CPI and/or SS-CPIP.

4.13　Time to priority interruption

The duration of the impending priority interruption state.

4.14　Unprotected call

A call which has not been assigned a CPIPL value or has a CPIPL value equal to zero.

5　List of acronyms

ANF	Additional Network Feature
AOC	Advice Of Charge
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
CI	Call Intrusion
CICL	Call Intrusion Capability Level
CINT	Call INTerception
CLIP	Calling Line Identification Presentation
CLIR	Calling/Connected Line Identification Restriction
CMN	CoMmoN Information
CNIP	Calling Name Identification Presentation
CNIR	Calling/Connected Name Identification Restriction
CO	Call Offer
COLP	Connected Line Identification Presentation
CONP	Connected Name Identification Presentation
CPI	Call Priority Interruption
CPICL	Call Priority Interruption Capability Level
CPIP	Call Priority Interruption Protection
CPIPL	Call Priority Interruption Protection Level
CT	Call Transfer

DND	Do Not Disturb
DNDO	Do Not Disturb Override
FE	Functional Entity
ISDN	Integrated Services Digital Network
MWI	Message Waiting Indication
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
PR	Path Replacement
RE	REcall
SDL	Specification and Description Language
SS	Supplementary Service
TC	Transit Counter
TE	Terminal Equipment
WTAU	Wireless Terminal AUthentication
WTLR	Wireless Terminal Location Registration
WTMI	Wireless Terminal Mobility Incoming call
WTMO	Wireless Terminal Mobility Outgoing call

6 SS-CPI stage 1 specification

6.1 Description

6.1.1 General description

Call Priority Interruption (SS-CPI) is a supplementary service that allows a call request for a priority call to proceed successfully in the case that there is no user information channel available.

A priority interruption only occurs if the served user has a higher Call Priority Interruption Capability Level (CPICL) than the Call Priority Interruption Protection Level (CPIPL) of at least one of the active calls on the selected route.

6.1.2 Qualifications on applicability to telecommunication services

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

6.2 Procedure

6.2.1 Provision/withdrawal

SS-CPI shall be provided or withdrawn after pre-arrangement with the service provider.

SS-CPI shall be provided on a per PISN number basis for one or more basic services.

One or more Call Priority Interruption Capability Levels (CPICL) shall be allocated to the served user. The procedure by which CPICL is allocated is outside the scope of this International Standard.

CPICL shall have a value in the range 1 (lowest priority) to 3 (highest priority). An implementation may offer one or more CPICL values.

NOTE 4 - It is not precluded that CPICL values can be variable, e. g. a user may have the possibility to change the value with a user procedure. The details of such capabilities are outside the scope of this International Standard.

At least one of the methods of invoking SS-CPI (see 6.2.2.2) shall be offered.

6.2.2 Normal procedures

6.2.2.1 Activation/deactivation/registration/interrogation

SS-CPI shall be activated upon provision and deactivated upon withdrawal.

Registration and interrogation shall not apply.

6.2.2.2 Invocation and operation

There are two different ways to invoke SS-CPI. A PISN may offer one or both of these ways.

These are:

i) Consultation: the served user, on being informed that a call has failed because of congestion en route to the destination, shall be able, within a defined period (consultation timer), to request SS-CPI.

ii) Immediate invocation: the served user shall be able to request SS-CPI as part of the initial call set-up, or as an implementation option, the network can invoke SS-CPI automatically on behalf of the user.

On invocation, CPICL, if provided, shall be assigned one of the offered values.

NOTE 5 - As an example, this assignment may be based on a class of service.

6.2.2.2.1 Verification and selection of an established call

If the consultation method is provided to the served user, the following procedure shall apply. If a call fails due to congestion en route to the destination and the PISN is not aware that call priority interruption is not allowed (e. g. because of insufficient CPICL), the PISN shall notify the served user that the call has failed because of congestion and that priority interruption may be possible. The served user may then request SS-CPI.

If the immediate invocation method is provided to the served user, the served user may request SS-CPI with the initial call set-up.

For both invocation alternatives the following shall apply. Upon receiving a call priority interruption request, the PISN shall check that at least one user information channel is available on the selected route.

If a user information channel is available on the selected route, the call shall proceed in accordance with basic call procedures.

If no user information channel is available on the selected route, and in order to determine that interruption is allowed, the PISN shall check that the CPICL value of the received call request is greater than zero (priority call). It shall then check that the Call Priority Interruption Protection Level (CPIPL) value of an active call on the selected route is lower than the CPICL value of the served user. If the PISN does not have knowledge of the CPIPL value of an active call, this call shall be treated as if the call has no protection (i.e. CPIPL value equal to zero).

NOTE 6 - CPIPL values are allocated when SS-CPIP is invoked. See 7.2.2.2.

The call that passes these checks shall be selected as the established call. If more than one call passes these checks, the PISN shall select the active call with the lowest CPIPL value as the established call. If more than one call has the same lowest CPIPL, the method used to select the established call from this group of calls shall be implementation dependent. If no active call passes these checks the priority call request may be rejected or some other implementation dependent action may be taken.

NOTE 7 - One example of an implementation dependent action is to establish the call on another route, if such a route is available.

When the established call has been selected, the users in the established call may as an option be provided with an Impending priority interruption warning notification and a short delay before the user connection is broken. If this notification is provided, it shall be sent to the users in the established call and the impending priority interruption state shall be entered.

NOTE 8 - The Impending priority interruption warning notification can be accompanied by an in-band tone or announcement to all users in the established call.

SS-CPI shall terminate when the call request reaches its destination or leaves the PISN.

6.2.2.2.2 Actions during impending priority interruption state

6.2.2.2.2.1 Impending priority interruption state ends

A time period, time to priority interruption (1-10 seconds as an implementation option), after the Impending priority interruption warning notification has been provided, the users involved in the established call shall be notified of the forced release. The impending priority interruption state shall be terminated, the established call shall be released and the priority call request shall proceed in accordance with basic call procedures selecting the newly available user information channel.

6.2.2.2.2.2 Release of priority call request

If the priority call request is released by the served user during the impending priority interruption state, the users involved in the established call shall be notified that the priority interruption request has been terminated and SS-CPI shall be terminated.

6.2.2.2.2.3 Release of established call

If the established call is released by a user during the impending priority interruption state, the priority call request shall proceed in accordance with basic call procedures selecting the newly available user information channel.

6.2.2.2.2.4 User information channel becomes available

If another user information channel becomes available for this call during the impending priority interruption state, the users involved in the established call shall be notified that the impending priority interruption state has been terminated. The priority call request shall proceed in accordance with basic call procedures selecting the newly available user information channel.

6.2.3 Exceptional procedures

6.2.3.1 Activation/deactivation/registration/interrogation

Not applicable.

6.2.3.2 Invocation and operation

If the interruption request cannot be accepted the request shall be ignored.

6.3 Interaction with other supplementary services and ANFs

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

6.3.1 Calling Name Identification Presentation (SS-CNIP)

No interaction.

6.3.2 Connected Name Identification Presentation (SS-CONP)

No interaction.

6.3.3 Completion of Call to Busy Subscriber (SS-CCBS)

SS-CPI may apply to a call resulting from the use of SS-CCBS.

6.3.4 Completion of Call on No Reply (SS-CCNR)

SS-CPI may apply to a call resulting from the use of SS-CCNR.

6.3.5 Call Transfer (SS-CT)

SS-CPI shall not be invoked to interrupt other calls during establishment of the new connection.

6.3.6 Call Forwarding Unconditional (SS-CFU)

SS-CPI may be invoked when establishing the diverted call.

6.3.7 Call Forwarding Busy (SS-CFB)

SS-CPI may be invoked when establishing the diverted call.

6.3.8 Call Forwarding No Reply (SS-CFNR)

SS-CPI may be invoked when establishing the diverted call.

6.3.9 Call Deflection (SS-CD)

SS-CPI may be invoked when establishing the diverted call.

6.3.10 Path Replacement (ANF-PR)

SS-CPI shall not be invoked to interrupt other calls during establishment of the new connection.

6.3.11 Call Offer (SS-CO)

No interaction.

6.3.12 Call Intrusion (SS-CI)

No interaction.

NOTE 9 - SS-CI may be used in conjunction with SS-CPI to provide for intrusion if a called user busy condition is determined.

6.3.13 Do not Disturb (SS-DND)

No interaction.

6.3.14 Do not Disturb Override (SS-DNDO)

No interaction.

6.3.15 Advice of Charge (SS-AOC)

No interaction.

6.3.16 Recall (SS-RE)

No interaction.

6.3.17   Call Interception (ANF-CINT)

A SS-CPI request shall have priority over any ANF-CINT request on a network congestion condition. There is no interaction with ANF-CINT for other invocation conditions.

6.3.18   Transit Counter (ANF-TC)

No interaction.

6.3.19   Interaction with Wireless Terminal Location Registration (SS-WTLR)

No interaction.

6.3.20   Interaction with Wireless Terminal Incoming Call (ANF-WTMI)

SS-CPI may be invoked when establishing a call to a WTM user.

6.3.21   Interaction with Wireless Terminal Outgoing Call (ANF-WTMO)

No interaction.

6.3.22   Interaction with Wireless Terminal Authentication of a WTM user (SS-WTAT)

No interaction.

6.3.23   Interaction with Wireless Terminal Authentication of a PISN (SS-WTAN)

No interaction.

6.3.24   Message Waiting Indication (SS-MWI)

No interaction.

6.3.25   Common Information (ANF-CMN)

No interaction.

6.3.26   Call Priority Interruption Protection (SS-CPIP)

See 6.2.

6.4   Interworking considerations

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

6.5   Overall SDL

Figure 1 contains the dynamic description of SS-CPI using the Specification and Description Language (SDL) defined in ITU-T Rec. Z.100 (1999). The SDL process represents the behaviour of the PISN in providing SS-CPI to a served user.

Input symbols from the left and output symbols to the left represent primitives from and to the served user.

Input symbols from the right represent inputs from the basic call process or inputs from an internal process.

Output symbols to the right represent primitives to the users in the established call, outputs to the basic call process or outputs to an internal process.