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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Use of QSIG for Message Centre Access (MCA) profile standard

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé à intégration de services — Emploi de QSIG pour une norme de profil pour accès au centre du message (MCA)

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Contents

Page

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 20115 was prepared by ECMA (as ECMA-345) 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 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 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 JTC1, ITU-T, ETSI and other international and regional standardization bodies. It represents a pragmatic and widely based consensus.

Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Use of QSIG for Message Centre Access (MCA) profile standard

1 Scope

This Profile Standard specifies the combination of base standards, together with the selection of appropriate options and parameter values, necessary to specify how QSIG/PSS1 can be used for Message Centre Access (MCA) procedures.

This International Standard identifies the necessary or optional employment of particular functions, procedures and services for a

- Calling User to deposit messages for a Served User at a Message Centre,
- Served User to monitor the Served User's Mailbox for new messages,
- Served User to browse through the messages saved in the Served User's Mailbox,
- Served User to retrieve the messages saved in the Served User's Mailbox, and
- Served User to get connected to the Originator of a message or any other destination.

2 Conformance

A system conforms to this International Standard if it correctly performs all the mandatory capabilities defined in one or more of the requirement list (RL) (Annex A) and one or more of the profile specific ICS (Annex B).

NOTE For the purpose of this International Standard capabilities marked as optional in the base standards may be mandatory or excluded.

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 9646-7:1994, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 7: Implementation Conformance Statements*

ISO/IEC 11571:1998, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Networks — Addressing*

ISO/IEC 11572:2000, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Circuit mode bearer services — Inter-exchange signalling procedures and protocol*

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 11582:2002, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Generic functional protocol for the support of supplementary services — Inter-exchange signalling procedures and protocol*

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 13869:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call Transfer supplementary service*

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 13873:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call Diversion supplementary services*

ISO/IEC 15505:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Message Waiting Indication supplementary service*

ISO/IEC 15506:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Message Waiting Indication supplementary service*

ISO/IEC 19459:2001, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Single Step Call Transfer Supplementary Service*

ISO/IEC 19460:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Single Step Call Transfer supplementary service*

ISO/IEC 20113:2004, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Make call request supplementary service*

ISO/IEC 20114:2004, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Make call request supplementary service*

ISO/IEC 20116:2004, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Message centre monitoring and mailbox identification supplementary services*

ISO/IEC 20117:2004, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Message centre monitoring and mailbox identification supplementary services*

ISO/IEC 21407:2001, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Simple dialog supplementary service*

ISO/IEC 21408:2003, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Simple dialog supplementary service*

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 Call (ISO/IEC 11582)

— Call (ISO/IEC 11582)

— Call Independent Signalling Connection (ISO/IEC 11582)

— Call Related (ISO/IEC 11582)

— Complete Number (ISO/IEC 11571)

— Compressed Information (ISO/IEC 20116)

— Display information (ISO/IEC 21407)

— Diverted-to PINX (ISO/IEC 13873)

— Keypad information (ISO/IEC 21407)

— Mailbox (ISO/IEC 20116)

— Mailbox Identification (ISO/IEC 20116)

— Make Call Request (ISO/IEC 20113)

— Message Centre (ISO/IEC 20116)

— Message Centre PINX (ISO/IEC 20117)

— Message Type (ISO/IEC 20116)

— Message Status (ISO/IEC 20116)

— MCR Co-operating PINX (ISO/IEC 20114)

— MCR Co-operating User (ISO/IEC 20113)

— MCR Destination PINX (ISO/IEC 20114)

— MCR Destination User (ISO/IEC 20113)

- MCR Requesting PINX (ISO/IEC 20114)
- MCR Requesting User (ISO/IEC 20113)
- New Message (ISO/IEC 20116)
- Original Call (ISO/IEC 20113)
- Originator (ISO/IEC 20116)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
- Requested Call (ISO/IEC 20113)
- Rerouting PINX (ISO/IEC 13873)
- Retrieved Message (ISO/IEC 20116)
- Secondary Call (ISO/IEC 13869)
- Served User (ISO/IEC 13872, ISO/IEC 20116)
- Server User (ISO/IEC 21407)
- Served User PINX (ISO/IEC 13873, ISO/IEC 20117)
- Server User PINX (ISO/IEC 21408)
- Transferred User (ISO/IEC 19459)
- Transferring User (ISO/IEC 13869)
- Telecommunication Service (ISO/IEC 11574)
- User (ISO/IEC 11574)
- User B (ISO/IEC 13865)
- Q reference point (ISO/IEC 11579-1)

4.2
Served User
The Served User as defined in Message Centre Monitoring (ISO/IEC 20116). For MCA, the Served User may also act as Served User in Call Diversion (as defined in ISO/IEC 13872), as a User B in Call Transfer (as defined in ISO/IEC 13865), as a Client User in Simple Dialog (as defined in ISO/IEC 21407), as a Transferred User in Single Step Call Transfer (as defined in ISO/IEC 19459) and as a Co-operating User in Make Call Request (as defined in ISO/IEC 20113).

4.3
Served User PINX
The Served User PINX as defined in ISO/IEC 20117. For MCA, the Served User PINX may also act as Served User PINX or Rerouting PINX for Call Diversion (as defined in ISO/IEC 13872), as a Primary PINX for Call Transfer (as defined in ISO/IEC 13865), as a Client User PINX for Simple Dialog (as defined in ISO/IEC 21408), as a Transferred PINX for Single Step Call Transfer (as defined in ISO/IEC 19460) and as a Co-operating PINX for Make Call Request (as defined in ISO/IEC 20114).

4.4
Message Centre
Depending on the MCA-Profile, either the MCM or the MWI Message Centre.

4.4.1
MCM Message Centre
The Message Centre as defined in ISO/IEC 20116. This definition is used in MCA-Profile-3 and MCA-Profile-4. For MCA, the MCM Message Centre may also act as Diverted-to PINX for Call Diversion (as defined in ISO/IEC 13873), as a Server User PINX for Simple Dialog (as defined in ISO/IEC 21408), a Transferring PINX for Call Transfer (as defined in ISO/IEC 13869), a Transferring PINX for Single Step Call Transfer (as defined in ISO/IEC 19460) and a Requesting PINX for Make Call Request (as defined in ISO/IEC 20114).

4.4.2
MWI Message Centre
The Message Centre as defined in ISO/IEC 15505. This definition is used in MCA-Profile-1 and MCA-Profile-2. For MCA, the MWI Message Centre may also act as Diverted-to PINX for Call Diversion (as defined in ISO/IEC 13873), as a Server User PINX for Simple Dialog (as defined in ISO/IEC 21408), as a Transferring PINX for Call Transfer (as defined in ISO/IEC 13869) and as a Transferring PINX for Single Step Call Transfer (as defined in ISO/IEC 19460).

4.5
MCA-Profile-1
MCA-Profile-1 is a profile, which describes the interoperation of supplementary services for Message Centre Access purposes. Supplementary services involved in MCA-Profile-1 are Call Diversion, Message Waiting Indication and Call Transfer.

4.6
MCA-Profile-2
MCA-Profile-2 is a profile, which describes the interoperation of supplementary services for Message Centre Access purposes. Supplementary services involved in MCA-Profile-2 are Call Diversion, Message Waiting Indication, Call Transfer, Single Step Call Transfer and Simple Dialog.

4.7
MCA-Profile-3
MCA-Profile-3 is a profile, which describes the interoperation of supplementary services for Message Centre Access purposes. Supplementary services involved in MCA-Profile-3 are Call Diversion, Call Transfer, Single Step Call Transfer, Simple Dialog, Message Centre Monitoring and Mailbox Identification.

4.8
MCA-Profile-4
MCA-Profile-4 is a profile, which describes the interoperation of supplementary services for Message Centre Access purposes. Supplementary services involved in MCA-Profile-4 are Call Diversion, Call Transfer, Single Step Call Transfer, Simple Dialog, Message Centre Monitoring, Mailbox Identification and Make Call Request.

4.9
Message Deposit
The part of MCA describing how an Originator can deposit a Message in a Served User's Mailbox at a Message Centre.

4.9.1
Direct Message Deposit
The part of MCA describing how an Originator can deposit a Message in a Served User's Mailbox by directly calling the Message Centre, i.e. without a prior call to the Served User.

4.9.2
Message Deposit after Diversion
The part of MCA describing how an Originator can deposit a Message in a Served User's Mailbox if the Originator gets diverted to the Served User's Mailbox.

4.9.3
Message Deposit after Transfer
The part of MCA describing how an Originator can deposit a Message in a Served User's Mailbox if the Originator gets transferred to the Served User's Mailbox.

4.10
Message Centre Monitoring
The part of MCA describing how a Message Centre informs a Served User about the status and status changes of Messages in the Served User's Mailbox.

4.11
Message Browsing
The part of MCA describing how a Served User can contact a Message Centre to get access to the Served User's Mailbox, for example; configuration update, message browsing or message deletion purposes.

4.12
Message Retrieval
The part of MCA describing how a Served User can retrieve Messages from the Served User's Mailbox.

4.13
Message Centre Transfer
The part of MCA describing how a Served User can request the Message Centre to get connected (e.g. transferred) to the Originator of a specific Message or any other destination.

5 Acronyms

APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation One
BC	Basic Call
CF	Supplementary Service Call Diversion
CISC	Call Independent Signalling Connection
CN	Corporate telecommunication Network
CT	Supplementary Service Call Transfer
DTMF	Dual Tone Multiple Frequency
GF	Generic Functional protocol (for the support of supplementary services)
MCA	Message Centre Access
MCM	Supplementary Service Message Centre Monitoring
MCR	Supplementary Service Make Call Request
MID	Supplementary Service Mailbox Identification
MWI	Supplementary Service Message Waiting Indication
NFE	Network Facility Extension
PINX	Private Integrated services Network eXchange

PISN	Private Integrated Services Network
PNP	Private Numbering Plan
QSIG	Q reference point SIGnalling system
RL	Requirements List
SD	Supplementary Service Simple Dialog
SS	Supplementary Service
SSCT	Supplementary Service Single Step Call Transfer

6 Specification framework

6.1 General Description

This International Standard describes the usage and interoperability of basic and supplementary services within a PISN for the purpose of Message Centre Access (MCA).

MCA incorporates functionality for the use of accessing a Message Centre due to the following reasons:

- an Originator deposits a Message in the Mailbox of a Served User (Message Deposit);
- a Message Centre informs a Served User about Messages in the Served User's Mailbox (Message Centre Monitoring);
- a Served User contacts the Message Centre to, for example, update configuration and browse or delete messages (Message Browsing);
- a Served User contacts the Message Centre in order to retrieve messages stored in the Served User's Mailbox (Message Retrieval);
- a Served User contacts the Message Centre to request connection to the Originator of a Message or any other destination (Message Centre Transfer).

To obtain the functionality needed for these procedures, different Supplementary Services were standardised in the past. Some of these Supplementary Services have similar functionality (e.g. Message Waiting Indication and Message Centre Monitoring or Call Transfer and Single Step Call Transfer) that leads to a variety of different combinations of these services. To restrict the variety for interworking purposes and to allow a smooth migration from older services to newer ones, four different profiles were defined for MCA:

- MCA-Profile-1 which makes use of Message Waiting Indication, Call Diversion and Call Transfer;
- MCA-Profile-2 which makes use of Message Waiting Indication, Call Diversion, Simple Dialog, Call Transfer and Single Step Call Transfer;
- MCA-Profile-3 which makes use of Message Centre Monitoring, Mailbox Identification, Call Diversion, Simple Dialog, Call Transfer and Single Step Call Transfer;
- MCA-Profile-4 which makes use of Message Centre Monitoring, Mailbox Identification, Call Diversion, Simple Dialog, Make Call Request, Call Transfer, Single Step Call Transfer.

6.2 Scenarios

6.2.1 Message Deposit

6.2.1.1 Direct Message Deposit

An Originating User may directly call a specific Message Centre to deposit a Message of a telecommunication service Message Type within the Mailbox of a specific Served User. Due to information received during call establishment, the Message Centre will connect the Originator to the indicated Mailbox, which then will provide further information either by means of B-Channel announcements or display information.

NOTE The signalling information provided during call establishment may not be sufficient to identify the required Mailbox. In such cases the Message Centre will require more information from the Originator, e.g. the party number of the Served User for whom a Message is to be deposited, in order to identify the mailbox.

After the Originator has deposited the Message, the Message Centre may either offer further services to the Originator or release the connection.

Clearing of the connection is the responsibility of the Originator.

6.2.1.2 Message Deposit after Diversion

The call from an Originator to a Served User may be diverted to the Served User's Mailbox, to allow the Originator to deposit a Message for the Served User.

After the Originator has deposited the Message, the Message Centre may either offer further services to the Originator or release the connection.

Clearing of the connection is the responsibility of the Originator.

6.2.1.3 Message Deposit after Transfer

The call from an Originator may be transferred, e.g. by an attendant using Call Transfer or Single Step Call Transfer, to the Served User's Mailbox to allow the Originator to deposit a Message for the Served User.

After the Originator has deposited the Message, the Message Centre may either offer further services to the Originator or release the connection.

Clearing of the connection is the responsibility of the Originator.

6.2.2 Message Centre Monitoring

A Message Centre shall be able to inform the Served User about changes in the Served User's Mailbox, e.g. after the receipt of a New Message or after a Message has been retrieved.

The procedures needed for this functionality are defined in Message Waiting Indication and Message Centre Monitoring.

6.2.3 Message Browsing

A Message Centre may be able to allow the Served User to browse through the messages in the Served User's mailbox regardless whether the messages are new or already retrieved.

The procedures needed for this functionality are defined in Simple Dialog and Message Centre Monitoring.

NOTE Procedures using DTMF and announcements may be required for certain profiles or if Simple Dialog and Message Centre Monitoring are not implemented.

6.2.4 Message Retrieval

A Message Centre shall be able to allow the Served User to retrieve messages from the Served User's mailbox.

The procedures needed for this functionality are defined in Simple Dialog, Message Centre Monitoring and Make Call Request.

NOTE Procedures using DTMF and announcements may be required for certain profiles or if Simple Dialog is not implemented.

6.2.5 Message Centre Transfer

A Message Centre may be able to connect the Served User to the Originator of a Message or any other destination.

The procedures related to this functionality are defined in Call Transfer, Single Step Call Transfer and Make Call Request.

7 Profiles

7.1 MCA-Profile-1

7.1.1 Message Deposit

Various message types may be accepted depending on the capabilities of the Message Centre.

7.1.1.1 Direct Message Deposit

Two procedures may be used in order to access the mailbox of the Served User:

1. Direct Access: the Mailbox of the Served User is identified using the Served User's individual Party Number (or a Message Centre Party Number in combination with an individual Subaddress).

   NOTE The individual Party Number may consist of a prefix identifying the Message Centre and the Party Number of the Served User, e.g. if the Message Centre is identified by 1234 and Served User's Party Number is 9876, then a Called Party Number 12349876 may identify the Served User's mailbox at the Message Centre.

2. Indirect Access: the Originator sets up a call related connection to the Message Centre using the Complete Number of the Message Centre. The Message Centre uses announcements and the Calling User identifies the Served User's mailbox by sending DTMF.

After being connected to the Served User's Mailbox the Originator may deposit a message.

The type of message shall be identified by the encoding of the Bearer Capability and High Layer Compatibility Information Elements in the SETUP message. After deposit of a new message the Message Centre PINX shall send a mwiActivate invoke APDU to the Served User PINX according to ISO/IEC 15506.

7.1.1.2 Message Deposit after Diversion

After the Originator's call is diverted to the Message Centre, the Served User shall be identified using either information provided in element divertingNr or, in case of multiple diversion, in element originalCalledNr of the received divertingLegInformation2 invoke APDU. If both elements are present it is up to the implementation and/or administration of the Message Centre which mailbox is appropriate.