
**Information technology —
Telecommunications and information
exchange between systems — Corporate
telecommunication networks — Signalling
interworking between QSIG and H.323 —
Generic functional protocol for the support
of supplementary services
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d'information entre systèmes — Réseaux de télécommunications
corporatifs — Signalisation de travail entre QSIG et H.323 — Protocole
fonctionnel général pour le support des services supplémentaires*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

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

International Standard ISO/IEC 21409 was prepared by ECMA (as ECMA-307) 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.

Annex A forms a normative part of this International Standard.

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Introduction

This International Standard is one of a series of Standards defining the interworking of services and signalling protocols deployed in Corporate telecommunication Networks (CNs). The series uses telecommunication concepts as developed by ITU-T and conforms to the framework of International Standards on Open Systems Interconnection as defined by ISO/IEC.

This International Standard defines the signalling protocol interworking for the generic functional procedures in support of Supplementary Services and/or Additional Network Features (ANFs) between a Private Integrated Services Network (PISN) and a private telecommunications network based on the Internet Protocol (IP). It is further assumed that the protocol for the PISN is that defined for the Q reference point (QSIG) and the protocols for the IP based network are based on ITU-T Recommendation H.323.

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 — Corporate telecommunication networks — Signalling interworking between QSIG and H.323 — Generic functional protocol for the support of supplementary services

1 Scope

This International Standard specifies signalling interworking between “QSIG” and “H.323” in support of generic functional procedures for supplementary services within a Corporate telecommunication Network (CN).

“QSIG” is a signalling protocol that operates at the Q reference point between Private Integrated Services eXchanges (PINX) within a Private Integrated Services Network (PISN). The Q reference point is defined in ISO/IEC 11579-1. A PISN provides circuit-switched basic services and supplementary services to its users. QSIG is specified in other Standards, in particular ISO/IEC 11572 (call control in support of basic services), ISO/IEC 11582 (generic functional protocol for the support of supplementary services) and a number of standards specifying individual supplementary services.

“H.323” is a set of signalling protocols for the support of voice or multimedia communication within a packet network, in particular a packet network that uses the Internet Protocol (IP) as its network layer protocol (IP network). H.323 signalling protocols operate between endpoints in an IP network, either indirectly via one or more gatekeepers, or directly. An endpoint can be a terminal or a gateway to another network. H.323 is an “umbrella” recommendation, referring to various ITU-T recommendations, in particular Recommendations H.225.0 and H.245 (basic communication capabilities) and Recommendation H.450.1 (generic functional protocol for the support of supplementary services).

NOTE - H.450.1 applies to the 1998 version of H.323 (also known as H.323 version 2) and to later versions.

Interworking between QSIG and H.323 permits a call originating at a user of a PISN to terminate at a user of an IP network, or a call originating at a user of an IP network to terminate at a user of a PISN. In addition this International Standard enables the participants of a call to exchange supplementary service control information in a generic way. The more specific aspects of interworking particular supplementary services are specified in other Standards.

This International Standard is applicable to any interworking unit that can act as a gateway between a PISN employing QSIG and an IP network employing H.323.

2 Conformance

In order to conform to this International Standard, a gateway shall satisfy the requirements identified in the Implementation Conformance Statement (ICS) proforma in annex A.

3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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 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 11582:1995, *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*

ITU-T Rec. H.225.0:1998 (or later edition), *Call signalling protocols and media stream packetization for packet-based multimedia communication systems*

ITU-T Rec. H.245:1998 (or later edition), *Control protocol for multimedia communication*

ITU-T Rec. H.323:1998 (or later edition), *Packet-based multimedia communications systems*

ITU-T Rec. H.450.1:1998, *Generic functional protocol for the support of supplementary services in H.323*

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:

- Endpoint (ITU-T Rec. H.323)
- Gatekeeper (ITU-T Rec. H.323)
- Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
- Switched Circuit Network (SCN) (ITU-T Rec. H.323)

Additionally the definitions of ISO/IEC 11582 and of ITU-T Rec. H.450.1 shall apply, as appropriate.

4.2 Other definitions

4.2.1 Call, Basic call : A call in the sense of QSIG (see ISO/IEC 11572), and a (point-to-point) conference in the sense of H.323 (see ITU-T Rec. H.323).

NOTE - A “call” in the sense of H.323 is that segment of a (point-to-point) conference which belongs to the H.323 domain. In a multipoint conference the H.323 segment of each conference leg is a separate call.

4.2.2 Corporate telecommunication Network (CN) : Sets of equipment [Customer Premises Equipment and/or Customer Premises Networks] which are located at geographically dispersed locations and are interconnected to provide telecommunication services to a defined group of users.

NOTE - A CN can comprise a PISN, a private IP network (intranet), or a combination of the two.

4.2.3 Gateway : A gateway as defined in H.323, here specifically for the purpose of interworking with a network employing QSIG.

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4.2.4 IP network : A public or private network offering connectionless packet-mode services based on the Internet Protocol (IP) as the network layer protocol.

4.2.5 Private Integrated Services Network (PISN) : A private switched circuit network (SCN).

4.2.6 Receiving side : Within the context of a single information exchange through a gateway, the side of the gateway where the information arrives.

4.2.7 Sending side : Within the context of a single information exchange through a gateway, the side of the gateway where the information is transmitted.

4.2.8 Side : A single protocol stack (QSIG or H.323) within a gateway.

5 Acronyms

APDU	Application Protocol Data Unit
ASE	Application Service Element
CN	Corporate telecommunication Network
GFT	Generic Functional Transport
GK	GateKeeper
ICS	Implementation Conformance Statement
IE	Information Element
IP	Internet Protocol
IPL	Inter-PINX Link
IWF	InterWorking Function

LAN	Local Area Network
MCU	Multipoint Control Unit
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
ROSE	Remote Operations Service Element
SCM	Signalling Carriage Mechanism
SCN	Switched Circuit Network
SS	Supplementary Service
TCP	Transmission Control Protocol
TE	Terminal Equipment
UDP	User Datagram Protocol

6 Service description

6.1 The architecture of the two networks

An H.323 arrangement consists of two or more H.323 endpoints connected to an IP network, e.g. a local area network (LAN). H.323 endpoints are terminals, gateways or multipoint control units (MCU). The arrangement may also contain one or more gatekeepers (GK). The underlying network's components (routers etc.), however, are of no concern with regard to H.323.

A gateway permits interworking with switched circuit networks (SCN), e.g. a PISN.

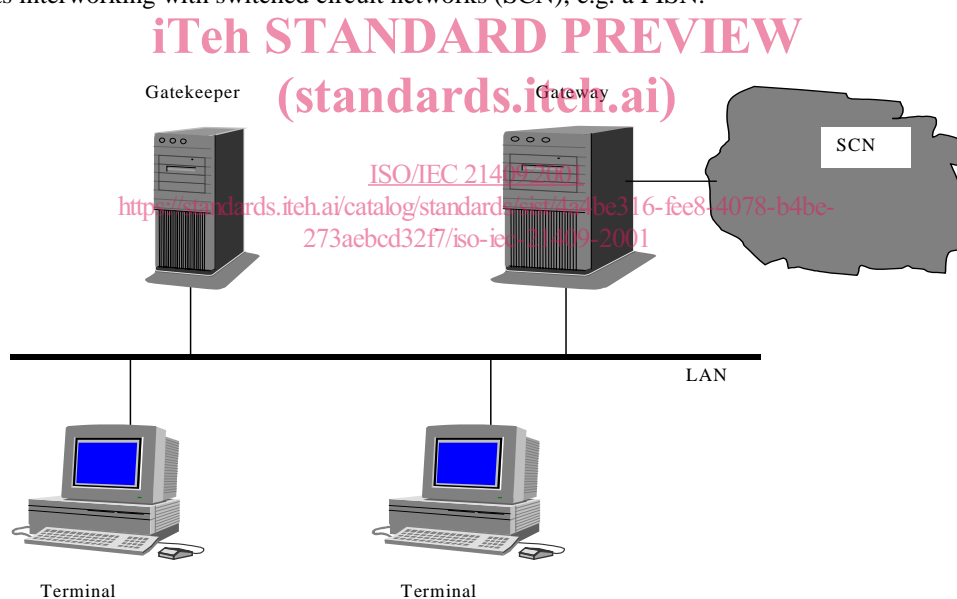


Figure 1 — Example of an H.323 arrangement

A Private Integrated Services Network (PISN) consists of one or more network exchanges (PINX) with attached terminals (TE). PINXs are inter-connected by inter-PINX links (IPLs). Communication requires a path to be set up between two TEs via PINXs and IPLs.

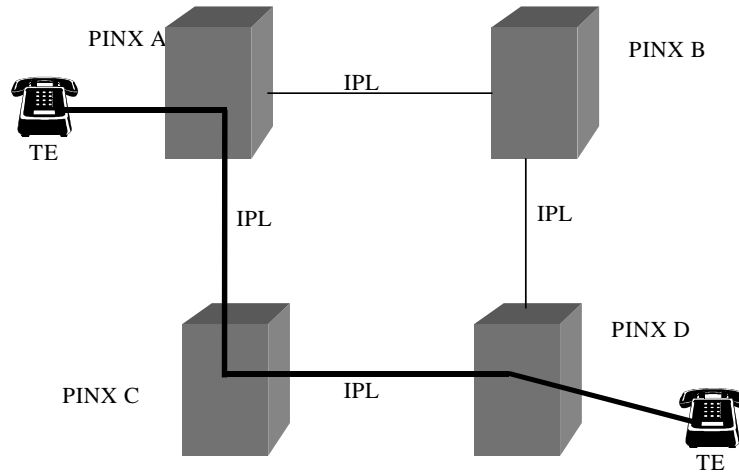


Figure 2 — Example of a PISN connection between two terminals

Comparing the two scenarios, the most significant difference is the absence of nodal entities in the H.323 case. Communication is an exchange of information packets directly between two or more endpoints: A gatekeeper, if present, has certain assisting tasks, but does not ‘switch’ any payload channels. It may, however, relay signalling information between endpoints or act upon it on behalf of endpoints.

In the PISN case, information channels are switched by PINXs between communicating terminals for the duration of the communication. The PINXs where the communicating terminals are attached are end/PINXs, which act on user requests and are in control of the connection through the PISN. If more than 2 PINXs are present in a call path, the intermediate PINXs act as transit or relay nodes for both signalling and user information (payload). This role sharing – TE, end PINX, transit PINX - does not exist in a pure H.323 conversation.

These structural differences between H.323 and PISNs will in many cases result in a different allocation of supplementary service functionality in the two environments. The possibly different function split must be taken into account when individual supplementary services are interworked.

6.2 Generic procedures: Capabilities

Generic procedures provide the transport protocol for supplementary service control information. Supplementary service control protocols are based on remote operations (ROSE) as defined in ITU-T Rec. X.219 / X.229 (blue book) and X.880 series.

Generic procedures for PISNs (QSIG-GF) are specified in ISO/IEC 11582. For the H.323 environment, generic procedures are specified in ITU-T Rec. H.450.1.

The following table 1 compares the capabilities of QSIG-GF and H.450.1.

Table 1 — Capabilities

Capability	QSIG-GF	H.450.1	Remarks
Call related transport	✓	✓	
Call independent connection oriented transport	✓	✓	
Call independent connectionless transport	✓	-	Currently not used by standardized QSIG supplementary services
Network Facility Extension (NFE)	✓	✓	Extended addressing capabilities in H.450.1
Interpretation APDU	✓	✓	
ROSE APDUs and procedures	X.219 / 229	X.880 series	In practice no relevant difference.
Other APDUs and procedures: DSE (dialogue procedures), ACSE	✓	-	Currently not used by standardized QSIG supplementary services
Manufacturer specific information	✓	✓	2 alternative containers in H.450.1
Notifications	✓	-	
Messages	ALERTING, CONNECT, DISCONNECT, PROGRESS, RELEASE, REL. COMP., SETUP; FACILITY, NOTIFY	ALERTING, CALL PROC., CONNECT, PROGRESS, REL. COMP., SETUP; FACILITY	These QSIG messages are defined in ISO/IEC 11572. All messages for H.450.1 transport are defined in H.225.0. These QSIG messages are defined in ISO/IEC 11582.
Information elements	Facility; Notification indicator	User-user information	Element H 450.1 Supplementary Service APDU within User-user information is the equivalent of information element Facility
ASN.1 encoding rules	X.208 X.209 BER	X.680 series X.691 PER (BAV)	BER – Basic Encoding Rules PER – Packed Encoding Rules BAV – basic aligned variant

Table 1 shows that the capabilities currently used by standardized supplementary services are supported in both environments (exception: Notifications are currently not used in H.450. However, in many cases an equivalent operation exists in an H.450 supplementary service). An interworking or mapping is therefore generally possible although details may be different.

NOTE - The NOTIFY message is optional in H.225.0 and may be passed on by a gateway to the H.323 side, but its processing is unspecified – it may be meaningless. In the other direction, current H.450.x services do not generate notifications.

6.3 Protocol model

QSIG-GF defines a protocol model which can be applied to H.450.1, too (see figure 3).

The shaded areas in figure 3 are specific to GF and are defined in ISO/IEC 11582. Call control and the non-shaded part of protocol control represent the basic call protocol as defined in ISO/IEC 11572. SS-control parts are defined in individual supplementary service standards. SCM is any suitable layer 2 protocol, dependent on the scenario in which QSIG is used.

NOTE - Some parts of the QSIG-GF protocol model, e.g. the DSE element, are omitted from figure 3 for clarity.

In the H.450.1 case call control and protocol control include H.225.0 and possibly H.245 signalling (the latter is not required by H.450.1 per se). The signalling carriage mechanism is an IP protocol stack, usually TCP (and/or UDP) on top of IP. The shaded areas are GF specific and are implicitly contained in H.450.1 (and partly in H.225.0).