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Digitalno omrežje z integriranimi storitvami (ISDN) – Protokol za krmiljenje klica in upravljanje virov prek omrežja TCP/IP, ki temelji na DSS1 – 1. del: Specifikacija protokola

Integrated Services Digital Network (ISDN); DSS1 based protocol for call control & resource management over a TCP/IP network; Part 1: Protocol specification

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Technical Specification

Integrated Services Digital Network (ISDN); DSS1 based protocol for call control & resource management over a TCP/IP network; Part 1: Protocol specification

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ETSI

Postal address

F-06921 Sophia Antipolis Cedex - FRANCE

Office address650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C

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Internet

secretariat@etsi.fr

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 1 of a multi-part TS covering Integrated Services Digital Network (ISDN); DSS1 based protocol for call control & resource management over a TCP/IP network, as identified below:

Part 1: "Protocol specification";

Part 2: "PICS proforma";

Part 3: "Test Suite Structure and test Purposes (TSS&TP) specification for the user";

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5: "Test Suite Structure and test Purposes (TSS&TP) specification for the network";

Part 6: "Abstract test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

1 Scope

The present document describes the DSS1 based protocol for call control and resource management over an Internet Protocol (IP) based network to a Network Access Server (NAS). The protocol runs between a NAS and a Media Gateway Controller (MGC) as defined by the N reference point in ETSI TIPHON TS 101 313 [1]. The scope of application of the protocol excludes Voice over IP (VoIP), Fax over IP (FoIP) or anything else which is not strictly internet dial-up access. The protocol uses infull (DSS1) with additional messages and information elements.

The transport mechanism for the IP based messages is outside the scope of the present document.

The protocol uses all standard DSS1 procedures with the consideration that the network entity is the Media Gateway Controller (MGC) and the user entity is the NAS. The present document only specifies those procedures that have been added to fit the architectural requirements.

The present document applies to narrowband bearer services in the Switched Circuit Network (SCN) used for modem and ISDN calls to NASs.

NOTE: Dial out access is for further study.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

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- [1] TS 101 313: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON); Network architecture and reference configurations; Phase II: Scenario 1 + Scenario 2".
- [2] ITU-T Recommendation I.112 (03/93): "Vocabulary of terms for ISDNs".
- [3] EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".
- [4] ITU-T Recommendation Q.699: "Interworking between ISDN access and non-ISDN access over ISDN User Part of Signalling System No. 7".
- [5] EN 300 899-1: "Integrated Services Digital Network (ISDN); Signalling System No.7; Interworking between ISDN User Part (ISUP) version 2 and Digital Subscriber Signalling System No. one (DSS1); Part 1: Protocol specification [ITU-T Recommendation Q.699, modified]".
- [6] ITU-T Recommendation Q.931: "SDN user-network interface layer 3 specification for basic call control".

3 Definitions

For the purposes of the present document, the following terms and definitions apply:

Integrated Services Digital Network (ISDN): see ITU-T Recommendation I.112 [2], subclause 2.3, definition 308.

Media Gateway Controller: see TS 101 313 [1], subclause 3.1.

Network: the DSS1 protocol entity at the network side of the user-network interface.

Network Access Server: the device that acts as a Media Gateway (see TS 101 313 [1], subclause 3.1).

4 Abbreviations

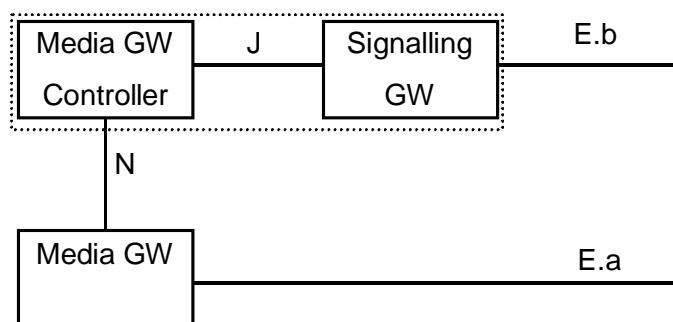
For the purpose of the present document, the following abbreviations apply:

DSS1	Digital Subscribe Signalling System Number 1
ISDN	Integrated Services Digital Network
IP	Internet Protocol
MGC	Media Gateway Controller
NAS	Network Access Server
SCN	Switched Circuit Network
SGW	Signalling Gateway
SS7	Signalling System No. 7

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5 Description (standards.iteh.ai)

This protocol is used at the N reference point defined in TS 101 313 [1] as shown in figure 1. The TIPHON architecture is functional rather than physical. However the NAS is a physical media gateway. The MGC could be a function of a combined Signalling Gateway (SGW)/MGC Controller or it could be a standalone device.



NOTE 1: The E.a reference point is between the gateway (Media Gateway) and the SCN. The E.b reference point is between the gateway (Signalling Gateway) and the SCN. The J reference point is between the SGW and the MGC.

NOTE 2: The transport mechanism for the IP based messages is outside the scope of the present document. This transport mechanism shall be reliable and shall support redundant paths.

NOTE 3: Dial out access is for further study.

Figure 1: TS 101 313 [1] functional architecture

6 Operational Requirements

The primary requirement is call control as per EN 300 403-1 [3] over an IP based network. Additionally, the MGC needs to be made aware of the state of the resources in the NAS. The continuity test procedure for incoming calls shall be supported.

7 Coding requirements

7.1 Messages

This subclause defines the messages the MGC and NAS use for call processing, maintenance and management. These messages are based on the "DSS1" message set, and in most cases are simply specific codings of standard DSS1 messages. However, because the requirements of the MGC based systems differ from those of ISDN access for which the DSS1 message set was developed, some messages described in this subclause are extensions of standard DSS1 messages. Table 1 lists the extended Control Protocol message set. The Protocol Discriminator used for new all messages is 0 x 4A.

Table 1: Control Protocol message set

Message	Value
LOGON	0x10
LOGON ACKNOWLEDGE	0x11
RESOURCE REGISTRATION	0x38
RESOURCE REGISTRATION ACKNOWLEDGE	0x39
SERVICE	0x3A
SERVICE ACKNOWLEDGE	0x3B

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The LOGON and LOGON ACKNOWLEDGE messages use a global call reference. The RESOURCE REGISTRATION, RESOURCE REGISTRATION ACKNOWLEDGE, SERVICE and SERVICE ACKNOWLEDGE messages use a unique call reference.

NOTE: Even though some messages use a unique call reference, these messages are not call related. These messages have to be uniquely identified and the call reference is the best mechanism in DSS1 to guarantee the uniqueness of the message.

7.1.1 LOGON

This message is sent by the NAS to the MGC to indicate a cold restart or a link level reset. See table 2.

Table 2: LOGON message content

Message type: LOGON Significance: local Direction: NAS to MGC				
Information element	Reference (subclause)	Direction	Type	Length
Protocol discriminator	4.2/Q.931 [6]	NAS → MGC	M	1
Call reference	4.3/Q.931 [6]	NAS → MGC	M (note)	2-*
Message type	4.4/Q.931 [6]	NAS → MGC	M	1

NOTE: This message is sent with the global call reference defined in 4.3/Q.931 [6].

7.1.2 LOGON ACKNOWLEDGE

This message is sent to acknowledge the receipt of the LOGON message and to indicate that the requested logon is completed. See table 3.

Table 3: LOGON ACKNOWLEDGE message content

Message type: LOGON ACKNOWLEDGE				
Significance: local				
Direction: MGC to NAS				
Information element	Reference (subclause)	Direction	Type	Length
Protocol discriminator	4.2/Q.931 [6]	MGC → NAS	M	1
Call reference	4.3/Q.931 [6]	MGC → NAS	M (note)	2-*
Message type	4.4/Q.931 [6]	MGC → NAS	M	1
NOTE: This message is sent with the global call reference defined in 4.3/Q.931 [6].				

7.1.3 RESOURCE REGISTRATION

This message is sent by the NAS to register associated trunk (E1 interfaces) and user port resources. See table 4.

Table 4: RESOURCE REGISTRATION message content

Message type: RESOURCE REGISTRATION				
Significance: local				
Direction: NAS to MGC				
Information element	Reference (subclause)	Direction	Type	Length
Protocol discriminator	4.2/Q.931 [6]	NAS → MGC	M	1
Call reference	4.3/Q.931 [6]	NAS → MGC	M (note 1)	2-*
Message type	4.4/Q.931 [6]	NAS → MGC	M	1
Resource	7.2.1	NAS → MGC	M (note 2)	3-5
Channel identification	4.5.13/Q.931 [6]	NAS → MGC	O (note 3)	2-*
Call state	4.5.7/Q.931 [6]	NAS → MGC	O (note 4)	3
NOTE 1: This message is sent with a unique call reference defined in 4.3/Q.931 [6].				
NOTE 2: When an entire E1 trunk interface or a host resource is specified, the <i>status</i> (octet 3) may be coded as available or unavailable. When one or more channels of an E1 trunk interface are specified, the <i>status</i> shall be coded as available if the Call state information element is included and the status shall be coded as unavailable if the Call state information element is not included.				
NOTE 3: Included when necessary to identify a trunk resource. May be repeated to identify multiple trunk interfaces.				
NOTE 4: Included when one (or more) channels of a trunk resource are identified. Omitted in other cases. Applies for all channels identified in the Channel identification information element.				