STENTOR

The Power of Telecommunications

SPECIFIC AIN 0.0 SS7 TCAP PROTOCOL

Network-to-Network Interface

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DOCUMENT HISTORY

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1   April 1996   Initial issue

DISCLAIMER

Stentor reserves the right to modify the interface described in this document for any reason including, but not limited to, ensuring that it conforms with standards promulgated by various agencies from time to time, utilization of advances in the state of the technical arts, or the reflection of changes in the design of any equipment, techniques, or procedures described or referred to herein.

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Readers are especially advised that the technical requirements contained herein may change. If any further information is required, please contact:

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ACKNOWLEDGEMENT

In order to remain consistent with accepted industry standards and definitions, substantial portions of this document are based on publications of the American National Standards Institute (ANSI), and other industry sources as noted herein. The documents referred to herein shall be interpreted in the context of the Canadian regulatory framework.

1. <u>INTRODUCTION</u>

This Document specifies the technical requirements for interfacing an AIN Service Provider (ASP) network with the network of a Stentor Company[1] to provide the interconnection required for specific Advanced Intelligent Network 0.0 (AIN 0.0) functionalities using the facilities of Signalling System Number 7 (SS7). Conformance to the requirements specified in this Document is intended to ensure acceptable interoperability. Interoperability is the ability of an ASP AIN 0.0 Service Control Point (SCP) to exchange AIN 0.0 messages with a Stentor AIN 0.0 Service Switching Point (SSP) and control the operation of the SSP within the limits made possible by the AIN 0.0 protocol as further qualified by this interface specification.

This Document describes a common channel signalling interface at the Signalling Point of Interconnection (SPOI) between the ASP network and the network of the Stentor Company. The interface described herein uses industry standard signalling and physical interfaces.

This Document does not specify all possible Stentor Company–ASP interfaces.

1.1 Background

Advanced Intelligent Network 0.0, also known as Intelligent Network Release 0, is a generic functional description which describes the SSP functionality and interactions between the AIN 0.0 SSP and the AIN 0.0 SCP. An AIN 0.0 switch has the capability to recognize a call requiring processing by an AIN 0.0 server or SCP.

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[1] The Stentor Companies include both Stentor Owner Companies and Stentor Associate Companies. The Stentor Owner Companies are AGT, BC Tel, Bell Ontario, Bell Québec, Island Tel–PEI, Manitoba Telephone System, Maritime Tel & Tel, NBTel, Newfoundland Telephone, and SaskTel. The Stentor Associate Companies are NorthwesTel and Québec Téléphone.

1.2   Scope

This Document describes an interface using the Message Transport Part (MTP), the Signalling Connection Control Part (SCCP), and the Transaction Capabilities Application Part (TCAP) of SS7 as defined by ANSI T1S1 to enable communications between a Stentor Company's AIN 0.0 SSP and the AIN Service Provider AIN 0.0 SCP. The Document also focuses on the AIN 0.0 Application Protocol as defined by Bellcore.

The signalling interface defined here may support a number of telecommunications services. This Document describes telecommunications services in generic terms only. This Document shall not be interpreted as a commitment by any individual Stentor Company to offer a specific service, nor as a description of specific service offerings. Stentor Companies offer services only on the basis of publicly filed tariff descriptions. These tariffs provide the only description of services offered by individual Stentor Companies.

2. **INTERFACE**

2.1 **General Structure of the Interface**

Support of the capability described in Section 1 requires one interface between the Stentor Company and the ASP. This interface connects SS7 Signalling Links from a Stentor Company SS7 network to a designated Signalling Point of Interconnection (SPOI). This interface carries signalling traffic between the AIN 0.0 switch and the ASP AIN 0.0 SCP. Figure 1 following shows a general schematic of the interconnection between the Stentor Company and the ASP.
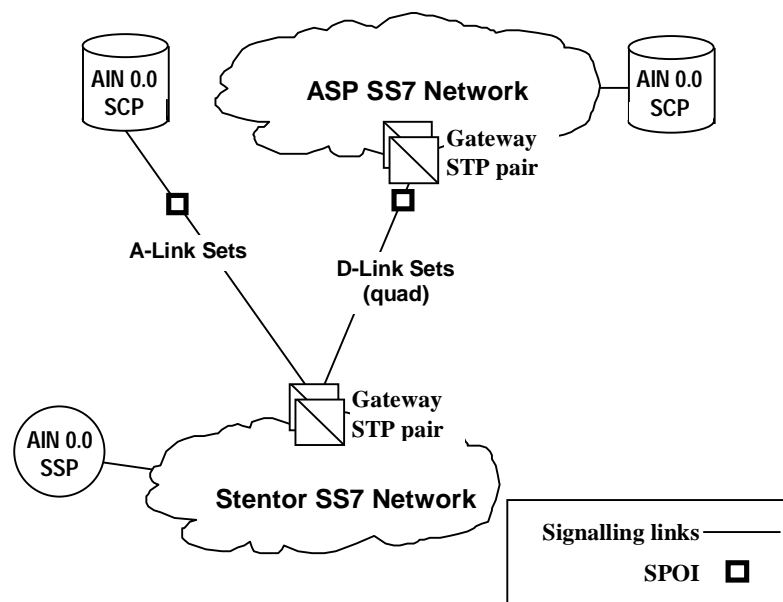

Figure 1 Interconnection Schematic

Notes:

1. Figure 1 shows only high–level relationships to illustrate the network interconnections. For example multiple combined SS7 link sets appear as a single line interconnecting the Stentor Company's SS7 network and the ASP's network.

2. Figure 1 should not be understood to represent internal details of Stentor Companies network.

3. Figure 1 shows two different signalling interconnection options that may be offered. An ASP will have only one of the two types of interconnection shown in Figure 1. Section 2.2 describes characteristics of alternative SPOI connections in more detail.

4. Not all interconnections may be offered or available. Refer to publicly filed tariff descriptions for details, applicable terms, and conditions.

2.2 Signalling Point of Interconnection Interface

The SPOI identifies the location where signalling information is transferred between the ASP and the Stentor Company. In the context of this Document, the term SPOI refers collectively to these physical interconnection points irrespective of their geographical diversity.

An ASP may connect the SPOI to its AIN 0.0 SCP either via A-links or D-links. As Figure 1 shows, in the former case the interconnection is through a combined A–link set connecting the ASP AIN 0.0 SCP office to the Stentor Company gateway Signalling Transfer Point (STP) pair. In the latter case the interconnection is via a D–link quad joining the Stentor gateway STP pair[2] to a gateway STP pair in an SS7 network designated by the ASP. Both signalling interconnections, between a specific ASP and Stentor Company networks, cannot coexist.

The SPOI interface is layered, with the different layers specified by the different protocol parts of SS7. ANSI Standard T1.110–1992, *Signalling System No. 7 (SS7)—General Information,* describes the protocol parts comprising SS7.

2.2.1 Interface Location

For an A–link interconnection between an ASP AIN 0.0 SCP and the Stentor SS7 network, there are two physical interconnection points, one for each link set in the combined A–link set. For a quad (four link sets) interconnection between an ASP SS7 network and a Stentor SS7 network, there are four physical points of interconnection, one for each link set in the quad.

These physical interconnection points may be at the same or different geographical locations, at the option of the ASP depending on the ASP's requirements for diversity. In each case, the interface location is the termination point of the transmission facility extending from the Stentor SS7 network to the designated location.

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[2]   "Gateway STP pair" implies that the network operator permits interconnection of its network to external SPs and STPs only at this pair. The provisioning of features to prevent unauthorized use of the SP pair or network containing it (e.g. those described in, but not limited to ANSI Standard T1.111, Chapter 5) is a local matter for the operator of the network. As such it is outside the scope of this specification.

2.2.2 General Interface Characteristics

Bellcore requirement TR-TSV-000905 Common Channel Signalling (CCS) Network Interface Specification, Issue 1, August 1989, and Supplement 1, July 1991 gives overall characteristics of the SPOI. The following clarifications apply to the use of this Document in the context of interconnection to provide AIN 0.0 services:

Section 2.1.1, Overview: "B-links" (Bridge links) are normally referred to as D-links by Stentor owners, but there is no functional difference.

Section 2.1.4, CCS Network Engineering: Link engineering requirements in Stentor Companies specify a normal expected traffic load of 0.35 erlang (or lower) on each link.

Section 3.1.5.1, Transfer Prohibited/Transfer Cluster Prohibited Message: Method B, Response Mode shall be used.

2.3 Layer Characteristics

There are three SS7 protocol parts relevant to the services described in this Document, the Message Transfer Part (MTP), the Signalling Connection Control Part (SCCP) and the Transaction Capabilities Application Part (TCAP). ANSI Standard T1.111–1992, *Message Transfer Part,* ANSI Standard T1.112–1992, *Signalling Connection Control Part (SCCP),* and ANSI Standard T1.114–1992, *Transaction Capabilities Application Part (TCAP)*, describe these three protocol parts. One application protocol is relevant to the services described in this document, the Advanced Intelligent Network 0.0 Application Protocol, defined by Bellcore.

Any use of other SS7 protocol parts, in particular the ISDN User Part (ANSI Standard T1.113), is outside the scope of this Document.

2.3.1 Message Transfer Part

The SS7 Message Transfer Part, specified in ANSI T1.111, provides the basic protocol for transferring Message Signal Units. TR-TSV-000905 together with the clarifications of Section 2.2.2 specifies the use of the Message Transfer Part at the interface.

2.3.2 Signalling Connection Control Part

The SS7 Signalling Connection Control Part, specified in ANSI T1.112, provides additional functions to the MTP to transfer non-circuit related signalling information. GR-1432-CORE, *CCSNIS Supporting SCCP and TCAP*, Issue 1, March 1994, together with the following clarification, specifies the use of the SCCP at the interface;

- All AIN 0.0 messages are encoded in Class 0 (connectionless with no special options) UnitData (UDT) messages only.

2.3.3 Transaction Capabilities Application Part

The SS7 Transaction Capabilities Application Part, specified in ANSI T1.114, controls non-circuit related information exchanged between signalling nodes.   GR-1432-CORE, *CCSNIS Supporting SCCP and TCAP*, Issue 1, March 1994, together with the following clarification, specifies the use of the TCAP for AIN 0.0 at the interface;

- Within the context of this Document, the only TCAP messages that may be seen at the SPOI are those having a TCAP Package Type of: Query with Permission, Response or Conversation with Permission, and Unidirectional, and have a minimum of one of the following TCAP Components: Invoke (Last), Invoke (Not Last), Return Result (Last), Return Error or Reject.

2.3.4 Advanced Intelligent Network Application Protocol

The Advanced Intelligent Network 0.0, specified in Bellcore TR-TSY-000402*, Additional Service Switching Point and Related End Office Capabilities (Including Private Virtual Network Services),* Issue 2, July 1989 and Revision 1, May 1991, is used at the SPOI. TR-TSY-000402, together with the following clarifications, specifies the use of the AIN 0.0 at the interface;

1) TCAP packages may be exchanged between an ASP AIN 0.0 SCP and a Stentor company's AIN 0.0 SSP only when a customer terminated on that SSP makes a call which the SSP recognizes as requiring processing by the ASP's SCP.

2) The Transaction Capabilities Signalling Procedures for AIN 0.0, as described in Appendix B.2 of Bellcore TR-TSY-000402 are supported with the following exceptions;

   - Section B.2.3, *TCAP Information for Response from the BSDB Containing ACG*.
   - Section B.2.10, *TCAP information for BSDB Query for Resource Counter Verification*
   - Section B.2.11, *TCAP information for SSP Response from Query for Resource Counter Verification*
   - In addition to above exceptions, the Bell Canada AIN 0.0 interface does not support the following procedures; Section B.2.4, *TCAP Information for Response from the BSDB Containing a Request for Termination Information* and Section B.2.5*, TCAP Information for Message from SSP with Termination Information.*

   The related data elements in the rest of TR-TSY-000402 used in the context of these exceptions are also not supported

3) Messages supported over this interface will only be generated as a result of specific events determined through the analysis of the received dialled number which must conform to the North American Numbering Plan. These triggering events are generally identified as "3/6/10 Public Office Dial Plan" and "Directory Number.

3.   REFERENCES

Other Authorities:

Rules:

4. ACRONYMS

ACG	Automatic Call Gapping
AIN	Advanced Intelligent Network
ASP	AIN Service Provider
Bellcore	Bell Communications Research
BSDB	Business Services DataBase
CCS7	See SS7
MTP	Message Transfer Part (of SS7)
SCCP	Signalling Connection Control Part (of SS7)
SCP	Service Control Point
SPOI	Signalling Point of Interconnection
SS7	Signalling System Number 7
SSP	Service Switching Point
STP	Signalling Transfer Point
TCAP	Transaction Capabilities Application Part (of SS7)