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**ATM ACCESS AND INTERCONNECT
BETWEEN UK LICENSED
OPERATORS
SIGNALLING ATM ADAPTATION
LAYER (SAAL) UNI TECHNICAL
RECOMMENDATION**

Issue 1

Network Interoperability Consultative Committee
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Normative Information

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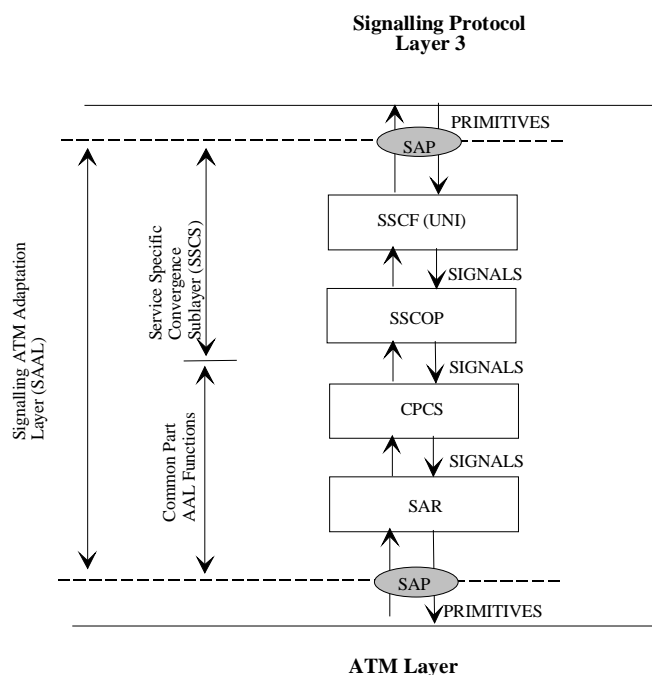
1. Introduction

This document defines the interconnect between UK licensed operators' public ATM networks, based upon the Signalling ATM Adaptation Layer (SAAL) procedures, as developed by the ITU-T and subsequently adopted by both the ATM-Forum (ATM-F) and European Telecommunications Standards Institute (ETSI). The SAAL is designed to operate between the ATM layer and the control plane layer. Its role is very similar to that of the user plane defined AAL's, and as such is based upon AAL5 procedures. Therefore the SAAL not only performs the adaptation between the signalling layer Protocol Data Units (PDUs) to the ATM cell layer and vice versa, but also provides additional services such as error detection and correction using retransmission, flow control, and a keep alive functionality.

The SAAL consists of a number of components, as shown in Figure 1. The SAAL makes use of the service provided by the Common Part Convergence Sublayer (CPCS) and Segmentation and Re-assembly (SAR) which forms the common part of AAL type 5 [2]. The Service Specific Convergence Sublayer (SSCS) part of AAL type 5 [2] is performed by a combination of the Service Specific Connection Oriented Protocol (SSCOP) [4] and a Service Specific Co-ordination Function (SSCF) [5].

The SAAL procedures are independent of the control plane functionality. Therefore the SAAL procedures are applicable to both Soft PVC (S-PVC) and Switched Virtual Connections (SVC) based services. For more information regarding S-PVC and SVCs, see the ATM-TG Overview Rec. [12]. An overview of the SAAL procedures can be found in ITU-T Recommendation Q.2100, [3].

Figure 1: Overview of SAAL



2. Scope

This technical recommendation defines the procedures for the SAAL. It is therefore intended to build upon the 'Interconnect Between UK licensed Operators Based Upon Permanent ATM Connections, (Technical Recommendation),' [11]. The SAAL functionality is divided into a number of layers as shown in Figure 1. The International standards body ITU-T, which was responsible for developing the SAAL procedures, made a distinction between the SSCF at the User Network Interface (UNI) and at the Network Node Interface (NNI).

This technical recommendation defines the procedures related to the SSCF at the UNI. ATM-F NNI based signalling protocols,

such as Private Network-Network Interface (P-NNI) and ATM Inter-Network Interface (AINI) make use of the SSCF at the UNI, rather than the NNI. Conversely, the ITU-T Broadband Integrated Services User Part (B-ISUP) and the ATM-F Broadband Inter Carrier Interface (B-ICI) signalling protocols use the SSCF NNI procedures. It is intended that a separate technical recommendation will be produced by the ATM Task Group addressing the SSCF NNI procedures.

This document covers the following recommendations and standards:-

- ETSI ETS 300 437-1 SSCF for signalling at the UNI [8] derived from ITU-T Rec. Q.2130 [5].

- ETSI ETS 300 436-1 SSCOP [9] derived from ITU-T Rec. Q.2110 [4].
- ETSI ETS 300 428 AAL Specification Type 5 [10] derived from ITU-T Rec. I.363.5 [2].

A definition of terms used within this technical recommendation can be found in ITU-T Rec. I.113 [1]. If any discrepancies occur between ITU-T recommendations and ETSI ETS standards referred to in this PNO-IG technical recommendation, then the ETSI ETS standards shall take precedence.

3. SAAL Characteristics

3.1 SSCF (UNI)

The Service Specific Co-ordination Function, (SSCF) shall be in accordance with ITU-T Rec. Q.2130 [5] with the following conditions listed below.

3.1.1 AAL Management

The procedures for SAAL management, as defined in ITU-T Rec. Q.2144 [7], are only relevant for the SSCF Network Node Interface (NNI), ITU-T Rec. Q.2140 [6]. Therefore ITU-T Rec. Q.2144 [7] procedures are not supported in this PNO-IG technical recommendation.

3.1.2 SAAL Services

The services offered by the SAAL shall be in accordance with Q.2130/Section 5 [5] with the exception that the support of un-assured transfer of data mode shall be for bi-lateral agreement between interconnecting operators.

3.1.3 SSCF Functions

The SSCF functions used within this PNO-IG technical recommendation shall be in accordance with Q.2130/Section 5 [5] with the exception that the support of AAL-UNITDATA primitives shall be for bi-lateral agreement between interconnecting operators.

3.1.4 Layer3 and SSCF Boundary

The primitives between the layer3 and the SSCF shall be in accordance with Q.2130/Section 7 [5] with the exception that AAL-UNITDATA primitives are for bi-lateral agreement.

3.1.5 SSCF and SSCOP Boundary

The primitives between the SSCF and the SSCOP shall be in accordance with Q.2130/Section 8 [5] with the exception that AAL-UNITDATA primitives are for bi-lateral agreement.

3.2 SSCOP

The SSCOP procedures shall be in accordance with ITU-T Rec. Q.2110, [4] with the following conditions listed below:

3.2.1 SSCOP & SSCF Signals

Signals between SSCOP and SSCF shall be in accordance with Q.2110/Section 6.1 [4] with the exception that the AA-UNITDATA signal is for bi-lateral agreement. MAA-signals between the SSCS layer management and SSCOP are not supported in this PNO-IG technical recommendation, since they are only relevant to the SSCF NNI and not the SSCF UNI. AA-RETRIEVE and AA-RETRIEVE COMPLETE signals are not supported in this PNO-IG technical recommendation, since they are not currently defined in the SSCF at the UNI.

3.2.2 Signal Sequences

The constraints for the signal sequences shall be in accordance with Q.2110/Section 6.2, [4] with the exception that AA-UNITDATA signal is for bi-lateral agreement.

3.2.3 SSCOP and CPCS

Signals between SSCOP and SSCF shall be in accordance with Q.2110/Section 6.3 [4].

3.2.4 SSCOP PDUs

The SSCOP Protocol Data Units (PDU) supported shall be in accordance with Q.2110/Section 7.1 [4] with the exception of the Management Data (MD) PDU and Unnumbered Data (UD) PDU. The support of the UD-PDU is for bi-lateral agreement. The MD-PDU is not supported in this PNO-IG technical recommendation.

3.2.5 SSCOP PDU Format

The format of the SSCOP PDUs shall be in accordance with Q.2110/Section 7.2, [4] with the exception of the Management Data, (MD) PDU and Unnumbered Data (UD) PDU. The support of the UD PDU is for bi-lateral agreement. The MD PDU is not supported in this PNO-IG technical recommendation.

Note: The PDU length shall be in accordance with Q.2130/Table 4 [5].

3.2.6 SSCOP Protocol States

The states of the SSCOP protocol shall be in accordance with Q.2110/Section 7.3 [4].

3.2.7 SSCOP State Variables

The SSCOP state variables shall be in accordance with Q.2110/Section 7.4 [4].

3.2.8 SSCOP PDU Parameters

The SSCOP PDU parameters shall be in accordance with Q.2110/Section 7.5 [4].

3.2.9 SSCOP Timers

Procedures for the SSCOP timers shall be in accordance with Q.2110/Section 7.6 [4]. The default values for the SSCOP timers namely, Timer_CC, Timer_KEEP-ALIVE, Timer-POLL, Timer_No-RESPONSE and Timer_IDLE are shown in Q.2130/Table 4 [5]. The values of the SSCOP protocol timers are application specific. The use of these default values are recommended, if however these default values are not used then other values shall be bi-laterally agreed by the interconnecting operators.

3.2.10 SSCOP Parameters

The SSCOP parameters shall be in accordance with Q.2110/Section 7.7 [4]. The use of default values is recommended where these are provided.

3.2.10.1 MaxCC

The default values of MaxCC are shown in Q.2130/Table 4 [5]. If values other than the default values are to be used, then these shall be bi-laterally agreed between the interconnecting operators.

3.2.10.2 MaxPD

The default values of MaxPD are shown in Q.2130/Table 4 [5]. If values other than the default values are to be used, then these shall be bi-laterally agreed between the interconnecting operators.

3.2.10.3 MaxSTAT

The default value of MaxSTAT is 67 as defined in [4]. If values other than the default values are to be used, then these shall be bi-laterally agreed between the interconnecting operators.

3.2.10.4 Clear Buffers

The value shall be bi-laterally agreed between the interconnecting operators.

3.2.10.5 Credit

As defined in Q.2110 [4].

3.2.11 SSCOP Credit and Flow Control

Procedures for the SSCOP credit or window size allocation shall be in accordance with Q.2110/ Section 7.8.1 [4]. It is recommended that the formula stated in Q.2110/Appendix IV [4] is used to calculate the SSCOP window size. If this formula is not used, then other SSCOP window sizes shall be bi-laterally agreed by the interconnecting operators.

The support of Local Flow Control is for bi-lateral agreement between the interconnecting operators. If Local Flow Control is supported, it shall be in accordance with Q.2110/ Section 7.8.2 [4].

3.3 Common Part AAL5

The Common Part of the SAAL is provided by ATM Adaptation Layer type 5 (AAL5). AAL5 is defined in ITU-T Rec. I.363.5 [2]. ITU-T Rec. I.363.5 [2] states that the AAL5 can support two modes of services, namely Message Mode or Streaming Mode. SSCOP supports only the Message Mode service and the Streaming Mode is for further study and therefore not supported in this PNO-IG technical recommendation.

SSCOP assumes the Common Part Convergence Sub-layer, (CPCS) Message Mode of operation without the option of "corrupted data delivery". The optional error discard function for Non-assured operations, as described in ITU-T Rec. I.363.5 [2] is not supported by SSCOP and is therefore not supported in this PNO-IG technical recommendation.

AAL5 General Framework shall be in accordance with ITU-T Rec. I.363.5/Annex B [2].

AAL5 Functional Model shall be in accordance with ITU-T Rec. I.363.5/Annex C [2].

3.3.1 CPCS

The Common Part Convergence Sub-layer, (CPCS) procedures shall be in accordance with ITU-T Rec. I.363.5 [2] with the following conditions.

- Only the procedures for Message Mode shall be supported. The Streaming Mode service is not supported in this PNO-IG technical recommendation.
- The value of the Max_SDU_Deliver_length parameter as described in I.363.5/Section 10.2.4 [2], thus shall be up to 4096 octets in length.
- The support of the reassembly timer, as described in ITU-T I.363.5 [2] or the ETSI equivalent, ETS 300 428 [10] is for bi-lateral agreement. It should be understood that neither ITU-T Rec. I.363.5 [2] or ETS 300 428 [10] define a value for the reassembly timer. If supported, it is recommended that the reassembly timer value be bi-laterally agreed between the interconnecting operators.

3.3.2 SAR

The Segmentation And Reassembly, (SAR) procedures shall be in accordance with ITU-T Rec. I.363.5 [2].

4. Abbreviations

AAL	ATM Adaptation Layer
AINI	ATM Inter-Network Interface
ATM	Asynchronous Transfer Mode
ATM-TG	ATM Task Group
ATM-F	ATM Forum
B-ICI	Broadband Inter Carrier Interface
B-ISUP	Broadband Integrated Services User Part
CPCS	Common Part Convergence Sublayer
ETS	European Telecommunications Standard
ETSI	European Telecommunications Standards Institute
ITU-T	International Telecommunication Union-Telecommunications standardisation sector
MD-PDU	Management Data PDU
NNI	Network Node Interface
PDU	Protocol Data Unit
P-NNI	Private Network-Network Interface
PNO-IG	Public Network Operators- Interest Group
SAAL	Signalling AAL
SAP	Service Access Point
SAR	Segmentation And Re-assembly
SDU	Service Data Unit
S-PVC	Soft Permanent Virtual Channel/Connection
SSCF	Service Specific Co-ordination Function
SSCOP	Service Specific Connection Oriented Protocol
SSCS	Service Specific Convergence Sublayer
SVC	Switched Virtual Channel/Connection
UD-PDU	Unnumbered Data PDU
UNI	User Network Interface

5. References

ITU-T Recommendations

<i>Ref.</i>	<i>Title (year published)</i>
1	ITU-T Rec. I.113 Vocabulary of Terms for Broadband Aspects of ISDN (06/97).
2	ITU-T Rec. I.363.5 B-ISDN ATM adaptation layer specification type 5 (08/96).
3	ITU-T Rec. Q.2100, B-ISDN Signalling ATM Adaptation Layer, (SAAL) Overview Description (07/94).
4	ITU-T Rec. Q.2110, B-ISDN ATM Adaptation Layer Service Specific Connection Oriented Protocol (SSCOP) (07/94).
5	ITU-T Rec. Q.2130, B-ISDN ATM Adaptation Layer Service Specific Co-ordination Function (SSCF) for Signalling at the User Network Interface (UNI) (07/94).
6	ITU-T Rec. Q.2140, B-ISDN ATM Adaptation Layer Service Specific Co-ordination Function (SSCF) for Signalling at the Network Node Interface (NNI) (02/95).
7	ITU-T Rec. Q.2144, B-ISDN ATM Adaptation Layer – Management for the SAAL at the Network Node Interface (NNI) (02/95).

ESTI ETS Standards

Ref.	Title (year published)
8	ETS 300 437-1 B-ISDN ATM Adaptation Layer Service Specific Co-ordination Function (SSCF) for Signalling at the User Network Interface (UNI) (11/95).
9	ETS 300 436-1 B-ISDN ATM Adaptation Layer Service Specific Connection Oriented Protocol (SSCOP) (11/95).
10	ETS 300 428 B-ISDN ATM Adaptation Layer (AAL) Type 5 (08/95).

PNO-IG Recommendations

Ref.	Title (year published)
11	Interconnect Between UK licensed Operators Based Upon Permanent ATM Connections, (Technical Recommendation), Issue 2.0 (07/97) Document Reference PNO-IG/ATM/TG/ CP(97)13
12	ATM Access and Interconnect between UK Licensed Operators, (Overview Recommendation) Issue 2 (10/98) Document Reference PNO-IG/ATM/TG/ CP(98)12

6. History

STATUS	DATE	CHANGES
Issue 1	21 st October 1998	Agreed for release to the PNO-IG steering committee, after comments from ATM Task Group meeting on (21/10/98) were incorporated