



**Satellite Earth Stations and Systems (SES);
Broadband Satellite Multimedia (BSM);
Guidelines for the Satellite Independent
Service Access Point (SI-SAP)**

PREVIEW
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Contents

Intellectual Property Rights	4
Foreword.....	4
Modal verbs terminology.....	4
1 Scope	5
2 References	5
2.1 Normative references	5
2.2 Informative references.....	5
3 Definitions and abbreviations.....	5
3.1 Definitions.....	5
3.2 Abbreviations	6
4 SI-SAP architecture.....	6
4.1 BSM functional architecture.....	6
4.2 Client-Server model	8
4.3 SI-SAP model.....	8
4.4 Protocols for the CSF-3 interface	9
5 SI-SAP addresses and identifiers	11
5.1 General	11
5.2 SI-SAP addressing.....	11
5.2.0 Overview	11
5.2.1 BSM_IDentity (BSM_ID)	11
5.2.2 Unicast and group BSM_IDs.....	12
5.2.3 IP unicast addressing	12
5.2.4 IPv4 multicast addressing	13
5.3 Queue Identifiers (QIDs).....	14
6 SI-SAP functions.....	14
6.1 General	14
6.1.0 Overview of functional planes and groups	14
6.1.1 U-plane functions.....	15
6.1.2 C-plane functions.....	15
6.1.3 M-plane functions	15
6.2 SI-SAP data transfer.....	15
6.3 SI-SAP address resolution.....	16
6.3.1 General.....	16
6.3.2 Static vs. dynamic address resolution	17
6.3.3 Unicast address resolution	17
6.3.4 Multicast address resolution	17
6.4 Resource reservation	18
6.4.1 General.....	18
6.4.2 Resource reservation.....	18
6.4.3 Quality of Service	19
6.5 Group receive	19
6.5.1 General.....	19
6.6 Group transmit.....	20
6.6.1 General.....	20
7 IP interworking scenarios.....	20
7.1 General	20
7.2 Sending unicast data.....	21
7.3 Receiving multicast data	22
Annex A (informative): Bibliography.....	23
History	24

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

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1 Scope

The present document provides a guide to the underlying models and assumptions that have been used to specify the BSM Satellite Independent Service Access Point (SI-SAP) interface.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ETSI TR 101 984: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM); Services and architectures".
 - [i.2] ETSI TS 102 292: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM) services and architectures; Functional architecture for IP interworking with BSM networks".
 - [i.3] ETSI TS 102 295: "Satellite Earth Stations and Systems (SES); Broadband Satellite Multimedia (BSM) services and architectures; BSM Traffic Classes".
 - [i.4] ETSI TR 102 375: "Satellite Independent Service Access Point (SI-SAP) interface: Services".
-

3 Definitions and abbreviations

3.1 Definitions

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

BSM_IDentity (BSM_ID): SI-SAP address that defines the BSM Subnetwork Point of Attachment (SNPA)

NOTE: The BSM_ID is divided into BSM Unicast ID (BSM_UID) and BSM Group ID (BSM_GID).

BSM Subnetwork Point of Attachment (SNPA): SI-SAP endpoint of the BSM data transport services

NOTE: The BSM_ID is used to address data sent to and received from the BSM Subnetwork Point of Attachment.

Queue Identifier (QID): SI-SAP parameter that identifies an abstract queue at the SI-SAP

NOTE: The QID is used to identify a specific lower layer resource when sending (submitting) data via the SI-SAP.

SI-SAP Instance (SAPI): specific independent instance of the SI-SAP in one ST

NOTE: A single unicast BSM_ID (UID) is associated with each instance of the SI-SAP (each SAPI). In addition one or more group BSM_IDs (GIDs) may be associated with each instance of the SI-SAP.

3.2 Abbreviations

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

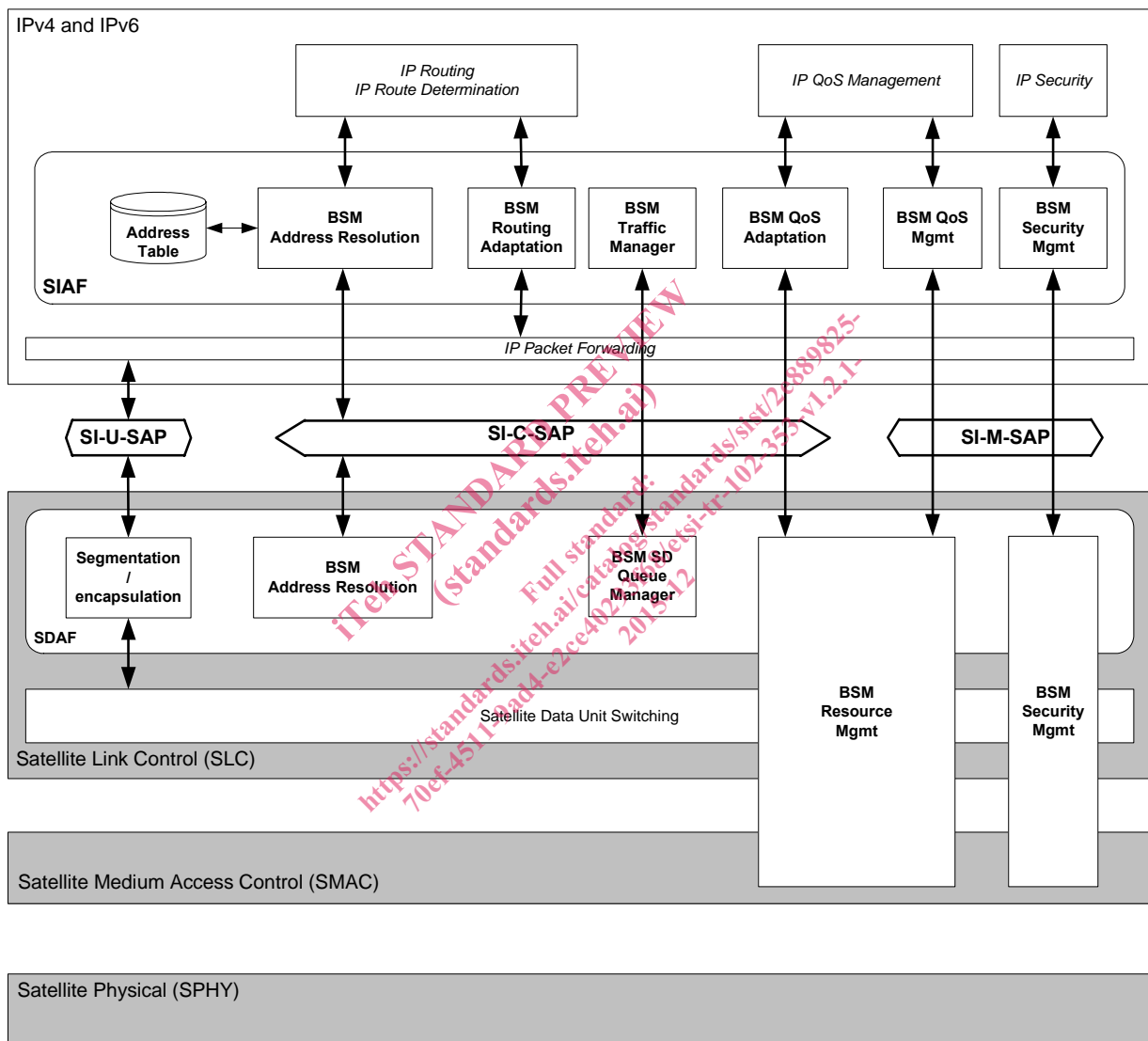
ARP	Address Resolution Protocol
ASM	Any Source Multicast
BSM	Broadband Satellite Multimedia
BSM_GID	BSM Group Identity
BSM_ID	BSM Identity
BSM_UID	BSM Unicast IDentity
CSF	Client Server Function
Flowspec	flow specification
GID	Group ID
ID	IDentity
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
L2Add	Layer 2 Address
LL	Lower Layer
LN	Local Network
MAC	Medium Access Control
NAT	Network Address Translation
ND	Neighbor Discovery
PEP	Performance Enhancing Proxy
QID	Queue IDentity
QoS	Quality of Service
RSVP	Resource ReserVation Protocol
SAPI	SI-SAP Instance
SD	Satellite Dependent
SDAF	Satellite Dependent Adaptation Functions
SD-ARP	Satellite Dependent Address Resolution Protocol
SDU	Service Data Unit
SI	Satellite Independent
SIAF	Satellite Independent Adaptation Functions
SI-SAP	Satellite Independent Service Access Point
SN	Satellite Network
SNPA	BSM SubNetwork Point of Attachment
SSM	Source Specific Multicast
ST	Satellite Terminal
UID	Unicast ID
UL	Upper Layer

4 SI-SAP architecture

4.1 BSM functional architecture

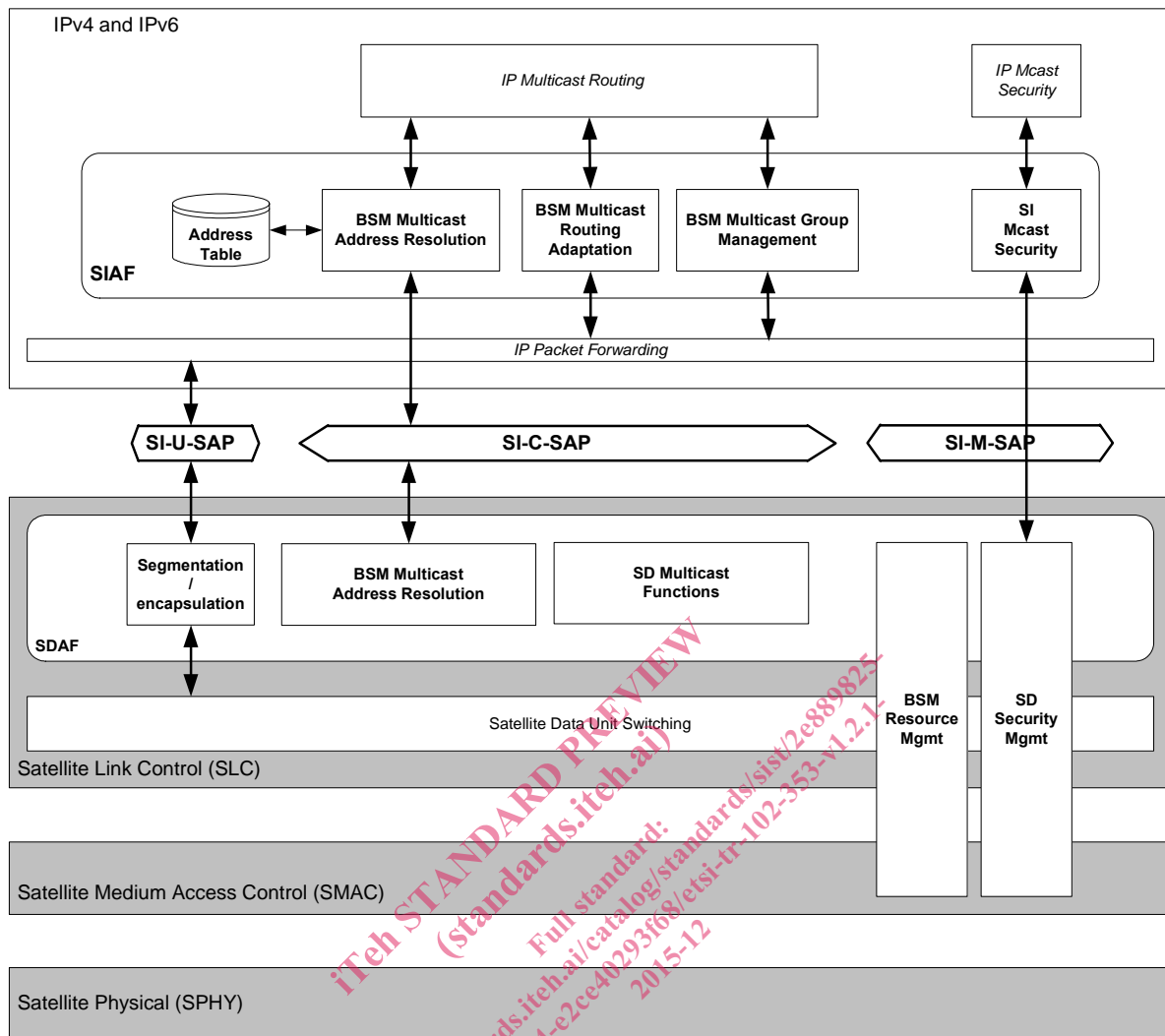
The Satellite Independent Service Access Point (SI-SAP) is introduced in the BSM services and architectures report (see ETSI TR 101 984 [i.1]) and a more detailed functional model of this interface is provided in the BSM functional architecture (see ETSI TS 102 292 [i.2]).

Figure 4.1.1, which is reproduced from the BSM functional architecture (see ETSI TS 102 292 [i.2]) presents the BSM protocol stack for unicast services and figure 4.1.2 presents the same stack showing the multicast functions. Both figures show the location of the Satellite Independent Service Access Point (SI-SAP) interface. This interface provides the BSM with a layer of abstraction for the lower layer functions and makes use of a BSM specific identity, the BSM_ID, to address the BSM subnetwork point of attachment (SNPA). It allows the BSM protocols developed in the Satellite Independent layer to operate over any BSM family. Moreover, the SI-SAP also enables the use of standard Internet protocols for example address resolution or multicast group management, directly over the BSM or with minimal adaptation to lower layer physical characteristics. Lastly the SI-SAP even makes it possible to envisage switching from one satellite system to another while preserving the BSM operator's investment in layer 3 software development.



NOTE: This figure is taken from ETSI TS 102 292 [i.2].

Figure 4.1.1: BSM protocol stack for unicast services



NOTE: This figure is taken from ETSI TS 102 292 [i.2].

Figure 4.1.2: BSM protocol stack for multicast services

4.2 Client-Server model

The BSM functional architecture (see ETSI TS 102 292 [i.2]) defines a Client-Server model that includes three logical interfaces called Client Server Function (CSF) interfaces.

4.3 SI-SAP model

The SI-SAP model divides the protocol stack at an ST into two parts as illustrated in figure 4.3.1:

- 1) The Satellite Independent (SI) Upper Layers (UL).
- 2) The Satellite Dependent (SD) Lower Layers (LL).

The SI-SAP model also defines two adaptation layers. These are also shown in figure 4.3.1:

- 1) The Satellite Independent Adaptation Functions (SIAF) to adapt between the upper layers and the SI-SAP services.
- 2) The Satellite Dependent Adaptation Functions (SDAF) to adapt between the lower layers and the SI-SAP services.

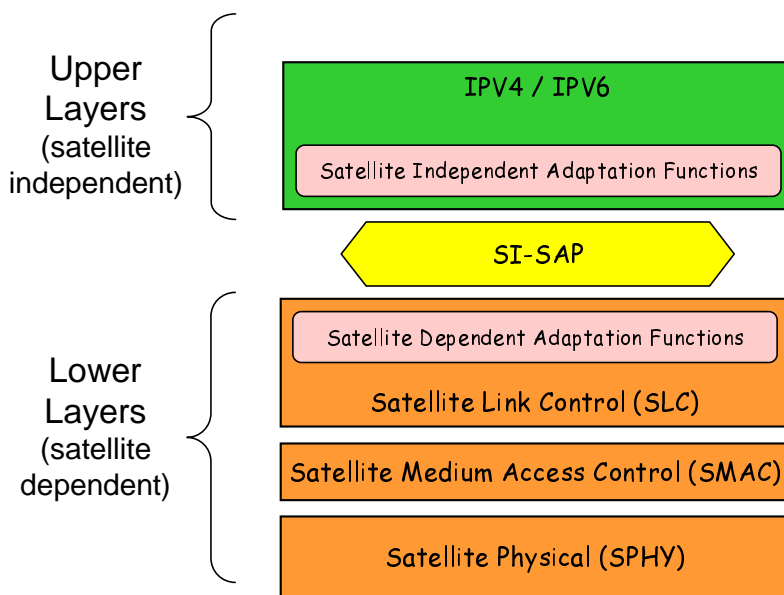


Figure 4.3.1: SI-SAP interface and the protocol stack

4.4 Protocols for the CSF-3 interface

The protocols that are used for the CSF-3 interface (see ETSI TS 102 292 [i.2]) can be divided into satellite independent upper layer protocols and satellite dependent lower layer protocols as illustrated in figure 4.4.1.

NOTE: The adaptation functions (SIAF and SDAF) do not include any protocols. The protocols are assumed to be located in either the IP layer (satellite independent case) or in the SLC/SMAC layer (satellite dependent case).

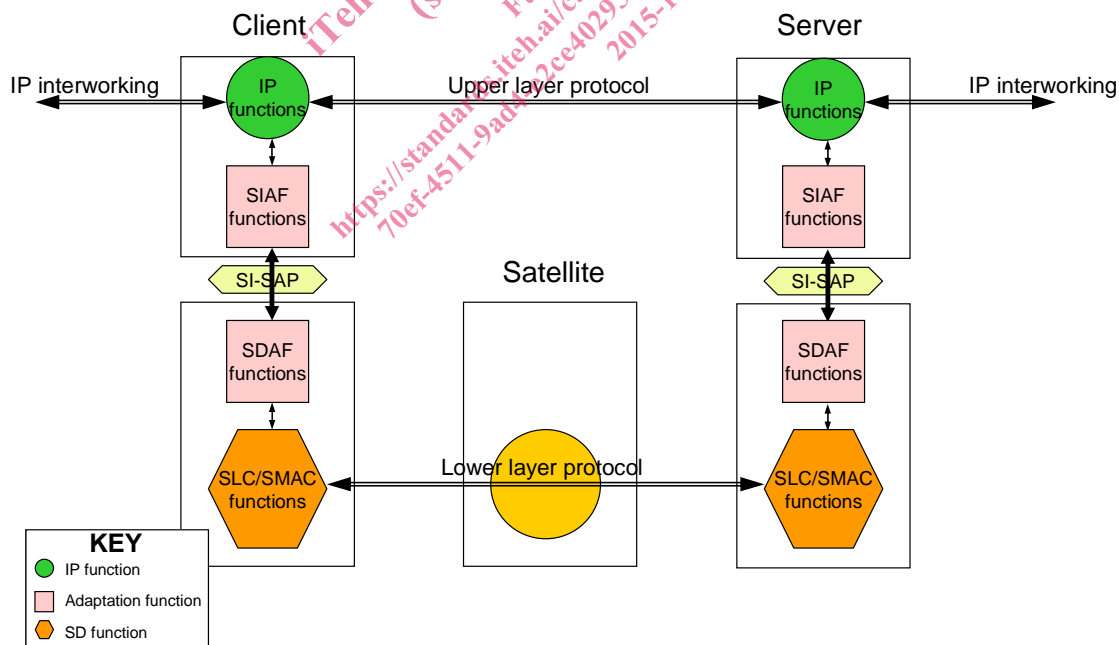


Figure 4.4.1: Protocols for the CSF-3 interface

A given IP interworking function can be realized using either the upper layer protocols or the lower layer protocols as follows:

- Upper Layer protocol (figure 4.4.2): In this case the IP interworking functional exchanges between the Client and Server are carried using a satellite independent upper layer protocol(s). This upper layer protocol is then carried transparently by the SI-SAP U-plane data transport services. The upper layer protocols can be any suitable network layer protocol; for example, standard IETF protocols; or adapted IETF protocols, or non-standard network layer protocols.
- Lower Layer protocol (figure 4.4.3): In this case, the IP interworking functional exchanges between the Client and Server are carried using a satellite dependent lower layer protocol(s). The network layer at the Client and the Server interwork these functions into an SI-SAP C-plane primitive. Below the SI-SAP these primitives activate the appropriate lower layer protocol(s). The available set of SI-SAP C-plane primitives (and the associated functions) is defined in clause 6 of the present document.

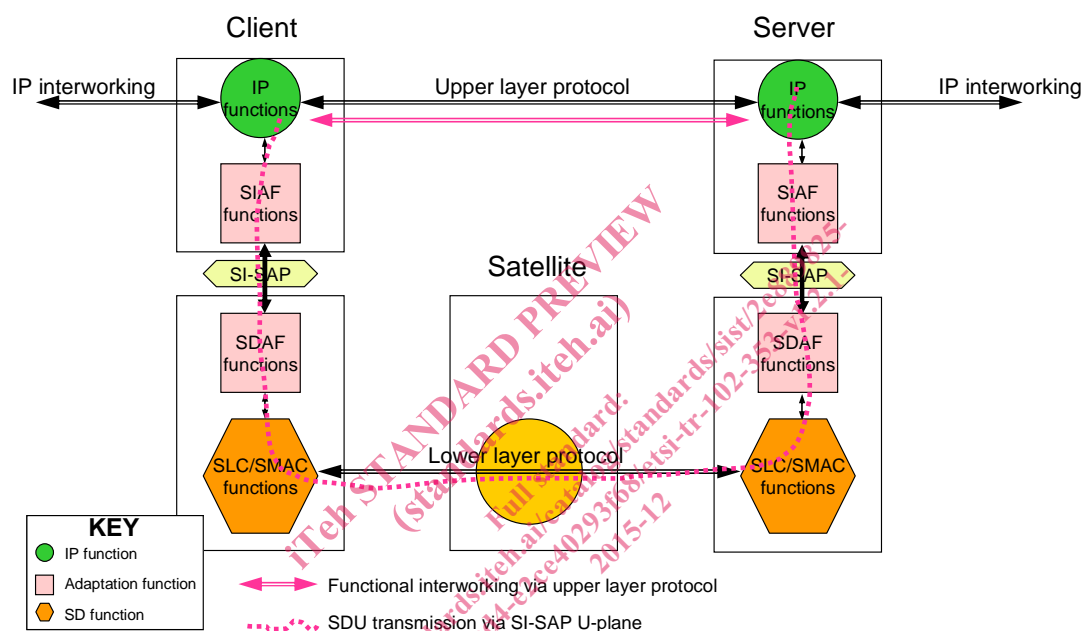


Figure 4.4.2: Interworking using upper layer protocols

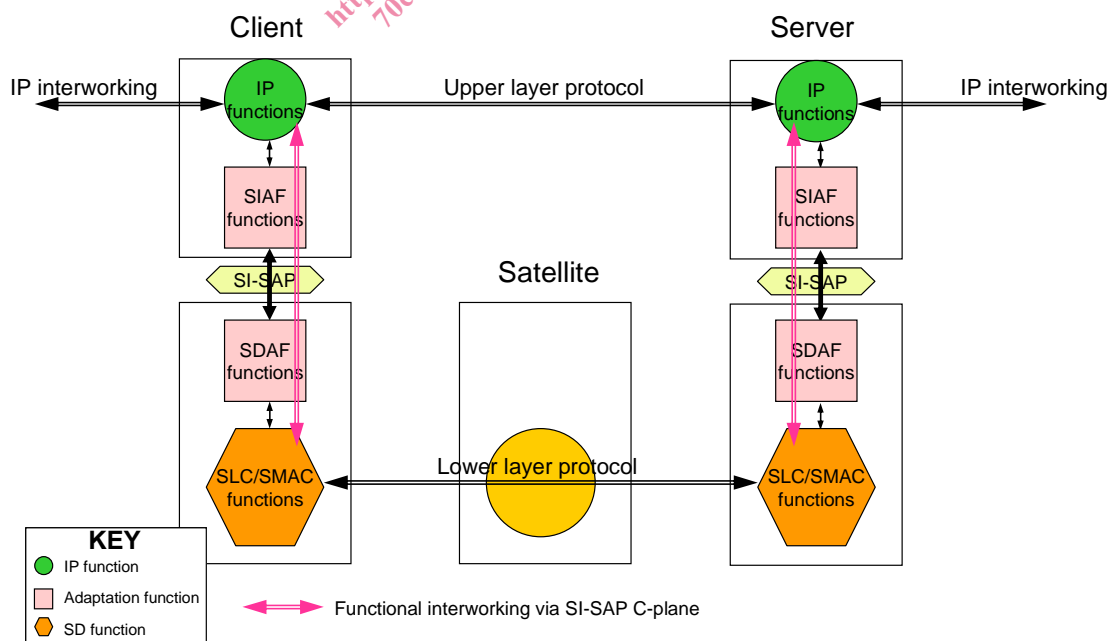


Figure 4.4.3: Interworking using lower layer protocols