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DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

SECURITY

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – GENERIC UPPER LAYERS SECURITY: SECURITY EXCHANGE SERVICE ELEMENT (SESE) SERVICE DEFINITION

ITU-T Recommendation X.831

(Previously "CCITT Recommendation")

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. Some 179 member countries, 84 telecom operating entities, 145 scientific and industrial organizations and 38 international organizations participate in ITU-T which is the body which sets world telecommunications standards (Recommendations).

The approval of Recommendations by the Members of ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, 1993). In addition, the World Telecommunication Standardization Conference (WTSC), which meets every four years, approves Recommendations submitted to it and establishes the study programme for the following period.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC. The text of ITU-T Recommendation X.831 was approved on the 10th of April 1995. The identical text is also published as ISO/IEC International Standard 11586-2.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

ITU-T X-SERIES RECOMMENDATIONS

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

(February 1994)

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Summary

This Recommendation | International Standard belongs to a series of Recommendations which provide a set of facilities to aid the construction of OSI Upper Layer protocols which support the provision of security services. This Recommendation defines the service provided by the Security Exchange Service Element (SESE). The SESE is an application-service-element (ASE) which facilitates the communication of security information to support the provision of security services within the Application Layer of OSI.

Introduction

This Recommendation | International Standard forms part of a series of Recommendations | multi-part International Standards, which provide(s) a set of facilities to aid the construction of Upper Layers protocols which support the provision of security services. The parts are as follows:

- Part 1: Overview, Models and Notation;
- Part 2: Security Exchange Service Element Service Definition;
- Part 3: Security Exchange Service Element Protocol Specification;
- Part 4: Protecting Transfer Syntax Specification;
- Part 5: Security Exchange Service Element PICS Proforma;
- Part 6: Protecting Transfer Syntax PICS Proforma.

This Recommendation | International Standard constitutes Part 2 of this series.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – GENERIC UPPER LAYERS SECURITY: SECURITY EXCHANGE SERVICE ELEMENT (SESE) SERVICE DEFINITION

1 Scope

1.1 This series of Recommendations | International Standards defines a set of generic facilities to assist in the provision of security services in application layer protocols. These include:

a) a set of notational tools to support the specification of selective field protection requirements in an abstract syntax specification, and to support the specification of security exchanges and security transformations;

b) a service definition, protocol specification and PICS proforma for an application-service-element (ASE) to support the provision of security services within the Application Layer;

c) a specification and PICS proforma for a security transfer syntax, associated with Presentation Layer support for security services in the Application Layer.

1.2 This Recommendation | International Standard defines the service provided by the Security Exchange Service Element (SESE). The SESE is an ASE which allows the communication of security information to support the provision of security services within the Application Layer.

2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

– ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model.*

– ITU-T Recommendation X.803 (1994) | ISO/IEC 10745:1995, *Information technology – Open Systems Interconnection – Upper layers security model.*

3 Definitions

The following terms are used as defined in ITU-T Rec. X.803 | ISO/IEC 10745:

– security exchange;

– security exchange item.

4 Abbreviations

For the purposes of this Recommendation | International Standard, the following abbreviations apply:

ASE Application Service Element

OSI Open Systems Interconnection

PICS Protocol Implementation Conformance Statement

SEI Security Exchange Item

5 Conventions

Clause 7 employs a tabular presentation of the SESE service primitive parameters. Each parameter is summarized using the following notation:

M Presence of the parameter is mandatory

O Presence of the parameter is an SESE protocol machine option

U Presence of the parameter is an SESE service user option

C Presence of the parameter is conditional

(=) The value of this parameter is identical to the value of the corresponding parameter of the preceding SESE service primitive.

6 Service overview

The security exchange service element provides for the communication of information associated with any security exchange, as described in Part 1. This service is typically used for the transfer of authentication, access control, non-repudiation or security management information.

6.1 Specific service facilities

The following service facilities are defined:

a) SE-TRANSFER;

b) SE-U-ABORT;

c) SE-P-ABORT.

The SE-TRANSFER service facility is used to initiate a security exchange of a certain type, transfer the first security-exchange-item (SEI), as well as transfer the other SEIs of a security exchange. It is the only service facility required in completing a security exchange.

The SE-U-ABORT service facility is used by the SESE service user to indicate that an error has occurred. This service is used to abnormally terminate a security exchange in progress. Optionally, this service may also abnormally terminate the ASO-association.

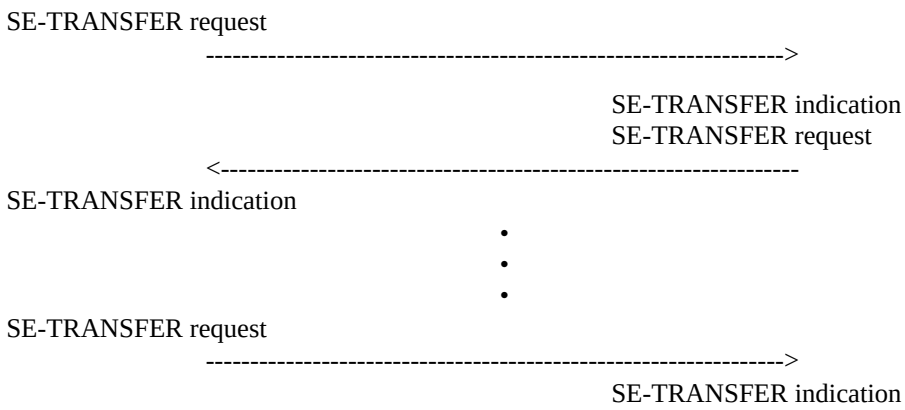
The SE-P-ABORT service facility is used by the SESE service provider to indicate that an error has occurred. This service is used to abnormally terminate a security exchange in progress. Optionally, this service may also abnormally terminate the ASO-association.

6.2 Procedural model for SE-TRANSFER service facility

Part 1 of this Recommendation | International Standard defines the following procedural model for security exchanges:

An initial Security Exchange Item (SEI) is transferred from A to B. This is optionally followed by one or more transfers of SEIs between A and B, according to the specific security exchange identified in the SE-TRANSFER. The sequence may be terminated upon receipt of any SEI, by generation of an error indication by either service user or service provider.

The time-sequence diagram shown below is an example illustrating the special case of a sequence of SEI transfers in alternate directions for an n-way security exchange. (This is an example of the “Alternating” class of exchange defined in 6.1 of ITU-T Rec. X.830 | ISO/IEC 11586-1.)



7 Service definition

The SESE service primitives are of the following types:

SE-TRANSFER	Non-confirmed
SE-U-ABORT	Non-confirmed
SE-P-ABORT	Provider-initiated

7.1 Parameters of service primitives

Following are descriptions of the service primitives parameters.

7.1.1 Security exchange identifier

This parameter identifies the particular type of security exchange being initiated. The identifier is established when the security exchange is defined, using the SECURITY-EXCHANGE information object class defined in Part 1.

7.1.2 Invocation identifier

This parameter identifies a particular security exchange invocation. It is used for subsequently referring to that invocation for correlation purposes, in a SE-TRANSFER, SE-U-ABORT, or SE-P-ABORT primitives.

Invocation identifiers are especially useful in handling multiple security exchange invocations within the context of, for example, an application association.

Invocation identifiers are provided by the users of services which initiate security exchanges, and it is the responsibility of such users to ensure that these identifiers are unambiguous within the scope of all active security exchange invocations.

7.1.3 Security exchange item

The item to be conveyed, as implied by the security exchange identifier.

7.1.4 Item identifier

In a SE-TRANSFER primitive, this parameter indicates which item of the security exchange this primitive is conveying. In a SE-U-ABORT or SE-P-ABORT primitive, this parameter indicates the item of a security exchange on which an error condition has been detected.

The specification of a security exchange may place specific constraints on the use of the “item identifier”. It is the responsibility of the SESE user to ensure that these constraints are met.

7.1.5 Start flag

In a SE-TRANSFER primitive, this parameter is used to indicate the transfer of the first security-exchange-item of a security exchange.

7.1.6 End flag

In a SE-TRANSFER primitive, this parameter is used to indicate that this security exchange item corresponds to the last security exchange required to satisfy the security mechanism. It is needed to accommodate those mechanisms requiring n exchanges, where n is not known *a priori*.

7.1.7 Error list

This parameter is one or more lists of error codes with optional error parameters. The error code indicates the cause of a SE-U-ABORT being generated. Error codes are established when a security exchange is defined, using the SE-ERROR information object class defined in Part 1. The optional error parameters provide additional information describing the cause of an abort.

7.1.8 Problem code

This parameter indicates the cause of an SE-P-ABORT being generated. The set of possible values is specified in clause 6 of Part 3.

7.1.9 Fatality indicator

In a SE-U-ABORT request primitive, this parameter is used to indicate to the SESE service provider whether or not the ASO-association (e.g. application association) must be terminated.

In a SE-U-ABORT indication and SE-P-ABORT indication primitives, this parameter is used to indicate to the SESE service user whether or not the ASO-association (e.g. application association) must be terminated.

7.2 Service primitives

The parameters of the SESE service primitives are provided below. (Refer to 6.1 for a definition of the SESE services, and to 7.1 for a description of the specific parameters.)

7.2.1 SE-TRANSFER service

The parameters of the SE-TRANSFER service are as follows:

Parameter Name	*Req*	*Ind*
Security exchange identifier	M	M(=)
Invocation identifier	U	C(=)
Security exchange item	M	M(=)
Item identifier	U	C(=)
Start flag	U	C(=)
End flag	U	C(=)

7.2.2 SE-U-ABORT service

The parameters of the SE-U-ABORT service are as follows:

Parameter Name	*Req*	*Ind*
Invocation identifier	U	C(=)
Item identifier	U	C(=)
Error list	U	C(=)
Fatality Indicator	U	C(=)

7.2.3 SE-P-ABORT service

The parameters of the SE-P-ABORT service are as follows:

Parameter Name	*Ind*
Invocation identifier	O
Item identifier	O
Problem code	M
Fatality Indicator	O

8 Sequencing information

The only sequencing constraint stipulated in this Service definition is that the invocation of SE-TRANSFER primitives with the same invocation identifier must be consistent with 7.1.2.