INTERNATIONAL STANDARD

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AMENDMENT 2
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Information technology — Open Systems Interconnection — Connection-oriented Session protocol: Protocol specification

AMENDMENT 2: Nested connections functional unit

Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Protocole de session en mode connexion: Spécification du protocole

AMENDEMENT 2: Unité fonctionnelle de connexions nichée

Reference number
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Foreword

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Amendment 2 to ISO/IEC 8327-1:1996 was prepared by ITU-T (as ITU-T Rec. X.225/Amd.2) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC. The identical text is published as ITU-T Rec. X.225/Amd.2.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – CONNECTION-ORIENTED SESSION PROTOCOL: PROTOCOL SPECIFICATION

AMENDMENT 2
Nested connections functional unit

1) Subclause 2.1

Insert a new reference in numerical order:

– ITU-T Recommendation X.207 (1993) | ISO/IEC 9545:1994, *Information technology – Open Systems Interconnection – Application layer structure*.

NOTE – ITU-T Rec. X.207 | ISO/IEC 9545 is not essential for the application of this Recommendation | International Standard, but is included in the list of references as it has been referred to, for information, in relation to the applicability of the nested connections functional unit.

2) Subclause 3.2

Add after item i)*:*

j) nested session connection;

k) nested session exception.

3) Subclause 5.6.10

Add to Table 3 a new row just before the Notes:

Nested connections		No additional associated SPDUs	

4) New subclause 5.6.15

Add a new subclause as follows:

5.6.15 Nested Connections functional unit

The nested connections functional unit supports the use of nested session connections.

NOTE – Nested session connections enable a new Application Service Object specification (see ITU-T Rec. X.207 | ISO/IEC 9545) to specify the inclusion within the Object of an Application Service Object governed by an existing specification. The nested session connection permits the inner Application Service Object to have full and independent access to session services (through the use of presentation services) while enabling the outer Application Service Object specification, through actions on the containing connection to retain control of synchronization, resynchronization, and aborting. The sequence of primitives issued for nested connections and for enclosing connections is preserved by the session layer.

5) New subclause 5.8 *bis*

Add a new subclause just before 5.9 as follows:

5.8 *bis* Nested connection identifier

Each session connection has associated with it a nested connection identifier that is a value from 0 to 255 encoded as a single octet. The outermost session connection has the value zero implicitly associated.

When a nested connection is initiated, the initiator of that session connection assigns a nested connection identifier which is currently not in use for any nested connection (at any depth) on the transport connection to which the nested connection is assigned.

Nested connections initiated by the initiator of the transport connection have the most significant bit of the nested connection identifier set to one. Nested connections initiated by the responder of the transport connection have the most significant bit of the nested connection identifier set to zero.

The nested connection identifier is carried in all SPDUs issued as part of a nested connection. Additionally, the CONNECT SPDU carries a parent nested connection identifier that identifies the immediately enclosing session connection for the new connection.

6) Subclause 6.1.4

Insert after first paragraph of this subclause:

When the nested connections functional unit has been negotiated for a session connection, a new nested session connection may be assigned to the transport connection to which the existing connection has been assigned. This assignment occurs in the initiator SPM if and only if an S-CONNECT request primitive is issued at a connection end-point nested within an existing session connection end-point. It occurs in the responder SPM if a CONNECT SPDU is received in a transport connection on which a session connection is in progress, and results in the creation of a nested session connection end-point within the connection end-point of the parent session connection (as identified by the parent nested connection identifier in the CONNECT SPDU) and an S-CONNECT indication primitive at the new (nested) connection end-point.

Change the original fourth paragraph (beginning Only the initiator ...*) of this subclause:*

Only the initiator of a transport connection is permitted to issue the CONNECT SPDU when there is no session connection on that transport connection. Where the nested connections functional unit has been agreed, both the initiator and the responder can issue the CONNECT SPDU for a nested session connection.

Change the original fifth paragraph (beginning When a session connection ...*) of this subclause:*

When a session connection is terminated, all nested connections which are not yet terminated are terminated with a session provider abort. When the outermost session connection is terminated, the underlying transport connection is also terminated, unless reuse of the transport connection has been agreed.

7) New subclause 6.3.8

Add a new subclause as follows:

6.3.8 Processing order of SPDUs on nested connections

The sequence of primitive events on a nested connection in relation to events on enclosing connections shall be preserved in the transfer of the corresponding SPDUs, and in the issue of corresponding service primitives.

Where the SPM of any connection enclosing a nested connection is discarding DATA SPDUs, all SPDUs on the nested connection shall be discarded, and a nested session exception occurs for the nested connection if any SPDUs are discarded for this reason. Where the SPM of any connection enclosing a nested connection is deferring the passing of primitives (as the result of a received SPDU on the expedited path) to the service user, it shall also defer the processing of SPDUs for a nested connection which are received on the expedited path.

NOTE – The service definition prevents the issue of any service primitives on a nested session connection unless an S-DATA primitive can be issued at that time on all enclosing session connections. It is the responsibility of enclosing application service object specifications to ensure that such states are entered in a timely manner to support the needs of any embedded application service object specification.

8) Subclause 6.5

Add at the end of this subclause:

NOTE – If such flow control is exercised, it affects all session connections that are assigned to this transport connection.

9) Subclause 7.1

Change this subclause to read:

The CONNECT SPDU is transmitted by the initiator of the transport connection (or in the case of a nested session connection, by either the initiator or the responder of the transport connection) on a previously assigned transport connection in order to initiate a session connection.

10) Subclause 7.1.1

Add a sentence to the end of 7.1.1 d):

For nested session connections, the service primitive does not contain corresponding parameters, and these parameters are absent in the protocol.

Add two new items at the end of 7.1.1:

g) For a nested session connection only, a parent nested connection identifier parameter which identifies the parent session connection.

h) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

11) Subclause 7.2.1

Add at the end of this subclause:

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

12) Subclause 7.3.1

Add at the end of this subclause:

c) for a nested session connection only, the nested connection identifier parameter assigned to this connection.

13) Subclause 7.4.1

Add a sentence to the end of 7.4.1 f):

For nested session connections, the service primitive does not contain corresponding parameters, and these parameters are absent in the protocol.

Add a new item h) *as follows:*

h) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

14) Subclause 7.5.1

Add at the end of this subclause:

g) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

NOTE – For a nested connection, the transport disconnect parameter shall always be set to indicate retention of the transport connection.

15) Subclause 7.5.2

Add after the third sentence of this subclause:

If the refused session connection was a nested connection, there is no further processing by this session protocol machine (the transport connection is always retained).

Change the beginning of the original fourth sentence (starts If the Transport Disconnect parameter ...*) to:*

If the refused session connection was not a nested connection, and the Transport Disconnect parameter ...

Replace Otherwise *at the beginning of the original fifth sentence by:*

If the refused session connection was not a nested connection, and the Transport Disconnect parameter does not indicate that the transport connection can be re-used, ...

16) Subclause 7.5.3

Add after the second sentence of this subclause:

If the refused session connection was a nested connection, the nested connection identifier becomes available for re-use and there is no further processing by this session protocol machine (the transport connection is always retained).

Change the beginning of the original third sentence (begins If the Transport Disconnect parameter ...*) to:*

If the refused session connection was not a nested connection, and the Transport Disconnect parameter ...

Replace Otherwise *at the beginning of the original fourth sentence by:*

If the refused session connection was not a nested connection, and the Transport Disconnect parameter does not indicate that the transport connection can be re-used, ...

17) Subclause 7.6.1

Add at the end of this subclause:

d) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

NOTE – For a nested connection, the transport disconnect parameter shall always be set to indicate retention of the transport connection.

18) Subclause 7.7.1

Add at the end of this subclause:

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

19) Subclause 7.7.2

Add a new sentence at the end of paragraph one of this subclause:

The nested connection identifier becomes available for re-use.

Add two new paragraphs at the end of this subclause:

If the session connection that was released contains nested session connections, then an S-P-ABORT indication shall be signalled on all nested session connections, and their nested connection identifiers become available for re-use.

If the session connection that was released was a nested connection, then there is no further processing by this session protocol machine (the transport connection is always retained).

20) Subclause 7.7.3

Add a new sentence at the end of paragraph one of this subclause:

The nested connection identifier becomes available for re-use.

Add a new paragraph after paragraph one of this subclause:

If the session connection that was released contains nested session connections, then an S-P-ABORT indication shall be signalled on all nested session connections, and their nested connection identifiers become available for re-use.

Replace Otherwise *at the beginning of the second sentence of the original paragraph two of this subclause by:*

If the session connection that was released was a nested connection, then there is no further processing by this session protocol machine (the transport connection is always retained).

21) Subclause 7.8.1

Add at the end of this subclause:

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

22) Subclause 7.9

Add to the end of the second sentence of this subclause:

or when a nested session exception occurs that is not signaled by an EXCEPTION REPORT SPDU or when an enclosing session connection terminates.

23) Subclause 7.9.1.1

Add immediately after 7.9.1.1 a):

NOTE – For a nested connection, the transport disconnect parameter shall always be set to indicate retention of the transport connection.

Add a new item c) *to* 7.9.1.1 *and rename existing* c) *as* d)*:*

c) for a nested session connection only, the nested connection identifier parameter assigned to this connection.

24) Subclause 7.9.1.2

Add immediately after 7.9.1.2 a):

NOTE – For a nested connection, the transport disconnect parameter shall always be set to indicate retention of the transport connection.

Add a new item c) *to this subclause and rename existing* c) *as* d)*:*

c) for a nested session connection only, the nested connection identifier parameter assigned to this connection.

25) Subclause 7.9.2

Add after any state of the SPM *in paragraph one of this subclause:*

... or the occurrence of a nested session exception which is not signaled by an EXCEPTION REPORT SPDU, or the termination of an enclosing session connection (in these cases the Reflect Parameter Values parameter shall be present and shall be empty – zero length contents) ....

Add two new paragraphs after paragraph three of this subclause:

If the session connection contains nested session connections, then an S-P-ABORT indication shall be signalled on all nested session connections, and their nested connection identifiers become available for re-use.

If the session connection was itself a nested connection, the SPM waits for an ABORT ACCEPT SPDU.

Replace The SPM starts the timer, *at the beginning of the original paragraph four of this subclause by:*

If the session connection was not a nested connection, the SPM starts the timer, ...

26) Subclause 7.9.3

Break the first paragraph of this subclause into two separate paragraphs after the second sentence. Insert the following two new paragraphs between these paragraphs:

If the session connection contains nested session connections, then an S-P-ABORT indication shall be signalled on all nested session connections, and their nested connection identifiers become available for re-use.

If the session connection that was released was itself a nested connection, an ABORT ACCEPT SPDU is sent. The nested connection identifier becomes available for re-use.

Change the beginning of the now fourth paragraph of this subclause (starts If the Transport Disconnect parameter ...*) to:*

If the session connection was not a nested connection, and the Transport Disconnect parameter ...

Change the beginning of the second sentence of the now fourth paragraph of this subclause (starts If the Transport Disconnect parameter ...*) to:*

If the session connection was not a nested connection, and either the Transport Disconnect parameter ...

27) Subclause 7.10

Add a new paragraph after paragraph one of this subclause:

The ABORT ACCEPT SPDU is never issued for a nested session connection.

28) Subclause 7.11.1

Add a new item b) *and rename the existing* b) *as* c)*:*

b) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

29) Subclauses 7.12.1 and 7.12.2

Replace these two subclauses with:

7.12.1 Content of EXPEDITED SPDU

7.12.1.1 If segmenting of the SSDU is not required (see 6.3.5), the EXPEDITED SPDU contains:

a) for a nested session connection only, the nested connection identifier parameter assigned to this connection;

b) a User Information Field which allows a limited amount of transparent user data to be transferred.

NOTE – Segmentation can only be required for a nested session connection. It shall not be used otherwise.

7.12.1.2 If the SSDU is to be segmented, the first EXPEDITED SPDU contains:

a) the nested connection identifier parameter assigned to this connection;

b) an Enclosure Item parameter which indicates that this SPDU is the beginning of the SSDU and not the end of the SSDU;

c) a User Information Field containing the first eight octets of the User Information.

The second (and last) SPDU contains:

d) an Enclosure Item parameter which indicates that this SPDU is not the beginning of the SSDU and is the end of the SSDU;

e) a User Information Field containing all octets after the first eight of the User Information.

7.12.2 Sending the EXPEDITED SPDU

An S-EXPEDITED-DATA request results in one or two EXPEDITED SPDUs being sent on the transport expedited flow. There will be two EXPEDITED SPDUs if and only if the S-EXPEDITED-DATA request is on a nested session connection and contains User Information of more than 11 octets.

30) Subclause 7.13.1

Add a new item b) *and rename the existing* b) *as* c)*:*

b) for a nested session connection only, the nested connection identifier parameter assigned to this connection.

31) Subclause 7.14.1

Add a new item b) *and rename the existing* b) *as* c)*:*

b) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

32) Subclause 7.15.1

Add a new item b) *and rename the existing* b) *as* c)*:*

b) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

33) Subclause 7.16.1

Add a new item c) *and rename the existing* c) *as* d)*:*

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

34) Subclause 7.17.1

Add a new item c) *and rename the existing* c) *as* d)*:*

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

35) Subclause 7.18.1

Add a new item b) *and rename the existing* b) *as* c)*:*

b) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

36) Subclause 7.19.1

Add to the end of the paragraph:

..., except for a nested session connection, when it contains the nested connection identifier parameter assigned to this connection.

37) Subclause 7.20.1

Add a new item d) *and rename the existing* d) *as* e)*:*

d) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

38) Subclause 7.21.1

Add a new item c) *and rename the existing* c) *as* d)*:*

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

39) Subclause 7.22.1

Add a new item d) *and rename the existing* d) *as* e)*:*

d) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

40) Subclause 7.23.1

Add a new item d) *and rename the existing* d) *as* e)*:*

d) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

41) Subclause 7.24.1

Add a new item g) *and rename the existing* g) *as* h)*:*

g) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

42) Subclause 7.25.1

Add a new item g) *and rename the existing* g) *as* h)*:*

g) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

43) Subclause 7.26.1

Add a new item d)*:*

d) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

44) Subclause 7.27

Add at the end of the first sentence:

or that an SPDU on a nested session connection has been discarded.

45) Subclause 7.27.1

Add at the end of the paragraph:

For a nested session connection, it also contains the nested connection identifier parameter assigned to this connection.

46) Subclause 7.27.2

Add after the first sentence:

The SPM may also generate an EXCEPTION REPORT SPDU if a nested session exception occurs. In this case the Reflect Parameter Values parameters will be present but will be empty (zero length contents). If a nested session exception occurs and an EXCEPTION REPORT SPDU is not generated, then an ABORT SPDU shall be generated as specified in 7.9.

47) Subclause 7.28.1

Add a new item c) *and rename the existing* c) *as* d)*:*

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

48) Subclause 7.29.1

Add a new item c) *and rename the existing* c) *as* d)*:*

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

49) Subclause 7.30.1

Add a new item d) *and rename the existing* d) *as* e)*:*

d) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

50) Subclause 7.31.1

Add a new item c) *and rename the existing* c) *as* d)*:*

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

51) Subclause 7.32.1

Add a new item b) *and rename the existing* b) *as* c)*:*

b) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

52) Subclause 7.33.1

Add a new item c) *and rename the existing* c) *as* d)*:*

c) For a nested session connection only, the nested connection identifier parameter assigned to this connection.

53) Subclause 7.34.1

Add a new item b) *and rename the existing* b) *as* c)*:*

b) For a nested session connection only, the nested connection identifier parameter assigned to this connection.