TECHNICAL REPORT

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SUBJECT/TASK (title)

ELCOM-90 Presentation service definition

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RESULT (summary)

This document is one of a series of technical reports which form the complete ELCOM-90 documentation. This is version .03 of the report with minor changes regarding responsible people and references. Future updates and new versions will NOT be published for this reason. New versions will only be submitted when technical changes are made.

Please see SINTEF's homepage at: http://www.sintef.no/ELCOM-90. From here you can download the latest version of all relevant documents as pdf-files for free.

This report defines services provided to the application layer by the presentation layer in the ELCOM-data communication concept. The services provided are: establishing, maintaining, using and disconnecting a connection between two application entities.

KEYWORDS

SELECTED BY AUTHOR(S)	Data communication	Control centres
	Communication protocols	Energy management

TABLE OF CONTENTS

1   INTRODUCTION

The services defined in this document supplies the process control application with tools facilitating communication.

The main goals for the design of these services are:

- Simplicity
- Adaptability
- Independence of architecture of lower layers
  (Allowing the use of ISO-protocols at a later development stage.)

Acknowledgement

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2   SCOPE AND FIELD OF APPLICATION

The service primitives defined in the ELCOM-90 - Presentation Service Definition - together with the primitives defined in the ELCOM-90-Application Service Definition - are regarded currently sufficient for communication between computers in a general process control environment. The primitives comprise a minimum set able to fulfil the following requirements:

- Allowing the inclusion of standard protocols for all layers below the application layer.
- Allowing extensions in the services to cope with the future OSI requirements.

3 ASSOCIATED DOCUMENTS

3.1 ELCOM-83 documents

[1]: TR 3522: **ELCOM-83 Application Service Definition**
Norwegian Electric Power Research Institute, Trondheim, Norway, 1988-07-05

[2]: TR 3528: **ELCOM-83 Application Protocol Definition**
Norwegian Electric Power Research Institute, Trondheim, Norway, 1988-07-14

[3]: TR 3523: **ELCOM-83 Definition of Local Application Interface**
Norwegian Electric Power Research Institute, Trondheim, Norway, 1988-07-05

[4]: TR 3524: **ELCOM-83 Presentation Service Definition**
Norwegian Electric Power Research Institute, Trondheim, Norway, 1988-07-06

[5]: TR 3527: **ELCOM-83 Presentation Protocol Definition**
Norwegian Electric Power Research Institute, Trondheim, Norway, 1988-07-13

[6]: TR 3532: **ELCOM-83 Definition of Local Presentation Interface**
Norwegian Electric Power Research Institute, Trondheim, Norway, 1988-09-12

[7]: TR 3649: **ELCOM-83 Conventions**
Norwegian Electric Power Research Institute, Trondheim, Norway, 1989-12-20
ISBN 82-594-0086-3

3.2 ELCOM-90 documents

This document is one of a series of technical reports which form the complete ELCOM-90 documentation. Below you will find the numbers and titles for all the associated technical reports. New versions may be submitted when technical changes are made.
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[8]: TR 3701: **ELCOM-90 Application Programming Interface Specification**

[9]: TR 3702: **ELCOM-90 Application Service Element. Service Definition.**

[10]: TR 3703: **ELCOM-90 Application Service Element. Protocol Specification**

[11]: TR 3704: **ELCOM-90 Presentation Programming Interface Specification.**

[12]: TR 3705: **ELCOM-90 Presentation Service Definition**

[13]: TR 3706: **ELCOM-90 Presentation Protocol Specification**

[14]: TR 3825: **ELCOM-90 User Element Conventions**

[15]:   TR A3933: **ELCOM-90 Local Conventions**

[16]   TR A4687: **PONG. The ELCOM net-watch procedure for TCP/IP networks**

[17]   TR A4124: **ELCOM-90 Application Service Element, User's manual.**

[18]   TR A6196: **Securing ELCOM-90 with TLS.**

4 DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

Initiator: The service user responsible for association establishment/group configuration, data transfer, and association termination (e.g. on a background computer as data sink).

Responder: The peer service user to the initiator (e.g. on a process computer as data source responding to the requests from the initiator). A Service user may act as initiator and responder at the same time.

4.2 Abbreviations

PS   Presentation Service
PSAP   Presentation Service Access Point
PS-User   Presentation Service User
PSDU   Presentation Service Data Unit
P-   Presentation -

5 CONVENTIONS

The following notation is used in parameter tables:

M   The parameter is mandatory.
C   The parameter is conditional.
(=)   The value of the parameter is identical to the corresponding parameter in the interaction described by the preceding related service primitive.
U   The parameter is a user option.
blank   The parameter is not present.

6 OVERVIEW AND GENERAL CHARACTERISTICS

This document defines services for establishing, maintaining, using and disconnecting a presentation connection between two application entities.

7 FACILITIES OF THE SERVICE

7.1 The Connection Establishment Facility

The connection establishment facility enables two PS-users to establish a presentation connection between them.

Simultaneous attempts by both users to establish a connection between them may result in two connections. This is a matter for the users to decide by accepting or rejecting each connection. A user of the service provider may always reject an unwanted connection.

No architectural restrictions are placed on the number of concurrent connections.

The connection establishment service allows the PS-users to establish the characteristics of the presentation connection. By the end of the connection establishment phase the service users shall be in agreement on a set of parameter values concerning the layer.

7.2 The Connection Termination Facility

There are two connection release services: the orderly release service and the provider initiated abort service (P-Abort service). The following subclauses describe the services in more detail.

7.2.1 The Orderly Release Service

The orderly release service allows either PS-user associated with a given connection to release the connection. This shall be done in a co-operative manner between the two PS- users without loss of PS-user-data. All PS-user-data must have been delivered and accepted by both PS-users before a presentation connection can be released.

7.2.2 P-Abort Service

This service is the means by which the PS-provider may indicate the release of the connection by reasons internal to the service provider or when the underlying service is not available. This may cause loss of PS-user-data.

7.3 Information Transfer Facility

The information transfer facility provides services which allow PS-users to exchange information on a presentation connection.

7.4 Summary of Facilities

Prefix of Name of Service Primitives	Name of Service	Type of Service
Presentation-Connection Establishment Facility		
P-connect	Connection establishment	Confirmed
Presentation-Connection Termination Facility		
P-Release	Connection release	Confirmed
P-P-Abort	Provider initiated abort	Non-confirmed
Information Transfer Facility		
P-Data	Send information	Non-confirmed

8 CLASSES OF SERVICE

No different classes defined.

9   MODEL OF THE SERVICE

A connection end-point (CEP) identification mechanism must be provided to allow a service user and the provider to distinguish between several connections at the same service access point.

All primitives must use this identification mechanism to identify the connection applied to. This implicit identification is not shown in the service primitives and must not be mixed up with address parameters of the connect primitives.

10   PERFORMANCE CHARACTERISTICS

(The need of data for this section is for further study).

11   SEQUENCES FOR PRIMITIVES

11.1   Global Sequences for Primitives

This clause defines the interrelationships among the facilities and the service primitives of the presentation layer. These relationships are illustrated in Figure 11.1. Any item listed at the same vertical line can be performed in any sequence with respect to any other item listed at the same vertical line.

P-CONNECT must be performed before the other service primitives can be performed. Note that P-P-Abort service primitives can occur at any time after the presentation connection has been established.
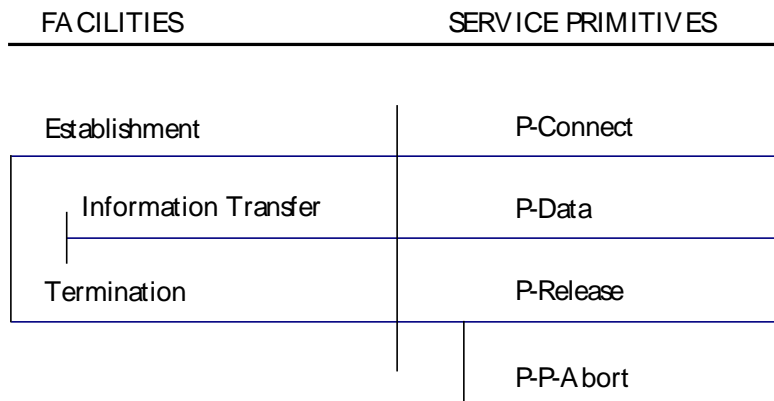
FACILITIES	SERVICE PRIMITIVES
Establishment	P-Connect
Information Transfer	P-Data
Termination	P-Release
	P-P-Abort

Figure 11.1 Presentation layer facility and service primitives relationships.

11.2   Local Sequences for Primitives

Each of the following time-sequence diagrams is partitioned by two vertical lines into three fields. The central field represents the service provider. The two side fields represent the two service users.

Sequences of primitives are positioned along lines representing the passage of time, increasing downwards. Arrows, placed in the areas representing the service user, indicate the direction of propagation of primitives.
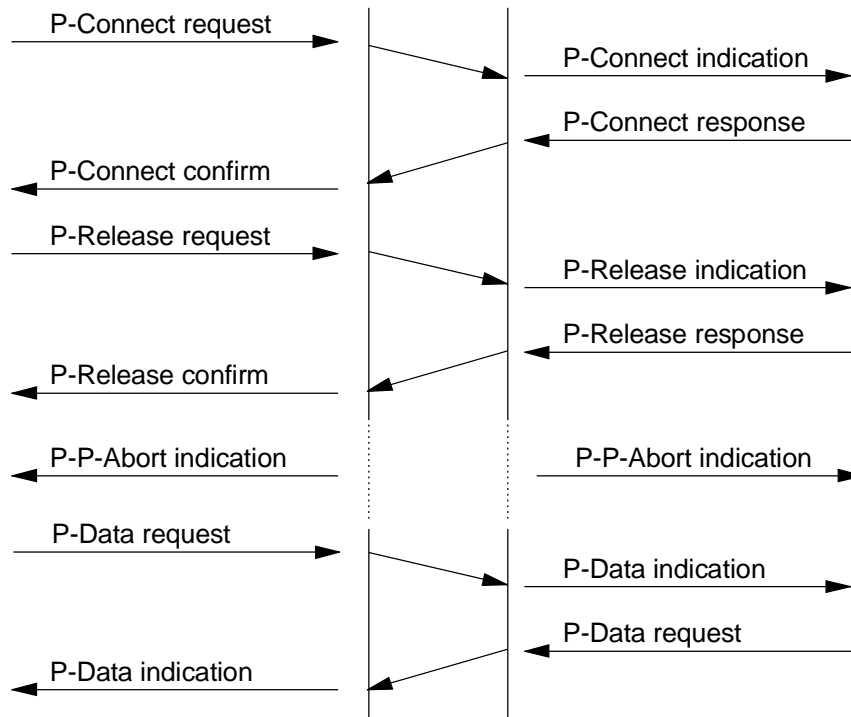

Figure 11.2 Time sequence diagram. Presentation primitives.

12 DEFINITION OF PRIMITIVES

12.1 Establishment

12.1.1 P-Connect

12.1.1.1 Function

This primitive allows two PS-users to establish a presentation-connection between them. The same primitive can be used regardless of the protocols used on lower levels. (E.g. X.25, OSI Transport Protocol or TCP/IP).

12.1.1.2 Parameters

PARAMETERS	COMMENT	REQUEST	INDICATION	RESPONSE	CONFIRM
Calling Presentation Address		M	M (=)	M	M (=)
Called Presentation Address		M	M (=)	M (=)	M (=)
User-data		U	C (=)	U	C (=)
Result				M	M (=)

Result =   Result ok/
Local lack of resources/
Remote lack of resources/
No answer from remote system/
Remote service user unavailable/
Called user unknown/
Misbehaviour of local service user/
Misbehaviour of remote service user/
Misbehaviour of local part of provider/
Misbehaviour of remote part of provider/
No available lower level connection/
Rejected by service user/
System implementation dependent reason/
Unknown reason/
Disconnected by the network layer/
Disconnected by the remote transport entity/

Disconnected by the local transport entity/
Remote transport entity congestion/
Protocol error/
Transport connection reference error/
Connect negotiation failed

12.2 Termination

12.2.1 P-Release

12.2.1.1 Function

Orderly release of the connection with no loss of data.

12.2.1.2 Parameters

PARAMETERS	COMMENT	REQUEST	INDICATION	RESPONSE	CONFIRM
Result	Affirmative [1]			M	M (=)

Result = Result ok/
        collision

12.2.2 P-P-Abort

12.2.2.1 Function

This primitive is used by the PS-provider to inform the PS-user of an abnormal termination of the presentation-connection.

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[1] Other result values are for further study.

12.2.2.2 Parameters

PARAMETERS	COMMENT	INDICATION
Reason		M

Reason =   Quality of service below minimum level/
No answer from remote system/
Misbehaviour of local service user/
Misbehaviour of remote service user/
Misbehaviour of local part of provider/
Misbehaviour of remote part of provider/
No available lower level connection/
System implementation dependent reason/
Unknown reason/
Disconnected by the network layer/
Disconnected by the remote transport entity/
Disconnected by the local transport entity/
Remote transport entity congestion/
Protocol error

12.3 Information Transfer

12.3.1 P-Data

12.3.1.1 Function

This primitive transfers one presentation service data unit transparently from a PS-user entity to its peer entity.

12.3.1.2 Parameters

PARAMETERS	COMMENT	REQUEST	INDICATION
User data		M	M (=)

User data = User data consisting of an unlimited number of octets.