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Signalling Protocols and Switching (SPS); Intelligent Networks switching aspects

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Foreword

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This ETR has been produced by the Signalling Protocols & Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Introduction

The information contained in this report reflects initial studies on switching aspects in Intelligent Networks (IN). The objectives of these studies were to develop a general understanding of IN switching aspects with a view to creating a basis for future IN studies in SPS3.

The studies were conducted prior to recent efforts in ETSI and CCITT which focus on the first standardisation phase targeted for 1992 and is known as the so-called Capability Set Number 1 (CS1).

Some of the information in the report may be relevant for both Capability Set Number 1 and/or longer term Capability Sets. Other information may be either beyond the scope of CS1, or may become obsolete as current studies on IN are progressed.

This report is divided in two parts:

Part 1 deals with the Connection Control Model (CCM). The contents of sections 1 to 3 is related to the functional plane of the IN conceptual model developed by ETSI STC/NA6;

Part 2 identifies different functional entities of IN especially the Service Switching and Call Control functional entities (SSF & CCF). A detailed study of the logical behaviour of SSF and CCF is started. The concept of trigger table are introduced and the behaviour of connection segment objects is described. Different chapters have reached different degrees of detail.

The result present in this technical report is an intermediate result and should be considered as a state-of-the-art at the end of 1990.

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Part 1: The Connection Control Model (CCM)

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OBJECTIVES & DESCRIPTION OF THE MODELLING

1.1 Objectives

The Connection Control Model is used to describe the interaction between functional entities (principally the SSF and SCF) in the functional plane of the IN conceptual model.

The Connection Control Model establishes a framework for the interaction between the SSF and SCF in a service- and vendor implementation-independent environment.

The CCM should only be used in order to provide a description of the SSF/CCF functions (triggers, events, operations, etc.) as seen from outside the SSF/CCF. It is not intended to place any constraint on implementations.

1.2 The Connection Control Model (CCM)

The following is a general description of the Connection Control Model (CCM). The full description is contained in the Draft Technical Report ETSI DTR/NA-6001 produced by NA6.

The CCM is a model of the interactions between the Service Control Function and the Service Switching function in an Intelligent Network (IN), in order to provide telecommunications and supplementary services related to calls in an IN-structured network.

Therefore, the CCM is centred around the concept of a “call”. A call can be defined as a temporary relation between two or more users of a telecommunications network, for the provision of telecommunications services and possible associated supplementary services (a user can be a human, a machine, a system, etc.). A call, in order to be established, maintained and released, involves resources of the telecommunications network.

An “IN call” can be defined as a call that involves resources belonging to an Intelligent Network architecture.

Typically, the life-cycle of an IN call is composed of the following phases:

a) a call request is issued by a telecommunications network user, and non-IN switch-based processes are activated in order to fulfill such a request

b) a Trigger Point is encountered and the Trigger Condition is fulfilled: subsequent call processing implies the interaction between IN entities (SSF, SCF, etc.)<1>.

<1> Phases a) and b) are missing if the service is triggered by the Service Control Function (e.g. “wake-up service”). In this case the SCF creates the socket autonomously and phase c) follows

c) a socket (or more than one) is opened and interactions between SSF and SCF occur through this socket

d) call processing can proceed without the interaction between IN entities, therefore the socket is closed and non-IN switch-based call processing is resumed

e) the call is finally terminated.

The Socket Models apply to phase c) of the call. They can be viewed as a "window" between the two functional blocks (SSF and SCF), through which they can see each other and interact in terms of pre-defined objects and operations on the objects.

Some interactions between SSF and SCF will not be associated to any specific call. To distinguish between call-related and non call-related interactions, different "socket types" are used, i.e. connection control socket, data management socket, status monitoring socket, traffic management socket and resource control socket.

The Connection Segment Relationship Model also applies to phase c) of the call, to cater for the interactions between different sockets and different service features (both provided in an IN fashion and provided locally by switch-based processes) related to the same call.

The Basic Call Model applies to phases b) and d) of the call. It is a model of the logical states of a call and of the points (states or transitions between states) in which the socket "window" can be opened and closed.

The three models together form the Connection Control Model.

1.2.1 The Basic Call Model (BCM)

Utility of the BCM: its main purpose is to limit, to an acceptable degree, the flexibility of choice of Trigger Points (TP's) within a call life-cycle. Once the set of allowed points is specified, additional information can be associated to each of them, to form the Trigger Table.

Consistency of the BCM with the other models and with call processing in general: at the time of socket opening, sufficient information must be sent from SSF to SCF in order to allow for a correct sequence of call processing. During the interactions through the socket(s), consistency depends on the correctness of modelling objects/operations and of service logic. At the time of socket closing a correct resumption of basic switch processing must be ensured.

The BCM is described in detail in Part II of this Technical Report.

2 TECHNICAL DETAILS OF THE CCM

The general description of the use of the different socket types in the Connection Control Model is described in the NA6 Draft Technical Report ETSI DTR/NA-6001.

This section contains the requirements on the parameters and primitives related to the objects available in the different socket types, in order to constitute an input for the consequent definition of application protocol elements.

2.1 Connection Control Socket

The connection control (CC) socket is used by the SCF to operate connection control related objects in a CCF/SSF, namely legs and connection points.

The primitives on the objects and the corresponding parameters are described in detail in these sections.

Note(s): Error replies are not specified.

2.1.1 CC-Provide-Instruction

The SSF uses this primitive to indicate service activation to the SCF, to request instructions from it.

The CC-PROVIDE-INSTRUCTION includes parameter(s) to describe the present content of the socket; i.e. the objects which exist within the socket namely leg and connection point identifiers, as well as information identifying the trigger condition (service activated, event which triggers the service).

Other parameters like CalledPartyNumber, CallingPartyNumber, CallingPartyCategory, UserServiceInformation, CUGInterlockCode, RedirectionInformation, RedirectingNumber, OriginalCalledNumber, which are all similar to ISUP parameters, indicate detailed characteristics of the leg(s) which exist(s) in the socket.

Information that needs to be exported from SSF to SCF is defined related to trigger conditions.

2.1.2 CC-CREATE a leg

The SCF uses this primitive to request the creation of a leg by the SSF to an addressable entity.

The CC-CREATE includes the following parameters:

- “leg identifier” to identify the leg to create