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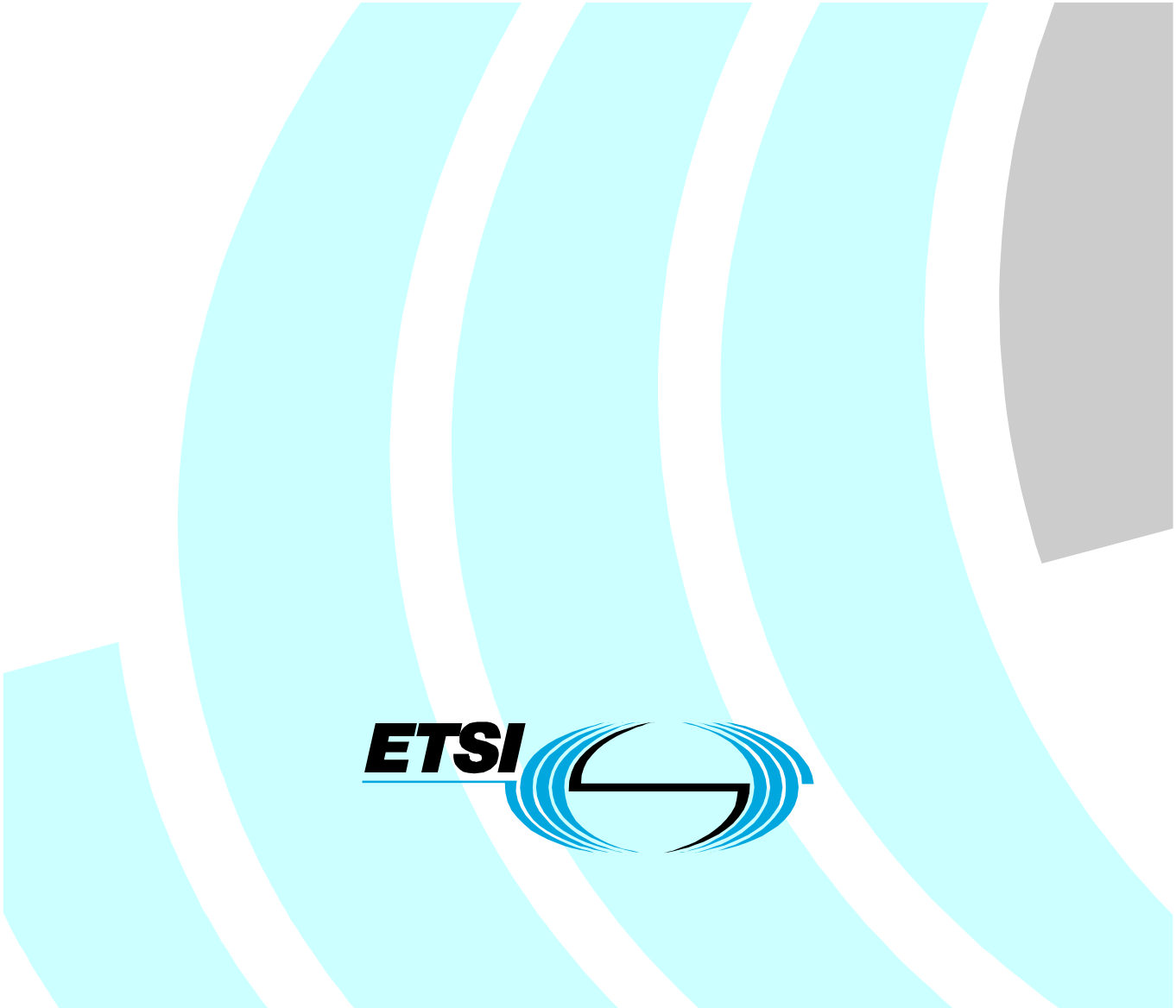
European Standard (Telecommunications series)

Intelligent Network (IN);
Intelligent Network Capability Set 4 (CS4);
Intelligent Network Application Protocol (INAP);
Protocol specification;
Part 1: Common aspects



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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN), and is now submitted for the Vote phase of the ETSI standards Two-step Approval Procedure.

The present document is part 1 of a multi-part deliverable covering Intelligent Network (IN); Intelligence Network Capability Set 4 (CS4); Intelligent Network Application Protocol (INAP); Protocol specification, as identified below:

Part 1: "Common aspects";

Part 2: "Service Switching Function - Switching Control Function (SSF-SCF) Interface".

The present document describes the enhancement for IN CS-4 common aspects.

The present document and EN 302 039-2 [5] define the Intelligent Network (IN) Application Protocol (INAP) for IN Capability Set-4 based and written as delta documents upon ETSI Core INAP CS-3 (EN 301 931-1 [1] and EN 301 931-2 [2]).

This set of documents define enhancements made on the SSF to SCF interface (part 2) as a subset of the ITU-T IN CS4 Recommendations Q.1248.1 [3], Q.1248.2 [4]. For the other interfaces, the ETSI Core INAP CS3 series of EN 301 931 apply.

In addition to the features supporting IN CS-1, IN CS-2 and IN CS-3 functionalities, the present document and EN 302 039-2 [5] provide:

- general extensions to the CS-3 INAP in support of IN CS-4 target services;
- protocol support of IP-based addressing schemes;
- protocol support of explicit control of the impact of CPH operations on signalling relationships.

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

1 Scope

The present document defines enhancements made to EN 301 931-1 [1] for IN-CS4.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ETSI EN 301 931-1: "Intelligent Network (IN); Intelligent Network Capability Set 3 (CS3); Intelligent Network Application Protocol (INAP); Protocol specification; Part 1: Common aspects".

[2] ETSI EN 301 931-2: "Intelligent Network (IN); Intelligent Network Capability Set 3 (CS3); Intelligent Network Application Protocol (INAP); Protocol specification; Part 2: SCF-SSF interface".

[3] ITU-T Recommendation Q.1248.1: "Interface Recommendation for Intelligent Network Capability Set 4: Common aspects".

[4] ITU-T Recommendation Q.1248.2: "Interface Recommendation for Intelligent Network Capability Set 4: SCF-SSF Interface".

[5] ETSI EN 302 039-2: "Intelligent Network (IN); Intelligent Network Capability Set 4 (CS4); Intelligent Network Application Protocol (INAP); Protocol specification; Part 2: SSF-SCF Interface".

[6] ITU-T Recommendation X.519: "Information technology - Open systems interconnection - The directory: Protocol specifications".

3 Abbreviations

For the purposes of the present document, the abbreviations given in EN 301 931-1 [1] apply.

4 Common Definitions

4.1 Object identifiers

The following ASN.1 module defines the object identifiers assigned to modules, packages and application contexts for EN 301 931-2 [2].

```
IN-object-identifiers {itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1) cs4(40)
modules(1) in3-object-identifiers(0) version1(0)}
DEFINITIONS ::=
BEGIN
-- For Modules from TCAP, ROS,
tc-Messages
    OBJECT IDENTIFIER ::= {itu-t recommendation q 773 modules(2) messages(1) version3(3)}
tc-NotationExtensions
    OBJECT IDENTIFIER ::= {itu-t recommendation q 775 modules(2)  notation-extension (4)
version1(1)}
ros-InformationObjects
    OBJECT IDENTIFIER ::= {joint-iso-itu-t remote-operations(4) informationObjects(5) version1(0)}
ros-genericPDUs
    OBJECT IDENTIFIER ::= {joint-iso-itu-t remote-operations(4) generic-ROS-PDUs(6) version1(0)}
ros-UsefulDefinitions
    OBJECT IDENTIFIER ::= {joint-iso-itu-t remote-operations(4) useful-definitions(7) version1(0)}
-- For IN CS3 SCF-SRF related Modules
id-cs3              OBJECT IDENTIFIER ::= { itu-t(0) identified-organization(4) etsi(0) inDomain(1)
in-network(1) cs3(30)}
modules-cs3             OBJECT IDENTIFIER ::= {id-cs3 modules(1)}
id-ac-cs3               OBJECT IDENTIFIER ::= {id-cs3 ac(3)}
id-at-cs3               OBJECT IDENTIFIER ::= {id-cs3 at(4)}
id-as-cs3               OBJECT IDENTIFIER ::= {id-cs3 as(5)}
id-rosObject-cs3    OBJECT IDENTIFIER ::= {id-cs3 rosObject(25)}

id-contract-cs3         OBJECT IDENTIFIER ::= {id-cs3 contract(26)}
id-package-cs3          OBJECT IDENTIFIER ::= {id-cs3 package(27)}
-- For IN CS4 Modules
id              OBJECT IDENTIFIER ::= { itu-t(0) identified-organization(4) etsi(0) inDomain(1)
in-network(1) cs4(40)}
modules             OBJECT IDENTIFIER ::= {id modules(1)}
id-ac               OBJECT IDENTIFIER ::= {id ac(3)}
id-at               OBJECT IDENTIFIER ::= {id at(4)}
id-as               OBJECT IDENTIFIER ::= {id as(5)}
id-rosObject        OBJECT IDENTIFIER ::= {id rosObject(25)}
id-contract         OBJECT IDENTIFIER ::= {id contract(26)}
id-package          OBJECT IDENTIFIER ::= {id package(27)}

object-identifiers  OBJECT IDENTIFIER ::= {modules in-object-identifiers(0) version1(0)}
common-datatypes    OBJECT IDENTIFIER ::= {modules in-common-datatypes(1) version1(0)}
errortypes          OBJECT IDENTIFIER ::= {modules in-errortypes(2) version1(0)}
operationcodes      OBJECT IDENTIFIER ::= {modules in-operationcodes (3) version1(0)}
errorcodes          OBJECT IDENTIFIER ::= {modules in-errorcodes(4) version1(0)}
common-classes      OBJECT IDENTIFIER ::= {modules in-common-classes(5) version1(0)}
ssf-scf-datatypes   OBJECT IDENTIFIER ::= {modules in-ssf-scf-datatypes(6) version1(0)}
ssf-scf-classes     OBJECT IDENTIFIER ::= {modules in-ssf-scf-classes(7) version1(0)}
ssf-scf-Operations  OBJECT IDENTIFIER ::= {modules in-ssf-scf-ops-args(8) version1(0)}
ssf-scf-Protocol    OBJECT IDENTIFIER ::= {modules in-ssf-scf-pkgs-contracts-acs(9) version1(0)}
scf-srf-datatypes   OBJECT IDENTIFIER ::= {modules-cs3 in-cs3-scf-srf-datatypes(10) version1(0)}
scf-srf-classes     OBJECT IDENTIFIER ::= {modules-cs3 in-cs3-scf-srf-classes(11) version1(0)}
scf-srf-Operations  OBJECT IDENTIFIER ::= {modules-cs3 in-cs3-scf-srf-ops-args (12) version1(0)}
scf-srf-Protocol    OBJECT IDENTIFIER ::= {modules-cs3 in-cs3-scf-srf-pkgs-contracts-acs(13)
version1(0)}
-- Application Context
-- SSF/SCF Application Context
id-ac-ssf-scfGenericAC
    OBJECT IDENTIFIER ::= {id-ac ssf-scfGenericAC(4) version1(0)}
id-ac-ssf-scfAssistHandoffAC
    OBJECT IDENTIFIER ::= {id-ac ssf-scfAssistHandoffAC(6) version1(0)}
id-ac-ssf-scfServiceManagementAC
    OBJECT IDENTIFIER ::= {id-ac ssf-scfServiceManagementAC(7) version1(0)}
id-ac-scf-ssfGenericAC
    OBJECT IDENTIFIER ::= {id-ac scf-ssfGenericAC(8) version1(0)}
id-ac-scf-ssfINTrafficManagementAC
    OBJECT IDENTIFIER ::= {id-ac scf-ssfINTrafficManagementAC(10) version1(0)}
id-ac-scf-ssfServiceManagementAC
    OBJECT IDENTIFIER ::= {id-ac scf-ssfServiceManagementAC(11) version1(0)}
```

```
id-ac-scf-ssfStatusReportingAC
    OBJECT IDENTIFIER ::= {id-ac scf-ssfStatusReportingAC(12) version1(0)}
id-ac-scf-ssfTriggerManagementAC
    OBJECT IDENTIFIER ::= {id-ac scf-ssfTriggerManagementAC(13) version1(0)}
id-ac-scf-ssfTrafficManagementAC
    OBJECT IDENTIFIER ::= {id-ac scf-ssfTrafficManagementAC(35) version1(0)}
-- SRF/SCF Application Context
id-ac-srf-scfAC OBJECT IDENTIFIER ::= {id-ac-cs3 srf-scfAC(14) version1(0)}
-- Abstract Syntaxes
-- SSF/SCF Abstract Syntaxes
id-as-ssf-scfGenericAS              OBJECT IDENTIFIER ::= {id-as ssf-scfGenericAS(4)}
id-as-assistHandoff-ssf-scfAS       OBJECT IDENTIFIER ::= {id-as assistHandoff-ssf-scfAS(6)}
id-as-scf-ssfGenericAS              OBJECT IDENTIFIER ::= {id-as scf-ssfGenericAS(7)}
id-as-scf-ssfINTrafficManagementAS  OBJECT IDENTIFIER ::= {id-as scf-ssfINTrafficManagementAS(9)}
id-as-scf-ssfServiceManagementAS    OBJECT IDENTIFIER ::= {id-as scf-ssfServiceManagementAS(10)}
id-as-ssf-scfServiceManagementAS    OBJECT IDENTIFIER ::= {id-as ssf-scfServiceManagementAS(11)}
id-as-scf-ssfStatusReportingAS      OBJECT IDENTIFIER ::= {id-as scf-ssfStatusReportingAS(12)}
id-as-scf-ssfTriggerManagementAS    OBJECT IDENTIFIER ::= {id-as scf-ssfTriggerManagementAS(13)}
id-as-scf-ssfTrafficManagementAS    OBJECT IDENTIFIER ::= {id-as scf-ssfTrafficManagementAS(33)}
-- SRF/SCF Abstract Syntaxes
id-as-basic-srf-scf                 OBJECT IDENTIFIER ::= { id-as-cs3 basic-srf-scf(14)}
id-as-basic-scf-srf                 OBJECT IDENTIFIER ::= { id-as-cs3 basic-scf-srf(15)}
-- ROS Objects
id-rosObject-scf                    OBJECT IDENTIFIER ::= {id-rosObject scf(1)}
id-rosObject-ssf                    OBJECT IDENTIFIER ::= {id-rosObject ssf(2)}
id-rosObject-srf                    OBJECT IDENTIFIER ::= {id-rosObject-cs3 srf(3)}
-- Contracts
-- SSF/SCF Contracts
id-inSsfToScfGeneric            OBJECT IDENTIFIER ::= {id-contract inSsfToScfGeneric(3)}
id-inAssistHandoffSsfToScf  OBJECT IDENTIFIER ::= {id-contract inAssistHandoffSsfToScf(5)}
id-inScfToSsfGeneric            OBJECT IDENTIFIER ::= {id-contract inScfToSsfGeneric(6)}
id-inScfToSsfINTrafficManagement
                OBJECT IDENTIFIER ::= {id-contract inScfToSsfINTrafficManagement(8)}
id-inScfToSsfServiceManagement
                OBJECT IDENTIFIER ::= {id-contract inScfToSsfServiceManagement(9)}
id-inSsfToScfServiceManagement
                OBJECT IDENTIFIER ::= {id-contract inSsfToScfServiceManagement(10)}
id-inScfToSsfStatusReporting
                OBJECT IDENTIFIER ::= {id-contract inScfToSsfStatusReporting(11)}
id-inScfToSsfTriggerManagement
                OBJECT IDENTIFIER ::= {id-contract inScfToSsfTriggerManagement(12)}
id-inScfToSsfTrafficManagement
                OBJECT IDENTIFIER ::= {id-contract inScfToSsfTrafficManagement(28)}
-- SRF/SCF Contracts
id-contract-srf-scf             OBJECT IDENTIFIER ::= {id-contract-cs3 srf-scf(13)}
-- Operation Packages
id-package-emptyConnection      OBJECT IDENTIFIER ::= { id-package emptyConnection(60)}
-- SSF/SCF Operation Packages
id-package-scfActivation        OBJECT IDENTIFIER ::= {id-package scfActivation(11)}
id-package-srf-scfActivationOfAssist
    OBJECT IDENTIFIER ::= {id-package srf-scfActivationOfAssist(15)}
id-package-assistConnectionEstablishment
    OBJECT IDENTIFIER ::= {id-package assistConnectionEstablishment(16)}
id-package-genericDisconnectResource
    OBJECT IDENTIFIER ::= {id-package genericDisconnectResource(17)}
id-package-nonAssistedConnectionEstablishment
    OBJECT IDENTIFIER ::= {id-package nonAssistedConnectionEstablishment(18)}
id-package-connect                  OBJECT IDENTIFIER ::= {id-package connect(19)}
id-package-callHandling             OBJECT IDENTIFIER ::= {id-package callHandling(20)}
id-package-bcsmEventHandling        OBJECT IDENTIFIER ::= {id-package bcsmEventHandling(21)}
id-package-dpSpecificEventHandling  OBJECT IDENTIFIER ::= {id-package dpSpecificEventHandling(22)}
id-package-chargingEventHandling    OBJECT IDENTIFIER ::= {id-package chargingEventHandling(23)}
id-package-ssfCallProcessing        OBJECT IDENTIFIER ::= {id-package ssfCallProcessing(24)}
id-package-scfCallInitiation        OBJECT IDENTIFIER ::= {id-package scfCallInitiation(25)}
id-package-timer                    OBJECT IDENTIFIER ::= {id-package timer (26)}
id-package-billing                  OBJECT IDENTIFIER ::= {id-package billing(27)}
id-package-charging                 OBJECT IDENTIFIER ::= {id-package charging(28)}
id-package-inTrafficManagement      OBJECT IDENTIFIER ::= {id-package inTrafficManagement(29)}
id-package-serviceManagementActivate
    OBJECT IDENTIFIER ::= {id-package serviceManagementActivate(30)}
id-package-serviceManagementResponse
    OBJECT IDENTIFIER ::= {id-package serviceManagementResponse(31)}
id-package-callReport               OBJECT IDENTIFIER ::= {id-package callReport(32)}
id-package-signallingControl        OBJECT IDENTIFIER ::= {id-package signallingControl(33)}
id-package-activityTest             OBJECT IDENTIFIER ::= {id-package activityTest(34)}
id-package-statusReporting          OBJECT IDENTIFIER ::= {id-package statusReporting(35)}
id-package-cancel                   OBJECT IDENTIFIER ::= {id-package cancel(36)}
id-package-cphResponse              OBJECT IDENTIFIER ::= {id-package cphResponse(37)}
```

```
id-package-entityReleased           OBJECT IDENTIFIER ::= {id-package entityReleased(38)}
id-package-triggerManagement        OBJECT IDENTIFIER ::= {id-package triggerManagement(39)}
id-package-uSIHandling              OBJECT IDENTIFIER ::= {id-package uSIHandling(40)}
id-package-triggerCallManagement    OBJECT IDENTIFIER ::= {id-package triggerCallManagement(63)}
id-package-trafficManagement        OBJECT IDENTIFIER ::= {id-package trafficManagement(78)}
-- SRF/SCF Operation Packages
id-package-specializedResourceControl
                    OBJECT IDENTIFIER ::= { id-package-cs3 specializedResourceControl(42)}
id-package-srf-scfCancel            OBJECT IDENTIFIER ::= { id-package-cs3 srf-scfCancel(43)}
id-package-messageControl           OBJECT IDENTIFIER ::= { id-package-cs3 messageControl(44)}
id-package-scriptControl            OBJECT IDENTIFIER ::= { id-package-cs3 scriptControl(45)}
id-package-srfManagement            OBJECT IDENTIFIER ::= { id-package-cs3 srfManagement(66)}

END
```

4.2 Common Data Types

```
IN-common-datatypes { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1) cs4(40)
modules(1) in-common-datatypes (1) version1(0)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
IMPORTS
    common-classes
FROM  IN-object-identifiers { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs4(40) modules(1) in-object-identifiers(0) version1(0) }

    EXTENSION,
    COMMON-BOUNDS,
    SupportedExtensions
FROM IN-common-classes common-classes;
CriticalityType ::= ENUMERATED {
        ignore(0),
        abort(1)
        }
Extensions {COMMON-BOUNDS : b1} ::= SEQUENCE SIZE (1..b1.&numOfExtensions) OF ExtensionField
ExtensionField::= SEQUENCE {
    type                        EXTENSION.&id ({SupportedExtensions}),
            -- shall identify the value of an EXTENSION type
    criticality                 CriticalityType DEFAULT ignore,
    value                       [1] EXTENSION.&ExtensionType
                                 ({SupportedExtensions}{@type})
    }
--This parameter indicates an extension of an argument data type. Its content is network operator
specific
Integer4 ::= INTEGER(0..2147483647)
InvokeID ::= INTEGER (-128..127)
UnavailableNetworkResource ::= ENUMERATED {
    unavailableResources(0),
    componentFailure(1),
    basicCallProcessingException(2),
    resourceStatusFailure(3),
    endUserFailure(4),
    screening(5)
    }
-- Indicates the network resource that failed
-- Note that since IN CS3 the screening value can only be used by the SCF.
END
```

4.3 Operation codes

The following ASN.1 module defines the operation codes which are allocated to each of the operations specified in EN 301 931-2 [2], except those imported from the Directory Abstract Service as defined in ITU-T Recommendation X.519 [6].

```
IN-operationcodes { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1) cs4(40)
modules(1) in-operationcodes(3) version1(0)}
DEFINITIONS ::=
BEGIN
IMPORTS
    ros-InformationObjects
FROM  IN-object-identifiers { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs4(40) modules(1) in-object-identifiers(0) version1(0) }
    Code
FROM Remote-Operations-Information-Objects ros-InformationObjects
;
-- the operations are grouped by the identified operation packages.
-- SCF activation Package
        opcode-initialDP                        Code ::= local : 0
-- SCF/SRF activation of assist Package
        opcode-assistRequestInstructions        Code ::= local : 16
-- Assist connection establishment Package
        opcode-establishTemporaryConnection     Code ::= local : 17
-- Generic disconnect resource Package
        opcode-disconnectForwardConnection      Code ::= local : 18
        opcode-dFCWithArgument                  Code ::= local : 86
-- Non-assisted connection establishment Package
-- establishment ASE;
        opcode-connectToResource                Code ::= local : 19
-- Connect Package (elementary SSF function)
        opcode-connect                          Code ::= local : 20
-- Call handling Package (elementary SSF function)
        opcode-releaseCall                      Code ::= local : 22
-- BCSM Event handling Package
        opcode-requestReportBCSMEvent           Code ::= local : 23
        opcode-eventReportBCSM                  Code ::= local : 24
-- Charging Event handling Package
        opcode-requestNotificationChargingEvent Code ::= local : 25
        opcode-eventNotificationCharging        Code ::= local : 26
-- SSF call processing Package
        opcode-collectInformation               Code ::= local : 27
        opcode-selectFacility                   Code ::= local : 30
        opcode-continue                         Code ::= local : 31
-- SCF call initiation Package
        opcode-initiateCallAttempt              Code ::= local : 32
-- Timer Package
        opcode-resetTimer                       Code ::= local : 33
-- Billing Package
        opcode-furnishChargingInformation       Code ::= local : 34
-- Charging Package
        opcode-applyCharging                    Code ::= local : 35
        opcode-applyChargingReport              Code ::= local : 36
-- Status reporting Package
        opcode-requestCurrentStatusReport       Code ::= local : 37
        opcode-requestEveryStatusChangeReport   Code ::= local : 38
        opcode-requestFirstStatusMatchReport    Code ::= local : 39
        opcode-statusReport                     Code ::= local : 40
-- IN Traffic management Package
        opcode-callGap                          Code ::= local : 41
-- Traffic management Package
        opcode-callFiltering                    Code ::= local : 145
-- Service management Package
        opcode-activateServiceFiltering         Code ::= local : 42
        opcode-serviceFilteringResponse         Code ::= local : 43
-- Call report Package
        opcode-callInformationReport            Code ::= local : 44
        opcode-callInformationRequest           Code ::= local : 45
-- Signalling control Package
        opcode-sendChargingInformation          Code ::= local : 46
-- Specialized resource control Package
        opcode-playAnnouncement                 Code ::= local : 47
        opcode-promptAndCollectUserInformation  Code ::= local : 48
        opcode-specializedResourceReport        Code ::= local : 49
 -- Cancel Package
        opcode-cancel                           Code ::= local : 53
        opcode-cancelStatusReportRequest        Code ::= local : 54
```

```
-- Activity Test Package
        opcode-activityTest                     Code ::= local : 55
-- CPH Response Package
        opcode-continueWithArgument             Code ::= local : 88
        opcode-createCallSegmentAssociation     Code ::= local : 89
        opcode-disconnectLeg                    Code ::= local : 90
        opcode-mergeCallSegments                Code ::= local : 91
        opcode-moveCallSegments                 Code ::= local : 92
        opcode-moveLeg                          Code ::= local : 93
        opcode-reconnect                        Code ::= local : 94
        opcode-splitLeg                         Code ::= local : 95
-- Exception Inform Package
        opcode-entityReleased                   Code ::= local : 96
-- Trigger Management Package
        opcode-manageTriggerData                Code ::= local : 97
        opcode-createOrRemoveTriggerData        Code ::= local : 135
-- Trigger Call Management Package
        opcode-setServiceProfile                Code ::= local : 136
-- USI Handling Package
        opcode-requestReportUTSI                Code ::= local : 98
        opcode-sendSTUI                         Code ::= local : 100
        opcode-reportUTSI                       Code ::= local : 101
-- SRF/SCF interface
        opcode-promptAndReceiveMessage          Code ::= local : 107
        opcode-scriptInformation                Code ::= local : 108
        opcode-scriptEvent                      Code ::= local : 109
        opcode-scriptRun                        Code ::= local : 110
        opcode-scriptClose                      Code ::= local : 111
        opcode-srfCallGap                       Code ::= local : 139

END
```

4.4 Errors

4.4.1 Error types

The following ASN.1 module defines the error types used by operations specified in EN 301 931-2 [2].

```
IN-errortypes { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1) cs4(40)
modules(1) in-errortypes(2) version1(0)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
IMPORTS
    ros-InformationObjects,
    common-datatypes,
    errorcodes,

    tc-Messages
FROM  IN-object-identifiers { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs4(40) modules(1) in-object-identifiers(0) version1(0) }
    ERROR
FROM Remote-Operations-Information-Objects ros-InformationObjects
    InvokeID,
    UnavailableNetworkResource
FROM IN-common-datatypes common-datatypes
    errcode-canceled,
    errcode-cancelFailed,

    errcode-eTCFailed,

    errcode-improperCallerResponse,
    errcode-missingCustomerRecord,
    errcode-missingParameter,
    errcode-parameterOutOfRange,
    errcode-requestedInfoError,
    errcode-systemFailure,
    errcode-taskRefused,
    errcode-unavailableResource,
    errcode-unexpectedComponentSequence,
    errcode-unexpectedDataValue,
    errcode-unexpectedParameter,
    errcode-unknownLegID,
    errcode-unknownResource,
    errcode-unknownSubscriber
FROM IN-errorcodes errorcodes;
```

```
-- TYPE DEFINITION FOR  ERRORS FOLLOWS
canceled    ERROR ::=   {
        CODE    errcode-canceled
                }
-- The operation has been canceled.
cancelFailed ERROR ::= {
    PARAMETER SEQUENCE {
        problem [0]     ENUMERATED {
                unknownOperation(0),
                tooLate(1),
                operationNotCancellable(2)
                        },
        operation [1] InvokeID
        }
    CODE    errcode-cancelFailed
    }
-- The operation failed to be canceled.

eTCFailed ERROR ::=     {
    CODE    errcode-eTCFailed
            }
-- The establish temporary connection failed.
improperCallerResponse ERROR ::= {
    CODE    errcode-improperCallerResponse
    }
-- The caller response was not as expected.
missingCustomerRecord ERROR ::= {
    CODE    errcode-missingCustomerRecord
    }
-- The Service Logic Program could not be found in the SCF.
missingParameter ERROR ::= {
    CODE    errcode-missingParameter
    }
-- An expected optional parameter was not received.
parameterOutOfRange ERROR ::= {
    CODE    errcode-parameterOutOfRange
    }
-- The parameter was not as expected (e.g. missing or out of range).
requestedInfoError ERROR ::= {
    PARAMETER    ENUMERATED {
            unknownRequestedInfo(1),
            requestedInfoNotAvailable(2)
            -- other values FFS
            }
    CODE    errcode-requestedInfoError
    }
-- The requested information cannot be found.
systemFailure ERROR ::= {
    PARAMETER   UnavailableNetworkResource
    CODE    errcode-systemFailure
    }
-- The operation could not be completed due to e.g. a system failure at the serving physical entity,
the
-- unavailability of the required resource or due to screening.
taskRefused ERROR ::= {
    PARAMETER   ENUMERATED {
                generic(0),
                unobtainable (1),
                congestion(2)
                --other values FFS
                            }
    CODE    errcode-taskRefused
    }
-- An entity normally capable of the task requested cannot or chooses not to perform the task at
this
-- time. This includes error situations like congestion and unobtainable address as used in e.g. the
-- connect operation.
unavailableResource ERROR ::= {
    CODE    errcode-unavailableResource
    }
-- A requested resource is not available at the serving entity.
unexpectedComponentSequence ERROR ::= {
    CODE    errcode-unexpectedComponentSequence
    }
-- An incorrect sequence of Components was received (e.g."DisconnectForwardConnection"
-- followed by "PlayAnnouncement").
unexpectedDataValue ERROR ::= {
    CODE    errcode-unexpectedDataValue
```

```
    }
-- The data value was not as expected (e.g. routing number expected but billing number received)
unexpectedParameter ERROR ::= {
    CODE    errcode-unexpectedParameter
    }
-- A parameter received was not expected.
unknownLegID ERROR ::= {
    CODE    errcode-unknownLegID
    }
-- Leg not known to the SSF.
unknownResource ERROR ::= {
    CODE    errcode-unknownResource
    }
-- Resource whose status is being requested is not known to the serving entity.
unknownSubscriber ERROR ::= {
    CODE    errcode-unknownSubscriber
    }
-- Subscriber whose status is being requested is not known to the serving entity.
END
```

4.4.2 Error codes

The following ASN.1 module defines the error codes which are allocated to each of the errors specified in EN 301 931-2 [2].

```
IN-errorcodes { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1) cs4(40)
modules(1) in-errorcodes(4) version1(0)}
DEFINITIONS ::=
BEGIN
IMPORTS
    ros-InformationObjects
FROM  IN-object-identifiers { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs4(40) modules(1) in-object-identifiers(0) version1(0) }
    Code
FROM Remote-Operations-Information-Objects ros-InformationObjects;
        errcode-canceled                   Code ::= local : 0
        errcode-cancelFailed               Code ::= local : 1
        errcode-eTCFailed                  Code ::= local : 3
        errcode-improperCallerResponse     Code ::= local : 4
        errcode-missingCustomerRecord      Code ::= local : 6
        errcode-missingParameter           Code ::= local : 7
        errcode-parameterOutOfRange        Code ::= local : 8
        errcode-requestedInfoError         Code ::= local : 10
        errcode-systemFailure              Code ::= local : 11
        errcode-taskRefused                Code ::= local : 12
        errcode-unavailableResource        Code ::= local : 13
        errcode-unexpectedComponentSequence Code ::= local : 14
        errcode-unexpectedDataValue        Code ::= local : 15
        errcode-unexpectedParameter        Code ::= local : 16
        errcode-unknownLegID               Code ::= local : 17
        errcode-unknownResource            Code ::= local : 18
        errcode-unknownSubscriber          Code::= local : 24
END
```

4.5 Common classes

```
IN-common-classes { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1) cs4(40)
modules(1) in-common-classes(5) version1(0)}
DEFINITIONS ::=
BEGIN
IMPORTS
    id-package-emptyConnection,
    id-rosObject-scf,

    id-rosObject-srf,
    id-rosObject-ssf,
    ros-InformationObjects,
    ros-UsefulDefinitions,
    ssf-scf-Protocol,
    scf-srf-Protocol,
    common-datatypes
FROM IN-object-identifiers { itu-t(0) identified-organization(4) etsi(0) inDomain(1) in-network(1)
cs4(40) modules(1) in-object-identifiers (0) version1(0)}
    ROS-OBJECT-CLASS, CONTRACT, OPERATION-PACKAGE, Code, OPERATION,
```

```
    CONNECTION-PACKAGE
FROM Remote-Operations-Information-Objects ros-InformationObjects
    emptyBind
FROM Remote-Operations-Useful-Definitions ros-UsefulDefinitions
    inAssistHandoffSsfToScf,
    inScfToSsfGeneric,
    inScfToSsfStatusReporting,
    inScfToSsfServiceManagement,
    inScfToSsfTrafficManagement,
    inScfToSsfTriggerManagement,
    inSsfToScfGeneric,
    inSsfToScfServiceManagement
FROM IN-SSF-SCF-pkgs-contracts-acs ssf-scf-Protocol
    srf-scf-contract
FROM IN-CS3-SCF-SRF-pkgs-contracts-acs scf-srf-Protocol
    CriticalityType
FROM IN-common-datatypes common-datatypes
;
ssf ROS-OBJECT-CLASS ::= {
    INITIATES   {inSsfToScfGeneric|
            inAssistHandoffSsfToScf|
            inSsfToScfServiceManagement}
    RESPONDS    {inScfToSsfGeneric|
            inScfToSsfTrafficManagement|
            inScfToSsfServiceManagement|
            inScfToSsfTriggerManagement|
            inScfToSsfStatusReporting}
    ID      id-rosObject-ssf}
-- The ssf class of ROS-object describes the communication capabilities of an SSF
-- This object can act as the initiator of the following contracts
--
-- inSsfToScfGeneric contract expresses the form of the service in which the SSF,
-- a ROS-object of class ssf, initiates the generic triggering approach contract.
-- This dialogue is initiated by the SSF with the InitialDP Operation.
-- inAssistHandoffSsfToScf contract expresses the form of the service in which the SSF,
-- a ROS-object of class ssf, initiates the Assist or Hand-off contract.
-- This dialogue is initiated by the SSF with the AssistRequestInstructions Operation.
-- inSsfToScfServiceManagement contract expresses the form of the service in which the SSF,
-- a ROS-object of class ssf, initiates ServiceManagement related contract for reporting
-- service Management results. This dialogue is initiated/ended by the SSF with
-- the ServicefilteringResponse Operation.
--
-- This object can act as the responder of the following contracts
--
-- inScfToSsfGeneric contract expresses the form of the service in which the SSF,
-- a ROS-object of class ssf, responds to the generic messaging approach for
-- the SCF Initiate Call Attempt contract. This dialogue is initiated by the SCF with
-- the InitiateCallAttempt or CreateCallSegmentAssociation, Generic case.
-- inScfToSsfTrafficManagement contract expresses the form of service in which the SSF,
-- a ROS object of class ssf, responds to the Traffic Management related contract.
-- This dialogue is initiated by the SCF with the CallGap Operation
-- inScfToSsfServiceManagement contract expresses the form of service in which the SSF,
-- a ROS object of class ssf, responds to the Service Management related contract.
--  This dialogue is initiated  by the SCF with the ActivateServiceFiltering Operation
-- inScfToSsfTriggerManagement contract expresses the form of service in which the SSF,
-- a ROS object of class ssf, responds to the Trigger Management related contract.
-- This dialogue is initiated by the SCF with the ManageTriggerData Operation
-- inScfToSsfStatusReporting contract expresses the form of service in which the SSF,
-- a ROS object of class ssf, responds to the Status Reporting related contract.
-- This dialogue is initiated by the SCF with the StatusReporting Operations.
srf ROS-OBJECT-CLASS ::= {
    INITIATES     {srf-scf-contract}
    ID        id-rosObject-srf
    }
-- The srf class of ROS-object describes the communication capabilities of an SRF
-- This object can act as the initiator of the following contract
--
-- srf-scf-contract contract expresses the form of service in which the SRF, a ROS-object of class
srf,
-- initiates the srf related contract. This dialogue is initiated by the SRF with
-- the AssistRequestInstruction Operation
scf ROS-OBJECT-CLASS ::= {
    INITIATES   {inScfToSsfGeneric|
            inScfToSsfTrafficManagement|
            inScfToSsfServiceManagement|
            inScfToSsfTriggerManagement|
            inScfToSsfStatusReporting
            }
```

```
    RESPONDS    {inSsfToScfGeneric|
            inAssistHandoffSsfToScf|
            inSsfToScfServiceManagement|
-- srf to scf contracts
            srf-scf-contract
            }
    ID  id-rosObject-scf}
-- The scf class of ROS-object describes the communication capabilities of an SCF
-- This object can act as the initiator of the following contracts
-- only contracts related to SSF-SCF, SCF-SRF are taken into account here
--
-- scf to ssf contracts
-- inScfToSsfGeneric contract expresses the form of the service in which the SCF,
-- a ROS-object of class scf, initiates the generic messaging approach for the SCF
-- Initiate Call Attempt contract. This dialogue is initiated  by the SCF with the
InitiateCallAttempt
-- or CreateCallSegmentAssociation, Generic case.
-- inScfToSsfTrafficManagement contract expresses the form of service in which the SCF,
-- a ROS object of class scf, initiates the Traffic Management related contract. This dialogue is
initiated
-- by the SCF with the CallGap Operation
-- inScfToSsfServiceManagement contract expresses the form of service in which the SCF,
-- a ROS object of class  scf, initiates the Service Management related contract.
-- This dialogue is initiated  by the SCF with the ActivateServiceFiltering Operation
-- inScfToSsfTriggerManagement contract expresses the form of service in which the SCF,
--  a ROS object of class scf, initiates the Trigger Management related contract.
-- This dialogue is initiated by the SCF with the ManageTriggerData Operation
-- inScfToSsfStatusReporting contract expresses the form of service in which the SCF,
-- a ROS object of class scf, initiates the Status Reporting related contract. This dialogue is
initiated
-- by the SCF with the StatusReporting Operations.
--
-- This object can act as the responder of the following contracts
--
-- ssf to scf contracts
-- inSsfToScfGeneric contract expresses the form of the service in which the SCF,
-- a ROS-object of class scf, responds to the generic triggering approach contract.
-- This dialogue is initiated by the SSF with the InitialDP Operation.
-- inAssistHandoffSsfToScf contract expresses the form of the service in which the SCF,
-- a ROS-object of class scf, responds to the Assist or Hand-off contract.
-- This dialogue is initiated by the SSF with the AssistRequestInstructions Operation.
-- inSsfToScfServiceManagement contract expresses the form of the service in which the SCF,
--  a ROS-object of class  scf, responds to the ServiceManagement related contract for reporting
-- Service Management results.
-- This dialogue is initiated/ended by the SSF with the ServicefilteringResponse Operation.
--
-- srf to scf contracts
-- srf-scf-contract contract expresses the form of service in which the SCF, a ROS-object of class
scf,
--  responds to the srf related contract. This dialogue is initiated by the SRF with the
AssistRequestInstruction
-- Definition of the extension class
EXTENSION ::= CLASS {
    &ExtensionType,
    &criticality    CriticalityType DEFAULT ignore,
    &id Code
    }
WITH SYNTAX {
    EXTENSION-SYNTAX    &ExtensionType
    CRITICALITY &criticality
    IDENTIFIED BY   &id
    }
-- Example of addition of an extension named 'Some Network Specific Indicator' of type
-- BOOLEAN, with criticality 'abort' and to be identified as extension number 1
-- Example of definition using the above information object class:
--
-- SomeNetworkSpecificIndicator  EXTENSION ::= {
--  EXTENSION-SYNTAX    BOOLEAN
--  CRITICALITY         abort
--  IDENTIFIED BY       local : 1
--  }
-- Example of transfer syntax, using the ExtensionField datatype as specified in clause 4.1.
-- Assuming the value of the extension is set to TRUE, the extensions parameter
-- becomes a Sequence of type INTEGER ::= 1, criticality ENUMERATED ::= 1 and value [1]
-- EXPLICIT BOOLEAN ::= TRUE.
--
-- Use of Q.1400 defined Extension is ffs
```

```
-- In addition the extension mechanism marker is used to identify the future minor additions to
INAP.
firstExtension EXTENSION ::= {
    EXTENSION-SYNTAX    NULL
    CRITICALITY ignore
    IDENTIFIED BY   local:1
    }
-- firstExtension is just an example.
SupportedExtensions   EXTENSION ::= {firstExtension , ...
-- full set of network operator extensions --}
-- SupportedExtension is the full set of the network operator extensions.
inUnbind OPERATION ::= {
    RETURN RESULT   FALSE
    ALWAYS RESPONDS FALSE }
emptyConnectionPackage CONNECTION-PACKAGE ::= {
    BIND    emptyBind
    UNBIND  inUnbind
    RESPONDER UNBIND    TRUE
    ID      id-package-emptyConnection
    }
EmptyReturnable OPERATION ::= {...}
COMMON-BOUNDS ::= CLASS
{   &numOfExtensions    INTEGER OPTIONAL}
WITH SYNTAX
{   [NUM-OF-EXTENSIONS  &numOfExtensions]}
-- The following instance of the parameter bound is just an example
networkSpecificBoundSet  COMMON-BOUNDS ::=
{   NUM-OF-EXTENSIONS   1}
END
```

Annex A (informative): Bibliography

IETF RFC 2543: "SIP: Session Initiation Protocol".

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History

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