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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**



Reference

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Keywords

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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 Public Enquiry 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: "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 CS3 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 (2001): "Interface Recommendation for Intelligent Network Capability Set 4: Common aspects".
- [4] ITU-T Recommendation Q.1248.2 (2001): "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 (2001): "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-ac(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-ac(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,
  srf-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

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History

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