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INTELLIGENT NETWORK

GLOBAL FUNCTIONAL PLANE FOR INTELLIGENT NETWORK CS-1

ITU-T Recommendation Q.1213

(Previously "CCITT Recommendation")

FOREWORD

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ITU-T Recommendation Q.1213 was prepared by ITU-T Study Group 11 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 17th of October 1995.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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SUMMARY

IN capability set 1 (IN CS-1) is the first standardized stage of the intelligent network as an architectural concept for the creation and provision of telecommunication services. This Recommendation provides the Intelligent Network (IN) Global Functional Plane (GFP) architecture for IN capability set 1 (IN CS-1). This Recommendation defines the IN GFP for IN CS-1 based on the general framework for IN GFP provided in Recommendation Q.1203, consistent with the scope of IN CS-1 defined in Recommendation Q.1211.

This Recommendation defines:

- the IN GFP model for IN CS-1;
- identifications and definition of the 15 IN CS-1 service independent building-blocks (SIBs), including the Basic Call Process (BCP) specialized SIB;
- the use of global service logic in IN CS-1.

Companion Recommendations include the Q.1200 and Q.1210 Series Recommendations.

Recommendation Q.1213

GLOBAL FUNCTIONAL PLANE FOR INTELLIGENT NETWORK CS-1

(Helsinki, 1993; modified in 1995)

1 General

The concepts for the Intelligent Network (IN) are embodied in the Intelligent Network Conceptual Model (INCM) as described in associated Recommendations I.312/Q.1201 [1]. The Global Functional Plane (GFP) of the INCM is described in associated Recommendations I.329/Q.1203 [2].

2 Scope of IN global functional plane for capability set 1

IN Capability Set 1 (IN CS-1) is the first standardized stage of the intelligent network as an architectural concept for the creation and provision of telecommunication services. This Recommendation provides the functional characteristics of the GFP associated specifically with IN CS-1. General GFP aspects are addressed in associated Recommendations I.312/Q.1201 [1] and I.329/Q.1203 [2].

The following functional characteristics are specific to IN CS-1 and are addressed in this Recommendation:

- IN CS-1 GFP Modelling (see clause 4).
- IN CS-1 SIBs (see clause 5).

For IN CS-1, 14 Service Independent Building Blocks (SIBs) are specified (not including the BCP SIB discussed below). These represent the minimum set of SIBs required to define the IN CS-1 targeted services, identified in Recommendation Q.1211 [3].

- BCP SIB (see clause 6).

For IN CS-1 the basic call process has been defined as a specialized SIB which provides the basic call capabilities. Nine Points of Initiation (POIs) for Global Service Logic (GSL) interfaces have been specified. In addition, six Points of Return (PORs) for GSL interfaces have been specified.

- Plane-to-plane mapping (see clause 8).

The relationships between the service plane and the GFP are specified for IN CS-1.

- For IN CS-1, network time is assumed to be available to all SIBs in the GFP and it does not have to be passed through call instance data.
- Stage 1 SDL diagrams are provided for IN CS-1 SIBs only where the SDLs clarify the understanding of the SIB operation.

3 References

The following Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time, the editions indicated were valid. All Recommendations and other references are subject to revision: all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] CCITT Recommendation I.312/Q.1201 (1992), *Principles of intelligent network architecture*.
- [2] CCITT Recommendation I.329/Q.1203 (1992), *Intelligent network global functional plane architecture*.



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- [3] ITU-T Recommendation Q.1211 (1993), *Introduction to intelligent network capability set 1*.
- [4] ITU-T Recommendation Q.1290 (1993), *Glossary of terms used in the definition of intelligent networks*.
- [5] CCITT Recommendation I.130 (1988), *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN*.
- [6] ITU-T Recommendation Z.100 (1993), *CCITT specification and description language (SDL)*.
- [7] ITU-T Recommendation Q.931 (1993), *Digital subscriber Signalling System No. 1 (DSS 1) – ISDN user-network interface layer 3 specification for basic call control*.

4 IN CS-1 global functional plane modelling

4.1 Role of SIBs in the global functional plane

SIBs are abstract representations of network capabilities that exist in an IN structured network. Their definition enforces the concept of service and technology independence by decoupling the services from the technology on which services are provided. The 14 SIBs defined in this Recommendation identify the network capabilities which will be available to service designers in a CS-1 IN structured network. Their use will provide valuable insight on how service creation will be facilitated in CS-n Recommendations.

4.2 Additional characteristics of a IN CS-1 SIB

Data required by each SIB is defined by SIB support data parameters and call instance data parameters.

SIBs are global in nature and their location need not be considered as the whole network is regarded as a single entity in the GFP.

4.3 IN CS-1 global functional plane model

The INCM described in Recommendation I.312/Q.1201 [1] models the GFP as shown in Figure 1. Normal or non-IN supported services are processed within the BCP. When an IN supported service is to be invoked, its GSL is launched at the POI by triggering mechanism from the BCP. The global functional plane models the network from a global, or a network wide, point of view. Contained in this view is the BCP SIB, including IN CS-1 POIs and PORs, the IN CS-1 SIBs, and the GSL, which describes how SIBs are chained together to describe service features.

This Recommendation specifies how the model can be used to fully define IN CS-1 service features in the GFP.

4.4 Terminology

The following terminology used in this Recommendation, is more fully defined in Recommendation Q.1290 [4]:

CID	Call Instance Data
CIDFP	Call Instance Data Field Pointer
CLI	Calling Line Identification
SSD	Service Support Data

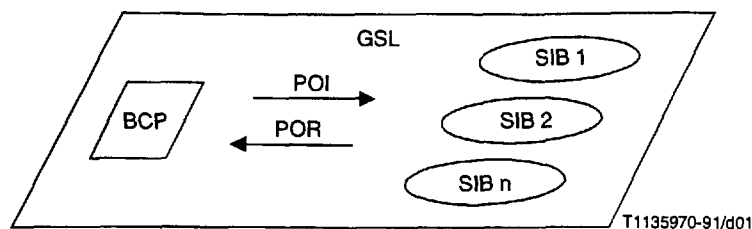


FIGURE 1/Q.1213
Global functional plane model

5 IN CS-1 Service Independent Building Blocks (SIBs)

The following list of SIBs have been identified as required to support the list of targeted IN CS-1 services and service features identified in Recommendation Q.1211 [3]:

- ALGORITHM
- AUTHENTICATE
- CHARGE
- COMPARE
- DISTRIBUTION
- LIMIT
- LOG CALL INFORMATION
- QUEUE
- SCREEN
- SERVICE DATA MANAGEMENT
- STATUS NOTIFICATION
- TRANSLATE
- USER INTERACTION
- VERIFY

The stage 1 SIB descriptions that follow reflect the understanding of the logical function of each SIB in its role of supporting IN CS-1 services and service features. The BCP, which is viewed as a specialized SIB, is described in clause 6.

An explanation of the format of the stage 1 SIB descriptions is outlined below.

5.1 Data parameters for SIBs

By definition, SIBs are independent of the service/SF they are used to represent. They have no knowledge about previous or subsequent SIBs which are used to describe the service feature.

In order to describe service features with these generic SIBs, some elements of service dependence is needed. Service dependence can be described using data parameters which enable a SIB to be tailored to perform the desired functionality. Data parameters are specified independently for each SIB and are made available to the SIB through global service logic.

Two types of data parameters are required for each SIB, dynamic parameters called Call Instance Data (CID) and static parameters called Service Support Data (SSD).

5.1.1 Call Instance Data (CID)

Call instance data defines dynamic parameters whose value will change with each call instance. They are used to specify subscriber specific details like calling or called line information. This data can be:

- made available from the BCP SIB (e.g. Calling Line Identification);
- generated by a SIB (e.g. a translated number); or
- entered by the subscriber (e.g. a dialled number or a PIN code).

Associated with each CID value is a logical name which is referred to as the CID Field Pointer (CIDFP). If a SIB requires CID to perform its function, there will be an associated CIDFP assigned through SSD (refer to 5.1.2). For instance, the TRANSLATE SIB's CID which defines what is to be translated is called Information. The TRANSLATE SIB's SSD parameter which defines where this data can be found is CIDFP-Filter Value(s).

Since the CID value can vary with each call instance, service features can be written with data flexibility. In the above TRANSLATE SIB example, one service feature may require translation of a calling number, while another service feature will require translation of the called number. In both cases, the data required by the SIB is specified by the information Calling Line Identity (CLI), but the CIDFP-Filter Value(s) changes. In the first service feature, the value of CIDFP-Filter Value(s) is set to CLI, while the second service feature sets the value of CIDFP-Filter Value(s) to Called Number.

Once a CIDFP has been specified for a service feature, it can be referenced by subsequent SIBs, and the CID value can be made available to all subsequent SIBs in the SIB chain. This CIDFP is said to be fixed for that service and is constant for all instances of that service. The actual value of the CID changes for each call instance of that service feature.

5.1.2 Service Support Data (SSD)

Service support data defines data parameters required by a SIB which are specific to the service feature description. When a SIB is included in the GSL of a service description, the GSL will specify the SSD values for the SIB. SSD consists of:

i) Fixed parameters

These are data parameters whose values are fixed for all call instances. For instance, the "File Indicator" SSD for the TRANSLATE SIB needs to be specified uniquely for each occurrence of that SIB in a given service feature. The "File Indicator" SSD value is then said to be fixed, as its value is determined by the service/SF description, not by the call instance.

If a service/SF is described using multiple occurrences of the same SIB, then fixed SSD parameters are defined uniquely for each occurrence.

ii) Field pointers

Field pointers identify which CID is required by the SIB, and in doing so provide a logical location for that data. They are signified by "CIDFP-xxxx", where "xxxx" names the data required. For instance, "CIDFP-Filter Value(s)" for the TRANSLATE SIB will specify which CID element is to be translated.

If more than one CID is required by a SIB to perform its function, then the SSD data parameters will contain multiple field pointers.

5.2 Method to describe IN CS-1 SIBs

The following template applies to characterize and describe the SIBs.

5.2.1 Definition

Prose description of the SIB from the service creation point of view.

5.2.2 Operation

Description of actions performed by the SIB. The operations section expands on the definition, to allow the reader to clearly understand the operation that this SIB is intended to perform.

5.2.3 Potential service applications

Service examples of where this SIB can be used.

5.2.4 Input

Input to each SIB is specified as three distinct elements:

- one logical start;
- Service Support Data which defines parameters which are specified by the service description;
- Call Instance Data which are specific to that call instance.

5.2.5 Output

Output from each SIB is specified as two distinct elements:

- one or more logical end;
- call instance data which defines data parameters specific to that call instance which results from the execution of that SIB and are required by other SIBs or the BCP to complete the call service instance.

5.2.6 Graphic representation

A graphic representation is used to describe input, operations and output of the SIB and is illustrated in Figure 2. Each SIB is characterized by having one logical start and one or more logical ends. These logic flows are shown by the solid arrows on the left and right of the diagram. Each logic flow is specified above each arrow. SSD parameters are identified by the dashed arrow at the top of the diagram and are specified beside the dashed arrow. Similarly, CID parameters are specified below the diagram. Input CID parameters are separated from the output parameters.

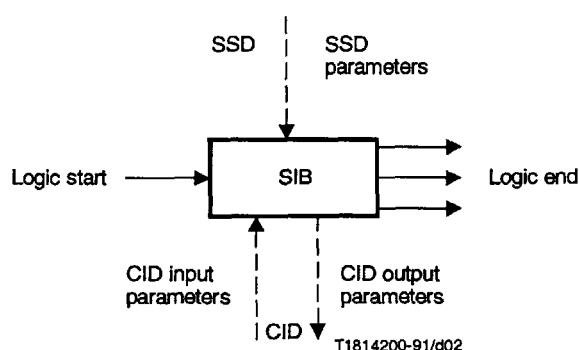


FIGURE 2/Q.1213
Graphical representation of IN CS-1 SIB

5.2.7 SDL diagram

This diagram gives a graphic representation of the stage 1 description of the SIB using SDL macro diagrams (see Recommendation Z.100 [6]).

5.3 ALGORITHM

5.3.1 Definition

Applies a mathematical algorithm to data to produce a data result.

5.3.2 Operation

This SIB takes a specified call instance data and applies the specified mathematical algorithm to it to produce the corresponding data result.

It can be used to implement a simple arithmetic operation as incrementing a counter.

5.3.3 Potential service applications

- Mass calling;
- Televoting.

5.3.4 Input

5.3.4.1 Logical start

Indicates the logical start of execution for the SIB.

5.3.4.2 Service support data

- Type
Specifies the type of algorithm for this SIB. Two algorithms have been identified for IN CS-1:
 - a) increment;
 - b) decrement.
- Value
Specifies the amount to be used when applying the SIB (e.g. 1, 2, etc.).
- CIDFP-Data
This CID field pointer specifies the call instance data to which the algorithm is to be applied.
- CIDFP-Error
This CID field pointer specifies where in output call instance data the error cause will be written.

5.3.4.3 Call instance data

- Data
The identifier is the data associated with the CIDFP-Data upon which algorithm is to be applied.

5.3.5 Output

5.3.5.1 Logical end

- Success;
- Error.

5.3.5.2 Call instance data

- Data
Contains the resultant value after the SIB has completed.

– Error cause

Identifies the specific condition which caused an error during the operation of the SIB. The following errors have been identified for ALGORITHM:

- a) invalid type;
- b) invalid value.

5.3.6 Graphical representation

See Figure 3.

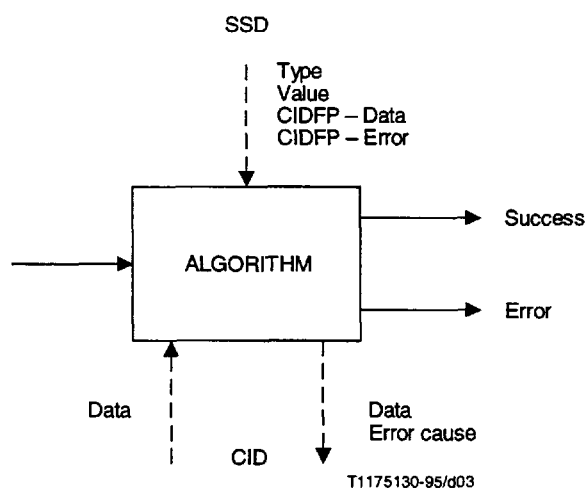


FIGURE 3/Q.1213
ALGORITHM SIB

5.4 AUTHENTICATE

5.4.1 Definition

Provides authentication functionality for a service.

5.4.2 Operation

This SIB provides an authentication function to establish an authorized relationship between the service logic and a database on behalf of a user.

The authentication function can be either simple authentication or externally defined.

5.4.3 Potential service applications

- All services.

5.4.4 Input

5.4.4.1 Logical start

Indicates the logical start of execution for the SIB.

5.4.4.2 Service support data

- Authenticate Name (optional)

This SSD field is only used if SSD Authenticate Mechanism ID has value “Simple”. The Authenticate Name is used to identify the location of the object containing the Authenticate Password attribute in order to set up an Authorized Relationship. A “null” in this SSD field indicates that the Authenticate Name can vary and its value must be provided through call instance data.

- Authenticate Password (optional)

This SSD field is only used if SSD Authenticate Mechanism ID has value “Simple”. The Authenticate Password provides the data to be matched in the Authenticate Name object in order to set up an Authorized Relationship. A “null” in this SSD field indicates that the Authenticate Name can vary and its value must be provided through call instance data.

- Authenticate Mechanism Id

The Authenticate Mechanism Id identifies the authentication mechanism which is to be used to establish the Authorized Relationship. It may take one of the following values:

- None, which implies that no authentication is performed.
- Simple, which implies that simple authentication is performed.
- External, which implies that an externally defined authentication is performed.

- CIDFP – Error

This CID field pointer specifies where in output call instance data the error cause will be written.

- CIDFP – Authorized Relationship Id

This CID field pointer specifies where in output call instance data the Authorized Relationship Id will be written.

- CIDFP – Authenticate Name

This CID Field Pointer specifies which call instance data is to be used as the Authenticate Name.

- CIDFP – Authenticate Password

This CID Field Pointer specifies which call instance data is to be used as the Authenticate Password.

5.4.4.3 Call instance data

- Authenticate Name (optional)

This CID field is only used if SSD Authenticate Mechanism Id has value “Simple” and SSD Authenticate Name has value “null”. The Authenticate Name is used to identify the location of the object containing the Authenticate Password attribute in order to set up an Authorized Relationship.

- Authenticate Password (optional)

This CID field is only used if SSD Authenticate Mechanism ID has value “Simple” and SSD Authenticate Name has value “null”. The Authenticate Password provides the data to be matched in the Authenticate Name object in order to set up an Authorized Relationship.

NOTE – When Authenticate Name and Authenticate Password are supplied as input CID, the SSD parameters Authenticate Name and Authenticate Password are not used.

5.4.5 Output

5.4.5.1 Logical end

- Success (Authentication successful);
- Error.

5.4.5.2 Call instance data

- Error cause

Identifies the specific condition which caused an error during the operation of the SIB.

- Authorized Relationship Id

The Authorized Relationship Id provides the identity of the established Authorized Relationship through which operations can be applied.

5.4.6 Graphical representation

See Figure 4.

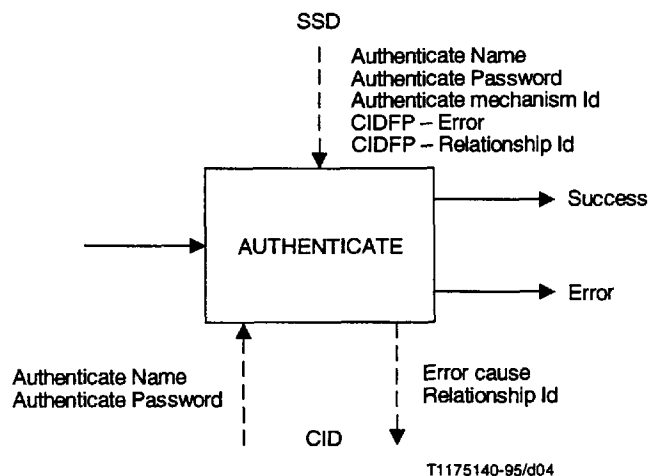


FIGURE 4/Q.1213
AUTHENTICATE SIB

5.5 CHARGE

5.5.1 Definition

Determine special charging treatment for the call, where special refers to any charging in addition to that normally performed by the basic call process.

In general, this involves identifying:

- the resources for which charging is to occur;
- to where the charges are to be directed.

It should be noted that this SIB is not responsible for the subscriber billing process.

5.5.2 Operation

The charging information output by this SIB must be compatible with the charging and billing system of the network operator or service provider. However, this SIB does not define the format of the output nor does it identify all the types of information that an Administration will require for charging. Generation of bills will often be done off-line by the Administration's existing billing system.

The CHARGE SIB is used for specific resource charging and may be invoked several times in one service/service feature instance.

Different simultaneous or consecutive call instances may charge the same account.

Typical resources for which charging can occur are:

- circuit-mode bearers;
- packet or messages;
- SRF resources, e.g. announcements, voice message storage, etc.;
- SCF usage (in units).

Typically, charging may be directed towards:

- a) the account identified by the CLI;
- b) the account identified by the called number (either the dialled number or the destination number);
- c) an account or credit card identified by the collected user information;
- d) the calling user's exchange accumulator;
- e) a payphone.

5.5.3 Potential service application

- Any service which requires specific IN charging.

5.5.4 Input

5.5.4.1 Logical start

Indicates the logical start of execution for the SIB.

5.5.4.2 Service support data

- number of accounts to charge;
- Account.

Each account is specified by two parameters, as follows:

a) Number

Specifies one of the following:

1) CIDFP-Line

This CID field pointer specifies which call instance data is to be used as the line number to charge.

2) CIDFP-Account

This CID field pointer specifies which call instance data is to be used as the account number to charge.

3) Fixed account

Specifies an account number which is fixed for all call instances.

b) Per cent (%)

Specifies the allocation of the total charge for this account. The sum of all allocations must equal 100%.

– Resource type

Specifies the resource to be charged for (e.g. bearer type, announcement, SCF usage, etc.).

– Units

Specifies a premium value for the specified resource type.

– Service/service feature identifier

Specifies the service/service feature for which charging is to be applied.

– CIDFP-Pulse

This CID field pointer specifies which call instance data is used to identify pulse metering on the calling line.

– CIDFP-Error

This CID field pointer specifies where in output call instance data the error cause will be written.