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Q.1902.4

Amendment 2

(04/2004)

SERIES Q: SWITCHING AND SIGNALLING

Specifications of signalling related to Bearer Independent Call Control (BICC)

Bearer Independent Call Control protocol (Capability Set 2): Basic call procedures

Amendment 2

ITU-T Recommendation Q.1902.4 (2001) – Amendment 2

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ITU-T Recommendation Q.1902.4

Bearer Independent Call Control protocol (Capability Set 2): Basic call procedures

Amendment 2

Summary

This amendment to the ISUP Specification ITU-T Rec. Q.1902.4 (07/2001) contains seven modifications:

1) Correction of a cut and paste error in 7.4.1 and 7.4.4;
2) Modifications of the codec negotiation in 8.3;
3) Fallback procedures modification of 8.6.2.2.2;
4) Signalling procedures for automatic rerouting (crankback); new procedures in a new clause 8.21;
5) Procedures to support the calling party's category for calls from mobile terminals; new procedures in a new clause 8.22;
6) Handling of national use elements at an international gateway SN or CMN; new procedures in a new clause 13.8;
7) Two message flows examples in codec negotiation and modification in Appendix I.

NOTE – Previous Amendment(s) to Q.1902.4 (07/2001) still apply and need to be taken into account when applying this Amendment.

Source

Amendment 2 to ITU-T Recommendation Q.1902.4 (2001) was approved on 13 April 2004 by ITU-T Study Group 11 (2001-2004) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ITU-T Recommendation Q.1902.4

Bearer Independent Call Control protocol (Capability Set 2): Basic call procedures

Amendment 2

1) Clause 7.4.1 Per-call bearer set-up in forward direction

Modify point 2.4 as follows:

…….

2.4) A Bearer Set-up request is sent to the selected BCF. This request includes:

- BNC-ID (as ~~received~~ sent in the BICC_Data indication primitive).
- BIWF address (as ~~received~~ sent in the BICC_Data indication primitive).
- Bearer Characteristics ……..

2) Clause 7.4.4 Per-call bearer set-up using bearer control tunnelling – delayed forward

Modify point 2.3 as follows:

…….

2.3) A Bearer Set-up request primitive is then sent to the selected BCF containing:

- BNC-ID (if ~~received~~ sent in the BICC_Data indication primitive).
- BIWF address (if ~~received~~ sent in the BICC_Data indication primitive).
- Bearer Characteristics ……..

3) Clause 8.3 Codec negotiation

Add the following new paragraph at the end of clause 8.3:

…….

When a call includes some SNs that are not supporting codec negotiation, procedures defined in this clause provide for codec negotiation between adjacent SNs supporting the capability. Basic bearer set-up procedures defined in 7.4 and 7.5 are used in those portions of the connection that do not support codec negotiation. A combination of codec procedures for a single call will result in selection and placement of codecs in a connection that is assumed to have acceptable transmission performance.

4) Clause 8.3.2 SN transiting codec negotiation

Modify clause 8.3.2 as follows:

…….

~~In the case of a GSN between a network supporting codec negotiation and a network not supporting such capability, then:~~

The following cases apply as appropriate when interworking occurs between a network that supports codec negotiation and one that does not support codec negotiation:

- if the incoming side of the call is the network that supports codec negotiation then the CSF shall perform the codec negotiation procedures described in 8.3.3 for SN terminating codec negotiation;
- if the incoming side of the call is the network that does not support codec negotiation subsequent, then the CSF shall perform the codec negotiation procedures described in 8.3.1 for an SN initiating codec negotiation.

5) Clause 8.3.4.1 Per-call bearer set-up in forward direction

Modify clause 8.3.4.1 as follows:

…….

The selected codec identity is indicated to the BCF, unless it is identical to the preferred codec indicated to the BCF in 8.3.1, and the Available Codec List is stored in the CSF for future use.

For abnormal procedures, see 8.3.6.

6) Clause 8.3.4.2 Per-call bearer set-up in backward direction

Modify clause 8.3.4.2 as follows:

…….

The selected codec identity is indicated to the BCF, unless it is identical to the preferred codec indicated to the BCF in 8.3.1, and the Available Codec List is stored in the CSF for future use.

For abnormal procedures, see 8.3.6.

7) Clause 8.3.5.1 Per-call bearer set-up in forward direction

Modify clause 8.3.5.1 as follows:

…….

The selected codec identity is indicated to the BCF and the Available Codec List is stored in the CSF for future use (if not already stored).

For abnormal procedures, see 8.3.6.

8) Clause 8.3.5.2 Per-call bearer set-up in backward direction

Modify clause 8.3.5.2 as follows:

…….

2) The selected codec identity is indicated to the BCF and the Available Codec List is stored in the CSF for future use (if not already stored).

3) The procedures to initiate bearer set-up continue at 7.5.2, 7.5.3 or 7.5.5 item 2.

For abnormal procedures, see 8.3.6.

9) Clause 8.3.6.3 Codec negotiation in an SN transiting codec negotiation

Modify clause 8.3.6.3 as follows:

Whenever a CSF transiting codec negotiation for a call, as described in 8.3.2, receives a BAT Compatibility Report information element in a BICC_Data indication primitive from the succeeding node indicating that the codec negotiation parameters have been discarded and the call is proceeding without such parameters, ~~the procedures are for further study~~ codec negotiation procedures towards the succeeding CSF should be abandoned and basic bearer set-up procedures, defined in 7.4 and 7.5, should be resumed. The CSF will initiate procedures described in 8.3.3 for the terminating codec negotiation towards the preceding CSF.

10) Clause 8.6.2.2.2 Succeeding network does not have the capability of performing fallback

Modify clause 8.6.2.2.2 as follows:

The CSF will include a Transmission Medium Used parameter (which has been set according to the fallback connection type indicated in the Transmission Medium Requirement parameter) in the ACM ~~or CPG~~ indicating that fallback has occurred for this call.

…….

11) New clause 8.21 Signalling procedures for automatic rerouting (crankback)

Add new clause 8.21 as follows:

8.21.1 Introduction

The automatic rerouting (crankback) signalling procedure allows the call set-up to return to a preceding SN so that the call can be automatically rerouted from there. Crankback is an optional signalling procedure that allows for sophisticated support of the automatic rerouting (ARR) capability (refer to ITU-T Rec. E.170). This procedure is an additional procedure to the unsuccessful call set-up procedures described in clause 9. An SN invokes the automatic rerouting signalling procedure when a call cannot be routed further from that SN. There are three possible cases:

1) The process to select an outgoing route from the SN fails;
2) A backward REL is received during the outgoing call set-up. The cause value received is either specific for the route chosen (e.g., bearer capability not implemented) or is temporary in nature (e.g., congestion);
3) The call cannot be established to the user at the destination local SN.

The number of attempts to reroute a call is limited. This limit is a network-specific value, not exceeding 63.

It needs to be emphasized that the automatic rerouting signalling procedure can only be effective when introduced on a network-wide basis.

8.21.2 Actions at an intermediate SN

8.21.2.1 Sending a REL with the possible invocation of automatic rerouting

Automatic rerouting may or may not be invoked when the call cannot be routed further from an intermediate SN as described in the cases 1 and 2 in 8.21.1. Invocation of automatic rerouting involves the setting or updating of the rerouting counter which keeps track of the number of rerouting attempts. A reason for not invoking automatic rerouting is when the counter has reached its upper limit.

Four cases can be distinguished in an intermediate SN:

a) Automatic rerouting is invoked and the automatic rerouting parameter has not been received in the IAM for the incoming call. In this case, the intermediate SN sends a REL towards the preceding SN, including the automatic rerouting parameter with the rerouting counter set to "*one*" and the rerouting inhibit indicator set to "*no indication*".

b) Automatic rerouting is invoked and the automatic rerouting parameter has been received in the IAM for the incoming call.

   In this case, the intermediate SN sends a REL towards the preceding SN including the automatic rerouting parameter with the rerouting counter incremented by one and the rerouting inhibit indicator set to "*no indication*".

c) Automatic rerouting is not invoked and the automatic rerouting parameter has, or has not, been received in the IAM for the incoming call.

   In this case, the intermediate SN sends a REL towards the preceding SN including the automatic rerouting parameter with the rerouting inhibit indicator set to "*do not crankback*". The rerouting counter is not incremented if it was received in the incoming IAM.

d) If the intermediate SN does not support the automatic rerouting signalling procedure, no automatic rerouting parameter is sent in the REL message and thus a regular backward release, according to 9.3, takes place.

As a network option, the reason for invoking, or not invoking, automatic rerouting can be indicated in the automatic rerouting parameter. This information could be helpful for operations and maintenance purposes. For example, it could be important to know whether an invocation (and, in particular, a rerouting inhibit) is based on:

- a cause code as received in a REL received during outgoing call set-up;
- trunk group data (which could, for instance, indicate that rerouting is useless since no other trunkgroup in the network exists to the final destination of the call);
- routing data (which could, for instance, indicate that rerouting is useless since no other route exists to the final destination of the call).

8.21.2.2 Receiving a REL with the automatic rerouting parameter

An intermediate SN can take four possible actions when it receives a REL from the succeeding SN with the automatic rerouting parameter:

a) It attempts to reroute the call to an alternative route if:

   - automatic rerouting has been invoked (rerouting counter greater or equal to one and rerouting inhibit indicator coded as "no indication");
   - autonomous logic in the SN indicates that rerouting should be applied in this SN.

   If an alternate route is available and the maximum number of rerouting attempts has not been exceeded, the SN includes the automatic rerouting parameter into the IAM, to indicate how many automatic rerouting (crankback) attempts have already occurred. If no alternative route is available, or the rerouting counter exceeds the maximum number of rerouting attempts allowed by the network, the received REL shall be passed towards the preceding SN with the inclusion of the automatic rerouting parameter as received.

   NOTE 1 – The maximum number of rerouting attempts is network specific.

b) It does not attempt rerouting but passes the received REL towards the preceding SN with the inclusion of the automatic rerouting parameter as received if the rerouting inhibit indicator is coded as "*do not crankback*".

   NOTE 2 – The rerouting inhibit indicator is the means by which a succeeding SN can explicitly prevent a preceding SN from performing automatic rerouting.

c) It does not attempt rerouting but passes the received REL towards the preceding SN with the inclusion of the automatic rerouting parameter as received if the rerouting inhibit indicator is coded as "*no indication*" and autonomous logic in the SN indicates that no rerouting should be applied in this SN. If the intermediate SN wants to inhibit rerouting, it includes the rerouting inhibit indicator set to "*do not crankback*" in the automatic rerouting parameter.

d) It handles the automatic rerouting parameter as an unrecognized parameter according to 13.4.4.2 if the SN does not support the automatic rerouting signalling procedure and, as a result, does not recognize the parameter. This may render the automatic rerouting mechanism ineffective.

8.21.2.3 Receiving an IAM with the automatic rerouting parameter

The intermediate SN may receive the automatic rerouting parameter in an IAM. This parameter is passed on if the call is routed to the succeeding SN. If the call cannot be routed to the succeeding SN, 8.21.2.1 applies.

Procedures for unrecognized parameters apply if the intermediate SN does not support the automatic rerouting signalling procedure and, as a result, does not recognize the parameter; see 13.4.4.2. This may render the automatic rerouting mechanism ineffective.

8.21.3 Actions at an intermediate CMN

8.21.3.1 Sending a REL with the possible invocation of automatic rerouting

The actions as described in 8.21.2.1 apply.

8.21.3.2 Receiving a REL with automatic rerouting parameter

The CMN does not attempt to reroute calls as it has no control of the bearer. The CMN shall pass the received REL towards the preceding SN with the inclusion of the automatic rerouting parameter as received. If it wants to inhibit rerouting, it includes the rerouting inhibit indicator set to "*do not crankback*" in the automatic rerouting parameter.

The CMN handles the automatic rerouting parameter as an unrecognized parameter according to 13.4.4.2 if it does not support the automatic rerouting signalling procedure and, as a result, does not recognize the parameter. This may render the automatic rerouting mechanism ineffective.

8.21.3.3 Receiving an IAM with the automatic rerouting parameter

The actions as described in 8.21.2.3 apply.

8.21.4 Actions at a gateway SN

The actions as described in 8.21.2 apply. However, passing of the automatic rerouting parameter in the IAM and REL messages between networks depends on bilateral agreement (e.g., exchanging automatic rerouting information may not be deemed desirable when crossing a network boundary).

8.21.5 Actions at a gateway CMN

The actions as described in 8.21.3 apply. However, passing of the automatic rerouting parameter in the IAM and REL messages between networks depends on bilateral agreement (e.g., exchanging automatic rerouting information may not be deemed desirable when crossing a network boundary).

8.21.6 Actions at the originating SN

The originating SN performs the same actions as described in 8.21.2.2 with the exception that the call is released, according to the normal release procedures, if it is not rerouted.

8.21.7 Actions at the destination SN

When a destination local SN cannot establish a call towards a user (case 3 in 8.21.1) and the incoming call is to be released:

- the same actions as described in 8.21.2.1 apply if it is known that the user is connected to at least one other SN over a physically separate link;
- the destination local SN shall not invoke the automatic rerouting signalling procedure if it is known that the user is not connected to any other SN over a physically separate link, or if there is no sufficient knowledge about an alternate link to the user; the automatic rerouting parameter with the rerouting inhibit indicator coded as "*do not crankback*" shall be included in the REL;
- no automatic rerouting parameter is sent in the REL message and thus a regular backward release according to 9.2 takes place if the destination local SN does not support the automatic rerouting signalling procedure.

12) New clause 8.22 Calling party's category setting for mobile terminals

Add new clause 8.22 as follows:

8.22.1 General

For the purpose of this clause, the originating SN is the SN which initiates the procedure, and the destination SN is the SN which terminates the procedure.

The use of these specific Calling Party's Category parameter values between network operators is based on bilateral agreements.

8.22.2 Actions at the originating SN

Once the originating SN has determined either by indication from mobile network or by other means (e.g., number range) that the call is from a mobile terminal located in the home PLMN, then the Calling Party's Category parameter is set to "mobile terminal located in the home PLMN".

If, for this call, the originating SN has determined that the call is from a mobile terminal located in a visited PLMN, then the Calling Party's Category parameter is set to "mobile terminal located in a visited PLMN".

If there is no indication that the mobile-initiated call has roamed or not, then the default setting of the Calling Party's Category parameter for this procedure will be "mobile terminal located in a visited PLMN".

8.22.3 Actions at the destination SN

The destination SN shall pass this information to the management system.

8.22.4 Actions at other exchanges

All other exchanges shall pass on these values of the Calling Party's Category parameter.

13) New clause 13.8 Handling of national use elements at an international gateway SN or CMN

Add new clause 13.8 as follows:

Unless a bilateral or multilateral agreement is reached among the network operators concerned, messages, parameters and parameter values marked as "national use" are not valid in the international network. Thus, an outgoing or incoming international gateway SN or CMN shall ensure that any "national use" messages/parameters/values received from its associated national network are not passed on.

NOTE – This requirement can be satisfied, for example, by the international gateway SN or CMN:

- fully implementing the appropriate national procedures, and any necessary interworking functions; or
- treating all "national use" codespace as unrecognized, and providing "pass-on not possible" treatment.

14) Clause I.2 Contents

Modify clause I.2 as follows:

…….

2) Codec negotiation and modification:

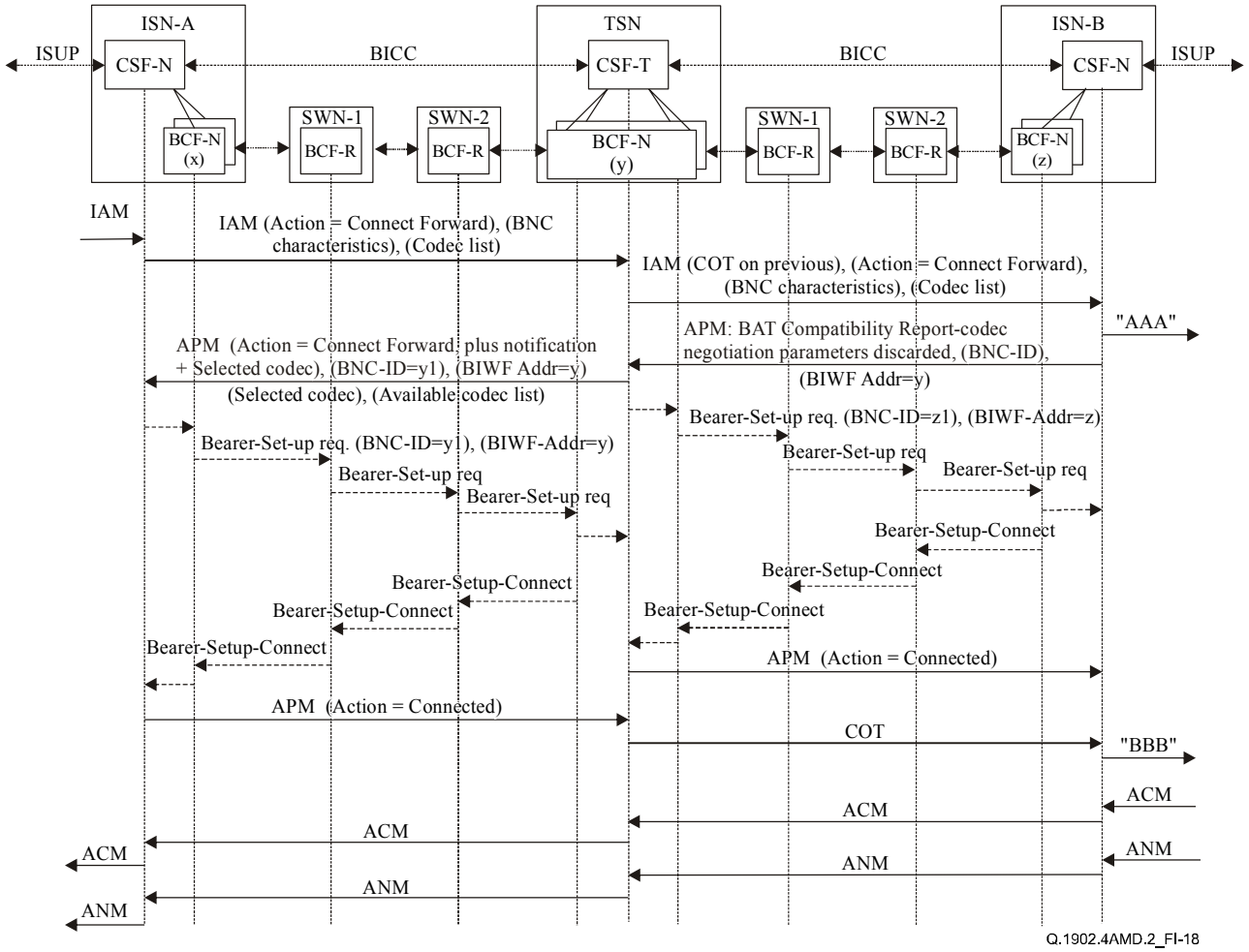
……

2.9) Forward establishment of backbone network connection when codec negotiation is not supported at ISN-B.

2.10) Forward establishment of backbone network connection when ISN-A does not support codec negotiation and TSN becomes a SN initiating codec negotiation toward ISN-B.

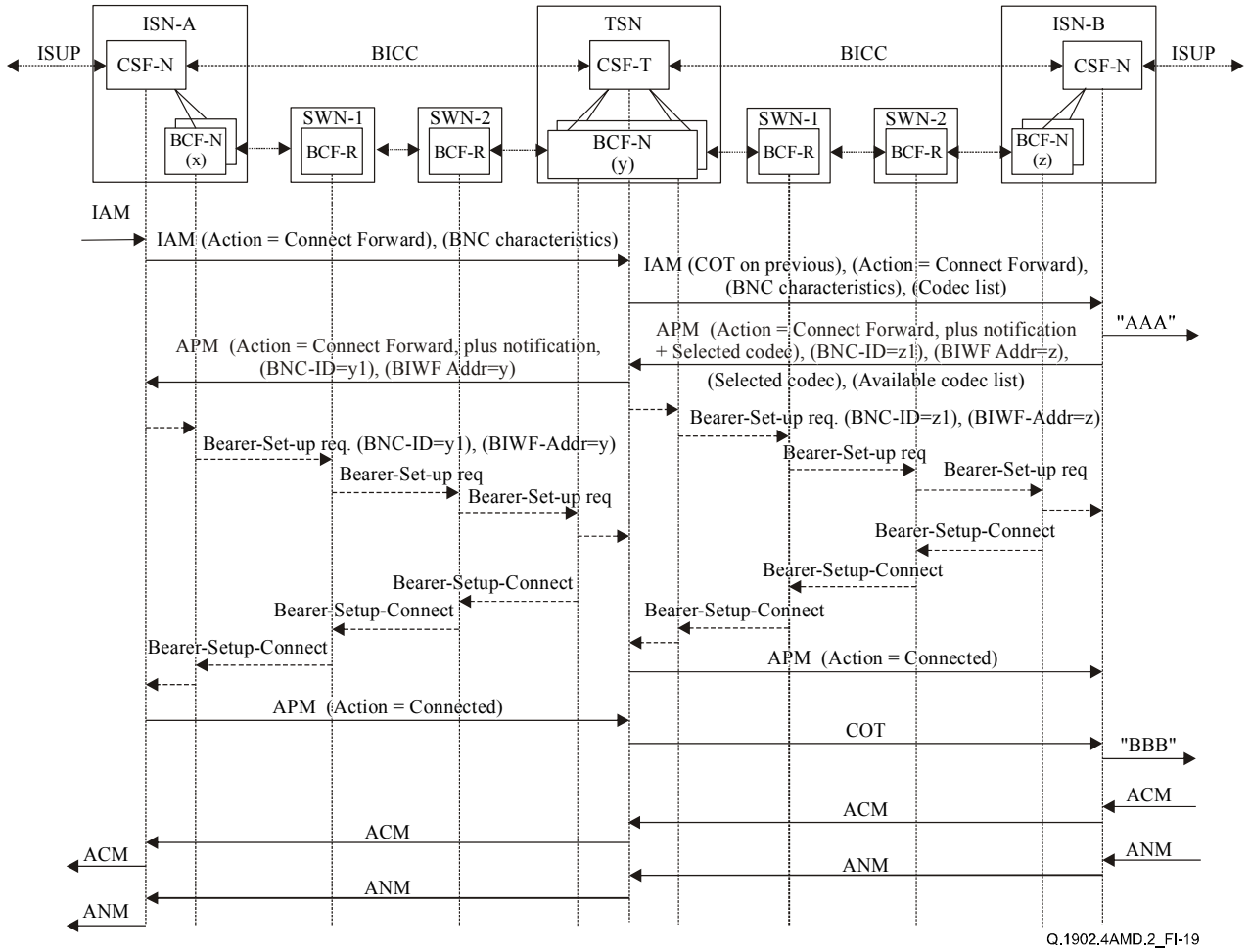
15) New Figures I.18 and I.19

Insert the following new call flows (Figures I.18 and I.19) and renumber the following call flows accordingly:



NOTE – TSN changes to perform role of SN terminating codec negotiation on receipt of BAT compatibility indication. ISN-A and TSN are supporting codec negotiation.

Figure I.18/Q.1902.4 – Forward establishment of backbone network connection when codec negotiation is not supported at ISN-B



NOTE – TSN is supporting codec negotiation but received IAM using non-codec negotiation. In this case, the TSN changes to perform the role of SN initiating codec negotiation toward ISN-B.

Figure I.19/Q.1902.4 – Forward establishment of backbone network connection when ISN-A does not support codec negotiation and TSN becomes a SN initiating codec negotiation toward ISN-B

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