ATIS-1000666.a.2000(S2019)

Supplement to ATIS-1000666, Interactions Between the Operator Services Network Capability (OSNC) and Release to Pivot (RTP)

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Supplement to T1.666-1999,

Interactions Between the Operator Services Network Capability (OSNC) and Release to Pivot (RTP)

Secretariat

Alliance for Telecommunications Industry Solutions

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Annex T

(normative)

1   Introduction

This Annex describes the additional functions that the Operator Services Network Capability (OSNC) -- described in T1.666-1999 -- will need to perform when invoking the Release to Pivot (RTP) network capability -- described in T1.661-1997. These functions are activated on a per-switch basis and are only activated when the Release to Pivot network capability is also active. In particular, the originating end office and the operator services switch may activate these functions independently, though RTP will not be invoked for a given call unless both switches have these functions active.

This Annex applies to an OSNC Originating Connection or to a Type 2 Transfer Connection.

No additional changes to the scope, purpose and application of the Operator Services Network Capability are required.

2   Normative References

The following documents contain provisions that, through reference in this text, constitute provisions of this American National Standard. These are in addition to the documents listed in clause 2 of other sections of this document.

T1.114-2000, *Signaling System Number 7 (SS7) - Transaction Capabilities Application Part (TCAP).*

T1.401-1993, *Interface Between Carriers and Customer Installations - Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signaling.*

T1.661-2000, *SS7 - Release to Pivot (RTP).*

3   Abbreviations and Definitions

IAM   Initial Address Message

ISDN   Integrated Services Digital Network

ISUP   ISDN User Part

OSNC	Operator Services Network Capability
OSS	Operator Services System
PIN	Personal Identification Number
RTP	Release to Pivot
ST	Start Signal
TCAP	Transaction Capabilities Application Part

4   Originating Connection Functions

4.1   Normal Procedures

During establishment of the originating connection, the network may add an offer of RTP functionality to the call setup request that results from an operator services request. The operator service may then invoke RTP when a new destination is determined for the call. Additional information may be exchanged to facilitate:

- returning the call to the RTP-invoking exchange,

- notification to the RTP-invoking exchange of the disposition of the call, and

- proper accounting[1].

4.2   Functional Entity Model
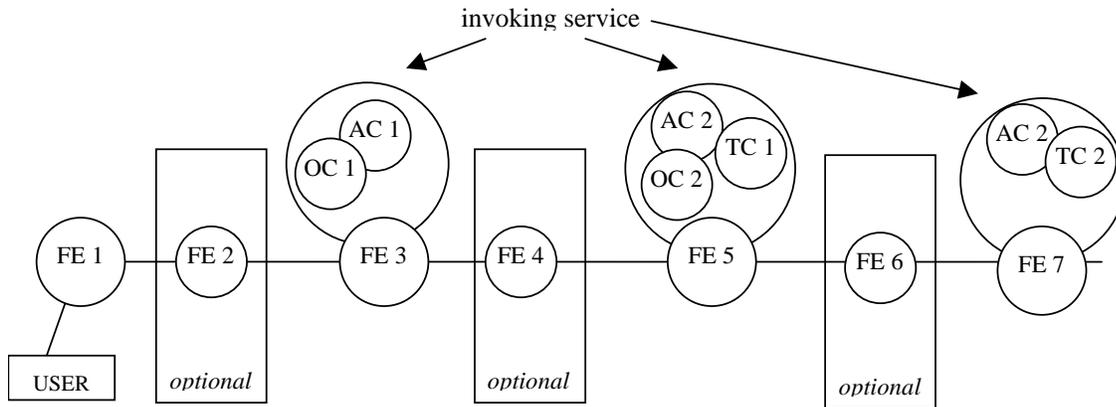

Figure 1 - Operator Services Network Capability Functions

4.3   Description of Functional Entity AC1

AC1 provides operator-services specific functionality in support of the invocation of RTP. During initial call establishment, AC1 is able to:

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[1] Note that the internetwork exchange of accounting information may require agreements that are outside the scope of this standard.

- use RTP functionality to assure an offer of RTP is sent forward with "Redirection Possible Any Time During the Call."

- specify "OSNC" as a Reason why RTP may be invoked.

- indicate forward the specific OSNC-related functions that are allowed on the call.

On invocation of RTP at AC1 by AC2, AC1 is able to:

- monitor the pivoted call to provide notification to AC2 of the disposition of the call.

- store information from AC2 to be returned to AC2 in the event the call is returned to AC2.

- monitor the call for the "#" or "*" indication that the call should be returned to AC2 and optionally collect user digits to be forwarded with the call setup. The "#"and "*" indications are specified in T1.401-1993, using the frequency pairs 1477/941 Hz and 1209/941 Hz, respectively.

- use the RTP "return to invoking exchange" function to return the call to AC2, optionally using routing information supplied by AC2.

4.4   Description of Functional Entity AC2

AC2 provides operator-services specific functionality in support of the invocation of RTP. On receipt of a call offering RTP with a reason of "OSNC," AC2 is able to:

- alert the invoking service of available OSNC-related functions allowed on the call.

- respond to a request from the invoking service to invoke RTP to deliver the call to a new destination, including information required to support the desired OSNC-related functions.

- receive notification of disposition of the call after the call has been released to AC1.

- deliver to the invoking service a call received by FE3 with an indication the call is being returned to AC2 following detection of a requested "#" or "*" signal from the user. The "#" and "*" indications are specified in T1.401-1993.

5   Information Flow Model

During initial call setup, OC1 is enhanced by the functions of AC1 to invoke RTP. RTP functionality is used to indicate that RTP may be invoked "Any Time During the Call" and to indicate "OSNC" as a reason for invoking RTP. Other services and network capabilities may add additional RTP reasons. AC1 functionality is used to pass additional information with the CALL REQest, as detailed in the protocol and procedures.

When the call is released by AC2, RTP functionality is used to indicate that the reason RTP is being invoked is OSNC. AC2 may pass additional information with the Call Disconnect, as detailed in the protocol and procedures.
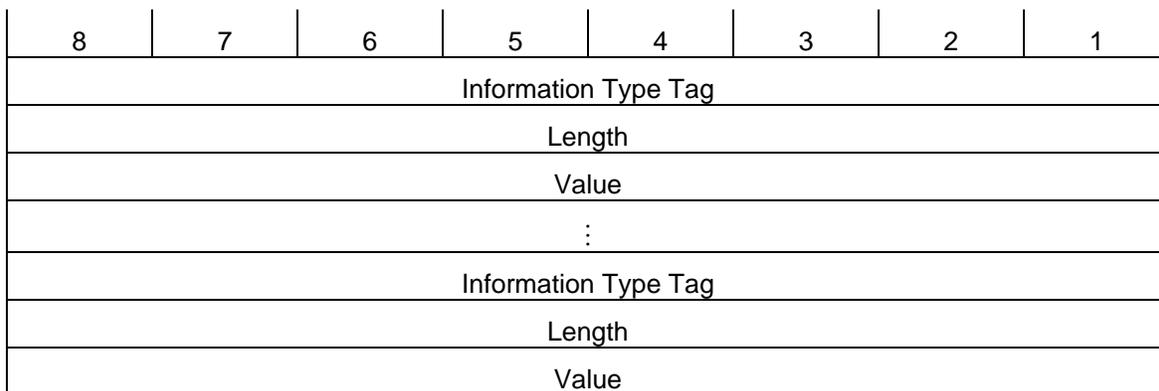
AC1 is an extension of, and resides in the same node as, OC1 functionality. AC2 is an extension of, and resides in the same node as, either OC2 or TC2.

6   Protocol and Procedures

6.1   Formats and Codes

6.1.1   Parameters for IAM

The format of the OSNC Forward Information parameter shall be a constructor as shown in Figure 2.

8	7	6	5	4	3	2	1
Information Type Tag							
Length							
Value							
⋮							
Information Type Tag							
Length							
Value							

Figure 2 - OSNC Forward Information parameter

The Tags in the OSNC Forward Information parameter are encoded as follows:

0000 0001	Version Control
0000 0010	Returned Information
0000 0011	Collected Information
0000 0100 to 0010 0000	spare
0010 0001	Reserved for answer/no answer notification version
0010 0010	Reserved for termination notification version
0010 0011	Reserved for notification version
0010 0100	Reserved for accounting information in Release version
0010 0101	Reserved for carrier in Release version
0010 0110	Reserved for monitor event version
0010 0111 to 1111 1111	spare

The following codes shall be used in the Version Control field:

bit	1:	Answer/No Answer support
	0	not supported
	1	supported
bit	2:	Termination notification
	0	not supported
	1	supported

bit   3:   Accounting information in Release
         0   not supported
         1   supported

bit   4:   Carrier information in Release
         0   not supported
         1   supported

bit   5:   Monitor Event
         0   not supported
         1   supported

bit   6:   Reserved for extension of Answer/No Answer

bit   7-8:   Reserved

The Returned Information shall be a constructor with the following form:

8	7	6	5	4	3	2	1
First octet of returned information							
⋮							
Last octet of returned information							

Figure 3 - Returned Information

The Collected Information shall have the following format

8	7	6	5	4	3	2	1
odd/even	encoding scheme			spare			
first digit				"#" or "*"			
third digit				second digit			
⋮							
filler (if needed)				nth address signal			

Figure 4 - Collected Information
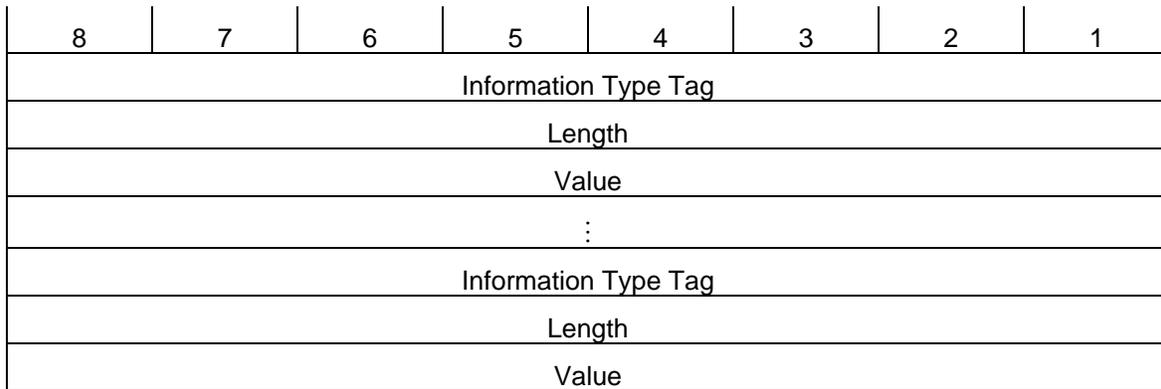
The address signals shall be encoded as follows:

    0000   digit 0
    0001   digit 1
    0010   digit 2
    0011   digit 3
    0100   digit 4
    0101   digit 5
    0110   digit 6

0111　digit 7
1000　digit 8
1001　digit 9
1010　spare (no interpretation)
1011　code 11
1100　code 12
1101　 *
1110　 #
1111　ST (Reserved) (no interpretation)

6.1.2   Parameters for Release

The format of the OSNC Backward Information parameter shall be a constructor as shown in Figure 5.

8	7	6	5	4	3	2	1
Information Type Tag							
Length							
Value							
⋮							
Information Type Tag							
Length							
Value							

Figure 5 - OSNC Backward Information parameter

The Tags in the OSNC Backward Information parameter are encoded as follows:

```
0000 0001      OSS Routing Identifier
0000 0010      Returned Information
0000 0011      Monitor Event Accepted
0000 0100      Call Reference Notification Request
0000 0101      Answer/No Answer Notification Accepted
0000 0110      Termination Notification Accepted
0000 0111      Point Code
0000 1000      Subsystem Number
0000 1001      Accounting Information
0000 1010
    to         spare
1111 1111
```

The OSS Routing Identifier field shall have the same format as the ISUP Called Party Address.

The Returned Information field shall have the same format as the corresponding field in the OSNC Forward Information parameter. (See Figure 2.)

The Monitor Event Accepted field shall be encoded as follows:

0000 0001   Monitor for "#"
0000 0010   Monitor for "#" and collect digits
0000 0011   Monitor for "*"
0000 0100   Monitor for "*" and collect digits
0000 0101
   to   spare
1111 1111

Note: The "#" and "*" indications are specified in T1.401-1993, using the frequency pairs 1477/941 Hz and 1209/941 Hz, respectively.

The Answer/No Answer Notification Accepted field has length zero and no values.

The Termination Notification Accepted field has length zero and no values.

The Point Code field shall have length three octets.

The Subsystem Number field shall have length one octet.

The Accounting Information field shall be a constructor containing specific modules for inclusion in the accounting information at the pivoting exchange[2].

6.1.3 Protocol for Notification Message

The OSNC Notification operation is a member of the Report Event family, does not require a reply and has value:

0000 1010 0000 0011

The OSNC Notification operation is sent with the following parameters:

- Call Reference
- Reason

The Call Reference shall be encoded as given in T1.114.5-2000 (Definitions and Functions of Transaction Capabilities Operations, Parameters, and Error Codes).

The Reason has length one octet and is encoded as follows:

0000 0000   no indication
0000 0001   answer
0000 0010   termination before answer
0000 0011   termination after answer

6.2 Procedures

During initial call establishment, if the functionality of this annex is active, the IAM shall indicate an offer of RTP with "Redirection Possible Any Time During the Call" and specifying "OSNC" as a Reason why RTP may be invoked. The OSNC Forward Information parameter shall also be sent containing the Version Control field set to indicate which specific OSNC-related functions are allowed on the call.

These procedures do not specify a Release Cause. The RTP default value of 23 will be used unless other network capabilities or services have other requirements.

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[2] Note that the internetwork exchange of accounting information may require agreements that are outside the scope of this standard.

On receipt of this IAM, operator services may determine to invoke one or more of the supported OSNC-related functions. The OSNC Backward Information parameter is populated as indicated in 6.2.1 through 6.2.7

If the OSNC Backward Information parameter requests a Notification function, each time a requested event occurs, the pivoting exchange shall send a TCAP Unidirectional message to the Point Code and Subsystem number given in the received OSNC Forward Information parameter. The Component Portion of the Unidirectional message shall contain the Notification operation with the ISUP Call Reference of the call in the Call Reference parameter and the reason for the notification in the Reason parameter.

6.2.1   OSS Routing Identifier

The OSS Routing Identifier field shall contain the address to be used if the call is returned to the RTP-invoking exchange.

6.2.2   Returned Information

The Returned Information field shall contain information of interest to the operator service in the event the call is returned to the RTP-invoking exchange. Since the information is not processed at the pivoting exchange, it may be formatted to suit the RTP-invoking exchange. The returned information shall contain an indication of the service state to apply when the call is returned[3].

6.2.3   Monitor Event Request

If the Monitor Event Request field indicates the call should be monitored, the pivoting exchange shall interrupt call processing on detection of the specified signal from the calling party. If digit collection is also requested, the pivoting exchange shall collect up to ten additional signals from the calling party. After digit collection (if applicable) the pivoting exchange shall send an IAM to the address contained in the OSS Routing Identifier field (or to the address used in the original IAM to the RTP-invoking exchange if no OSS Routing Identifier field is received) including the Version Control field, the Collected Information field and, if applicable, the Returned Information field.

6.2.4   Notification Request

If the Notification Request field indicates that An Answer/No Answer notification is requested, the pivoting exchange will send a TCAP message with a Notification operation indicating whether or not the call to the new destination was answered.

If the Notification Request field indicates that Termination After Answer notification is requested, the pivoting exchange will send a TCAP message with a Notification operation indicating the termination of the call after answer. If the call terminates before answer, no notification is sent.

6.2.5   Point Code

The Point Code field provides the point code to be used when sending a TCAP message with a Notification operation.

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[3] If the returned information contains user card number and PIN information, this information should be encrypted.

6.2.6   Subsystem Number

The Subsystem Number field provides the SSN to be used when sending a TCAP message with a Notification operation.

6.2.7   Accounting Information

The Accounting Information field shall be populated by the operator service with the accounting information required at the pivot exchange[4].

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[4] Note that the internetwork exchange of accounting information may require agreements that are outside the scope of this standard.