



RAP Format Specification

Version 6.12

18 November 2015

This is a Binding Permanent Reference Document of the GSMA

Security Classification: Confidential - Full, Rapporteur, and Associate Members

Access to and distribution of this document is restricted to the persons permitted by the security classification. This document is confidential to the Association and is subject to copyright protection. This document is to be used only for the purposes for which it has been supplied and information contained in it must not be disclosed or in any other way made available, in whole or in part, to persons other than those permitted under the security classification without the prior written approval of the Association.

Copyright Notice

Copyright © 2015 GSM Association

Disclaimer

The GSM Association ("Association") makes no representation, warranty or undertaking (express or implied) with respect to and does not accept any responsibility for, and hereby disclaims liability for the accuracy or completeness or timeliness of the information contained in this document. The information contained in this document may be subject to change without prior notice.

Antitrust Notice

The information contain herein is in full compliance with the GSM Association's antitrust compliance policy.

Table of Contents

1	Introduction	3
1.1	Overview	3
1.2	Scope	3
1.3	Definitions	3
1.4	Abbreviations	3
1.5	References	4
1.6	Conventions	4
2	Rejects and Returns Process	4
2.1	Physical Format ASN.1 Considerations	4
2.1.1	Encoding of Returned TAP data within RAP files	4
2.2	Creation of RAP Acknowledgement File	4
2.3	Private Interface Considerations	5
2.3.1	VPMN Sends TAP to VDCH; VDCH Sends RAP Back to VPMN	5
2.3.2	VDCH Receives RAP from HPMN, Forwards to VPMN	6
2.3.3	HPMN Sends RAP to HDCH; HDCH Adjusts RAP, Sends to VPMN	7
2.4	Considerations on where the VPMN and HPMN use the same DCH	8
3	Logical Structures	10
3.1	RAP File	10
3.1.1	Return Batch	10
3.1.2	RAP Batch Control Information	11
3.1.3	Fatal Return	12
3.1.4	Error Detail	13
3.1.5	RAP Audit Control Information	14
3.1.6	RAP Acknowledgement File	15
4	Data Dictionary	15
5	Physical Format	28
6	File Naming Conventions	37
6.1	Commercial RAP Data	37
6.2	Test RAP Data	37
6.3	Acknowledgement of Commercial RAP Data	37
6.4	Acknowledgement of Test RAP Data	38
7	Migration to a New Release	38
Annex A	IOT Related Errors	39
Annex B	Other Errors	41
Annex C	Minimum Content of RAP Disputes and Denials	42
Annex D	Document Management	43
D.1	Document History	43
D.2	Other Information	46

1 Introduction

1.1 Overview

This document defines the logical and physical data that must be transferred between PMNs under the Returned Account Procedure (RAP).

The primary commercial requirement for data to be transferred is defined in BA.13 [3].

1.2 Scope

The version of RAP supported by this document is RAP Specification Version Number 1, RAP Release Version Number 5 (RAP1.5). The implementation timetable for this version of RAP is such that all RAP files created on or after 1 May 2011 (the Effective Date) must conform to this format specification.

Section 7 contains information on migration to a new RAP release and TD.34 [5] contains rules for release management and how to make changes to the RAP format).

The transfer medium is beyond the scope.

1.3 Definitions

Term	Description
Appropriate TAP Standard	TAP3 as defined by TADIG
Private Interface	Any interface between the agent (DCH) and its client.
Public Interface	The interface between two PMNs. This may occur within a single agent (DCH).
Validation	Action taken by the HPMN to ensure that TAP data being sent to it conforms to the appropriate TAP standard.

1.4 Abbreviations

Term	Description
ASN.1	Abstract Syntax Notation 1
BER	Basic Encoding Rules
CAMEL	Customised Application Mobile Enhanced Logic
DCH	Data Clearing House
EC	Executive Committee
EMC	Executive Management Committee
GPRS	General Packet Radio Service
HDCH	Home DCH, agent of the HPMN
HPMN	Home PMN
IOT	Inter Operator Tariff
ISDN	Integrated Services Digital Network
MSC	Mobile Switching Centre
PMN	Public Mobile Network
PRD	Permanent Reference Document

Term	Description
RAP	Returned Account Procedure
SDR	Special Drawing Right
TADIG	Transferred Account Data Interchange Group
TAP	Transferred Account Procedure
UTC	Universal Time Co-ordinated
VAT	Value Added Tax
VDCH	Visited DCH, agent of the VPMN
VPMN	Visited PMN

1.5 References

Ref	Doc Number	Title
[1]	PRD BA.08	Timescales for Data Transfer
[2]	PRD BA.11	Treatment of Exchange Rates for Billing and Payment
[3]	PRD BA.13	Returned Account Procedure
[4]	PRD TD.13	TADIG Code Naming Conventions
[5]	PRD TD.34	Release Management Processes
[6]	PRD TD.57	TAP3 Format Specification
[7]	RFC 2119	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997. Available at http://www.ietf.org/rfc/rfc2119.txt

1.6 Conventions

The key words "must", "must not", "required", "shall", "shall not", "should", "should not", "recommended", "may", and "optional" in this document are to be interpreted as described in RFC 2119 [7].

2 Rejects and Returns Process

The Rejects and Returns Process flow is described in BA.13 [3].

2.1 Physical Format ASN.1 Considerations

2.1.1 Encoding of Returned TAP data within RAP files

The returned ASN.1 group must be the original received from the VPMN, and not re-encoded.

2.2 Creation of RAP Acknowledgement File

A RAP Acknowledgement File is not in any way related to the decoding of and/or processing of the contents of the RAP file. The necessary information (Sender, Recipient, RAP File Sequence Number, File Type Indicator) needed to produce the RAP Acknowledgement File can be found in the RAP file name, so as long as those elements can be identified, the Recipient of the RAP file must send a RAP Acknowledgement File back to the Sender of the RAP file.

2.3 Private Interface Considerations

An operator may employ an agent, for example a Data Clearing House (DCH), to perform services such as validation of TAP data. This section describes how RAP files can be created and handled between the operator and its agent, in the 'private interface' between these entities. This is strictly voluntary and subject to agreement between the operator and its agent, and does not have any impact on the 'public interface'.

To facilitate the creation and transfer of RAP data between the operator and its agent, an optional element in the RAP Batch Control Information, the Roaming Partner element, can be used.

Note: If this element is present on the 'public interface', the whole RAP file may be rejected due to an ASN.1 syntax error.

The following sections describe three scenarios where an operator and its agent interact in the Returned Account Procedure:

1. The VPMN sends a TAP file to its agent (VDCH), and the agent finds errors and sends a RAP file back to the VPMN.
2. The agent (VDCH) receives a RAP file from its customer's roaming partner (or its agent), and the VDCH forwards the RAP file to its customer (VPMN).
3. The HPMN creates a RAP file for a TAP file it receives from its roaming partner; the HPMN sends the RAP file to its agent (HDCH), which then adjusts the RAP file to meet Public Interface requirements, and sends it to the VPMN or its agent.

Note: In all cases, file naming of RAP files and RAP Acknowledgement files follows the normal file naming conventions defined in Section 6.

2.3.1 VPMN Sends TAP to VDCH; VDCH Sends RAP Back to VPMN

In this scenario:

- The VPMN sends a TAP file to its agent (VDCH).
- The agent validates the file, finds errors, and creates a RAP file to return the errors to the VPMN.
- The agent forwards the rest of the TAP file to the HPMN roaming partner or its agent (unless the errors were Fatal or Missing).

The TAP file created by VPMN and forwarded to the VDCH will be as normal:

- Sender: VPMN
- Recipient: HPMN
- Sequence: 1

The RAP file created by the VDCH will contain the optional Roaming Partner element:

- Sender: VDCH
- Recipient: VPMN
- Sequence: 1 (the next RAP sequence for this VDCH/VPMN pair)
- Roaming Partner: HPMN

File naming for the RAP file will follow the standards in Section 6 (Sender will be VDCH, Recipient will be VPMN).

The VDCH forwards the valid portion of the TAP file to the roaming partner (or its agent) as normal (unless the errors were Fatal or Missing):

- Sender: VPMN
- Recipient: HPMN

- Sequence: 1

In this scenario, note the following:

- The sequence numbering of the TAP file and RAP file are independent. In the example, it is coincidental that the sequence numbers are the same.
- When creating RAP files, the VDCH must create a separate RAP file for each of the VPMN's roaming partners; that is, it cannot combine returned data for more than one HPMN into the same RAP file.
- The VPMN will need to adjust the value of the TAP file on the invoice it sends to its roaming partner, to reflect the amount that was actually forwarded to the partner.
- If the VPMN desires to send a RAP Acknowledgement File to its agent, it would include the following:
 - Sender: VPMN
 - Recipient: VDCH
 - Sequence: 1

Note: The Roaming Partner element is not contained in the RAP Acknowledgement file. File naming will follow the standards in Section 6 (Sender will be VPMN, Recipient will be VDCH).

2.3.2 VDCH Receives RAP from HPMN, Forwards to VPMN

In this scenario:

- The VPMN has created a TAP file and sent it to its agent (VDCH).
- The agent forwarded the TAP file to the HPMN's agent or, if it doesn't use an agent, directly to the HPMN.
- The HPMN/agent discovers errors and creates a RAP file. It processes the remainder of the TAP file as normal (unless the errors were Fatal or Missing).
- The HPMN/agent sends the RAP file to the VDCH.
- The VDCH in turn sends the RAP file to the VPMN. The VDCH sends a RAP Acknowledgement file to the HPMN/agent.

In this case, the VDCH merely passes the RAP file to the VPMN. It makes no changes to the RAP file.

The TAP file created by the VPMN and forwarded to the VDCH will be as normal:

- Sender: VPMN
- Recipient: HPMN
- Sequence: 2

The VDCH forwards this file to the HPMN or its agent with the same Sender/Recipient/Sequence Number.

The RAP file created by the HPMN/agent will be as normal:

- Sender: HPMN
- Recipient: VPMN
- Sequence: 1 (the next RAP sequence number for this HPMN/VPMN pair)
- Roaming Partner: Not present

The HPMN/agent sends this RAP file to the VDCH. The remainder of the TAP file will be processed by the HPMN/agent as normal (unless the errors were Fatal or Missing).

Note: In this scenario, if the HPMN creates the RAP file, it's assumed that it doesn't use an agent (HDCH). See Section 2.3.3 for the scenario where the HPMN uses an agent (HDCH) and creates a RAP file.

The VDCH forwards the RAP file to the VPMN as-is; it makes no changes (the Roaming Partner element is not used):

- Sender: HPMN
- Recipient: VPMN
- Sequence: 1
- Roaming Partner: Not present

The VDCH creates and sends a RAP Acknowledgement file to the HPMN/agent as normal:

- Sender: VPMN
- Recipient: HPMN
- Sequence: 1

File naming for the RAP Acknowledgement file will follow the standards in Section 6 (Sender will be VPMN, Recipient will be HPMN).

In this scenario, note the following:

- The normal TD.32 rules are followed. The VDCH merely passes along to the VPMN the RAP file that was created by the HPMN or its agent.
- Financial adjustments are handled according to normal Rejects and Returns procedures. The HPMN is not liable for the charges returned to the VPMN.
- If the VPMN desires to send a RAP Acknowledgement file to its agent (not recommended), it would include the following:
 - Sender: VPMN
 - Recipient: HPMN
 - Sequence: 1

File naming for the RAP Acknowledgement file would follow the standards in Section 6 (Sender will be VPMN, Recipient will be HPMN).

2.3.3 HPMN Sends RAP to HDCH; HDCH Adjusts RAP, Sends to VPMN

In this scenario:

- The HPMN has received a TAP file, via its agent, from its roaming partner (VPMN) or its agent.
- The HPMN finds errors in the file and creates a RAP file. It forwards the RAP file to its agent (HDCH). It processes the remainder of the TAP file as normal (unless the errors were Fatal or Missing).
- The HDCH makes adjustments to the RAP file to prepare it for the Public Interface, and forwards it to the VPMN or its agent.

The TAP file that was received by the HPMN was as follows:

- Sender: VPMN
- Recipient: HPMN
- Sequence: 3

The RAP file created by the HPMN will use the Roaming Partner element. The RAP file will be as follows:

- Sender: HPMN
- Recipient: HDCH
- Sequence: 1 (the next RAP sequence for this HPMN/HDCH pair)
- Roaming Partner: VPMN

File naming for the RAP file will follow the standards in Section 6 (Sender will be HPMN, Recipient will be HDCH). The HPMN forwards this RAP file to its agent (HDCH). It processes the remainder of the TAP file as normal (unless the errors were Fatal or Missing).

The HDCH adjusts the RAP file to prepare it for the Public Interface, changing the Recipient to the VPMN, changing the Sequence to the next number for that HPMN/VPMN pair, and removing the Roaming Partner element:

- Sender: HPMN
- Recipient: VPMN
- Sequence: 2 (the next RAP sequence for that HPMN/VPMN pair)
- Roaming Partner: Not present

File naming for the RAP file will follow the standards in Section 6 (Sender will be HPMN, Recipient will be VPMN). The HDCH forwards this RAP file to the VPMN or its agent.

In this scenario, note the following:

- When creating RAP files, the HPMN must create a separate RAP file for each of its roaming partners; that is, it cannot combine returned data for more than one VPMN into the same RAP file.
- If the HDCH desires to send a RAP Acknowledgement File to the HPMN, it would include the following:
 - Sender: HDCH
 - Recipient: HPMN
 - Sequence: 1
- The Roaming Partner element is not contained in the RAP Acknowledgement file. File naming will follow the standards in Section 6 (Sender will be HDCH, Recipient will be HPMN).
- Financial adjustments will be handled according to normal Rejects and Returns procedures. The HPMN is not liable for the charges returned to the VPMN.

2.4 Considerations on where the VPMN and HPMN use the same DCH

Where the VPMN and HPMN use the same DCH, a public interface exists inside this DCH. In this situation the involved DCH must support the generation and handling of public RAP files. All services applied to the TAP file on behalf of the VPMN are carried out before the TAP file is made available to the HPMN on the public interface. Such services may include, but are not limited to, TAP release conversion and validation.

The public TAP file is validated on behalf of the HPMN and any rejected TAP records must be included in a public RAP file made available to the VPMN. All appropriate binding PRDs apply to public interfaces TAP and RAP files.

Any additional services carried out on the TAP file on behalf of the HPMN are within the private interface between the DCH and the HPMN. Additional services may include, but are not limited to, TAP release conversion.

The following scenario applies:

- The VPMN creates a TAP file and sends it to its DCH.
- The DCH may validate the TAP file on behalf of the VPMN and potentially create a private RAP.
- A TAP release conversion is done on behalf of VPMN if necessary.
- Optionally, the DCH can validate on behalf of the VPMN and generate a private RAP file, if necessary.
- The DCH validates on behalf of the HPMN, discovers errors and creates a public RAP file according to timescale defined in BA.08 [1]. It processes the remainder of the TAP file as normal, and sends it to the HPMN (unless the errors were Fatal).
- The RAP file must be loaded, acknowledged and sent to the VPMN.
- Financial adjustments are handled according to normal Rejects and Returns procedures. The HPMN is not liable for charges in TAP records returned to the VPMN.

3 Logical Structures

3.1 RAP File

3.1.1 Return Batch

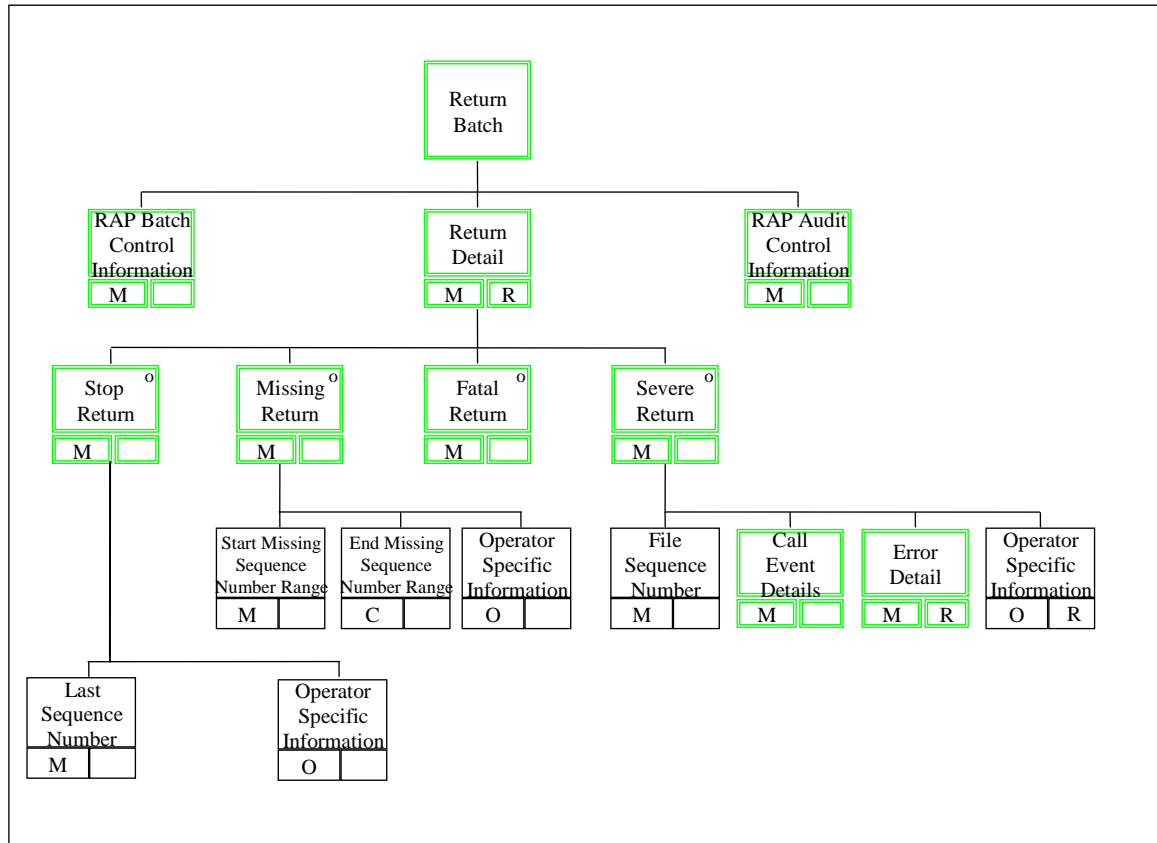


Figure 1: Return Batch Logical Structure

Group element name	Also occurs in	Detail shown in
Return Batch		
RAP Batch Control Information		Figure 2:
Return Detail		
Stop Return		
Missing Return		
Fatal Return		Figure 3:
Severe Return		
Call Event Details		Appropriate TAP Standard
Error Detail	Figure 3:	Figure 4:
RAP Audit Control Information		Figure 5:

Table 1: Return Batch Group Elements

3.1.2 RAP Batch Control Information

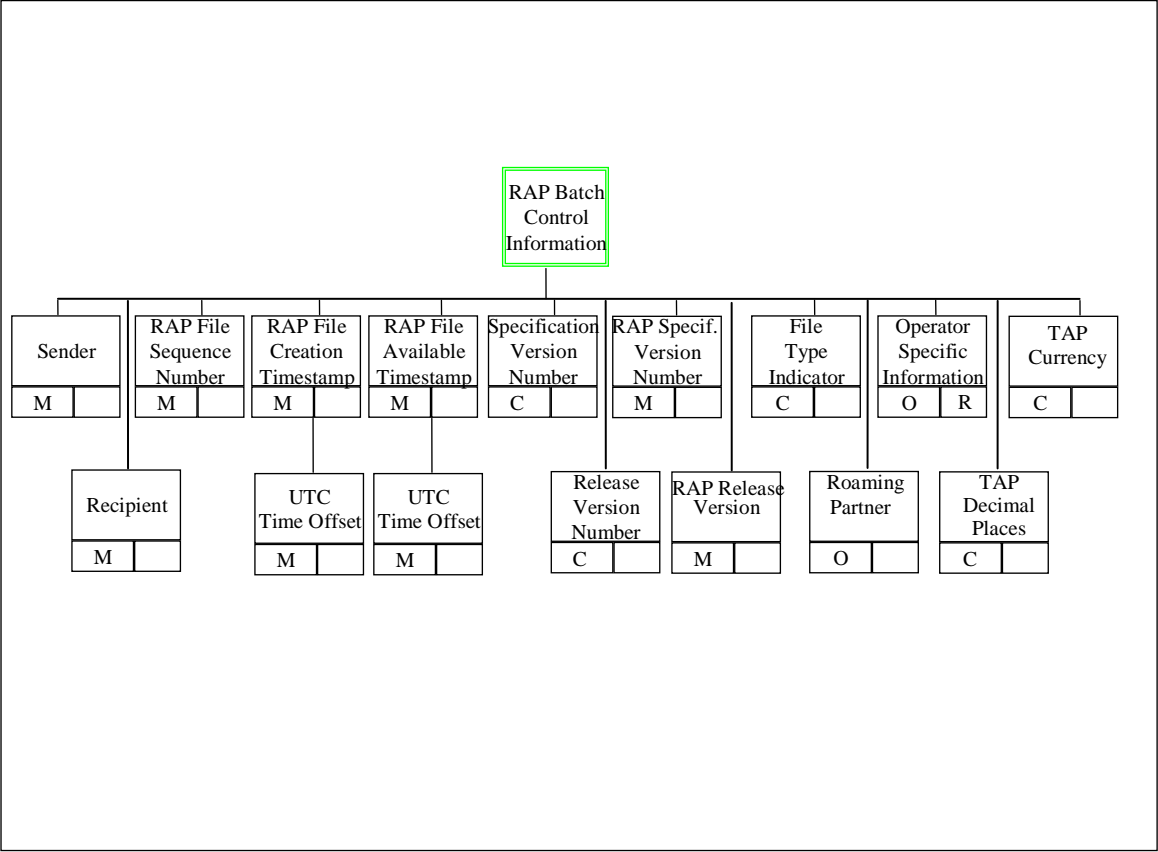


Figure 2: RAP Batch Control Information Logical Structure

Group element name	Also occurs in	Detail shown in
RAP Batch Control Information	Figure 1:	

Table 2: RAP Batch Control Information Group Elements

3.1.3 Fatal Return

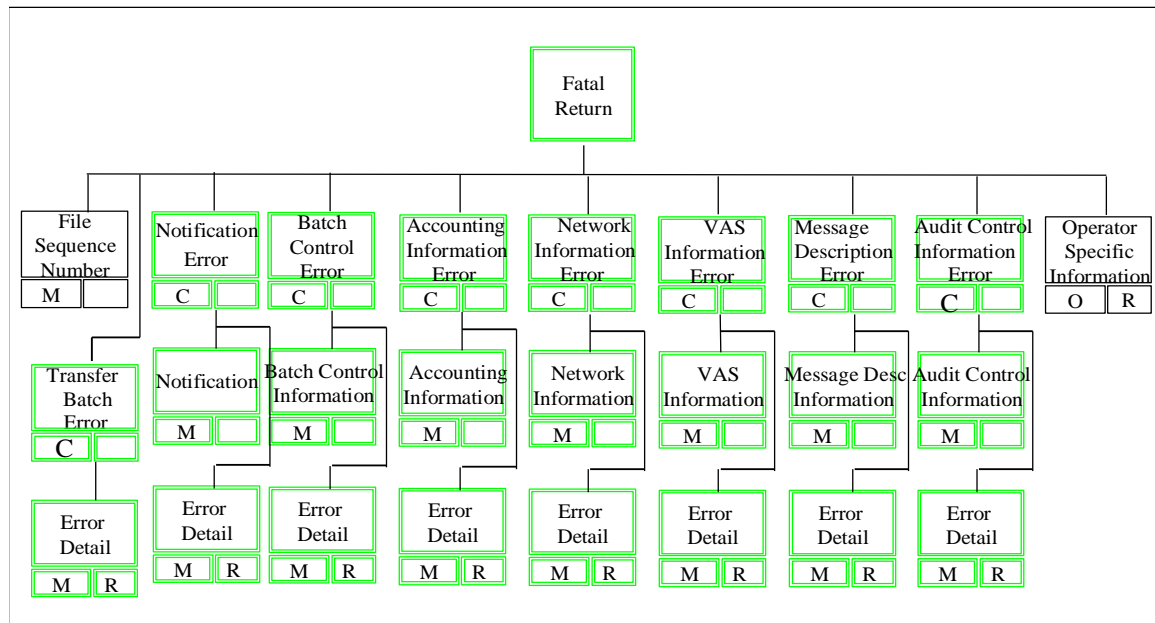


Figure 3: Fatal Return Logical Structure

Group element name	Also occurs in	Detail shown in
Fatal Return	Figure 1:	
Transfer Batch Error		
Notification Error		
Batch Control Error		
Accounting Information Error		
Network Information Error		
VAS Information Error		
Message Description Error		
Audit Control Information Error		
Notification		Appropriate TAP Standard
Batch Control Information		Appropriate TAP Standard
Accounting Information		Appropriate TAP Standard
Network Information		Appropriate TAP Standard
VAS Information		Appropriate TAP Standard
Message Description Information		Appropriate TAP Standard
Audit Control Information		Appropriate TAP Standard
Error Detail	Figure 1:	Figure 4:

Table 3: Fatal Return Group Elements

3.1.4 Error Detail

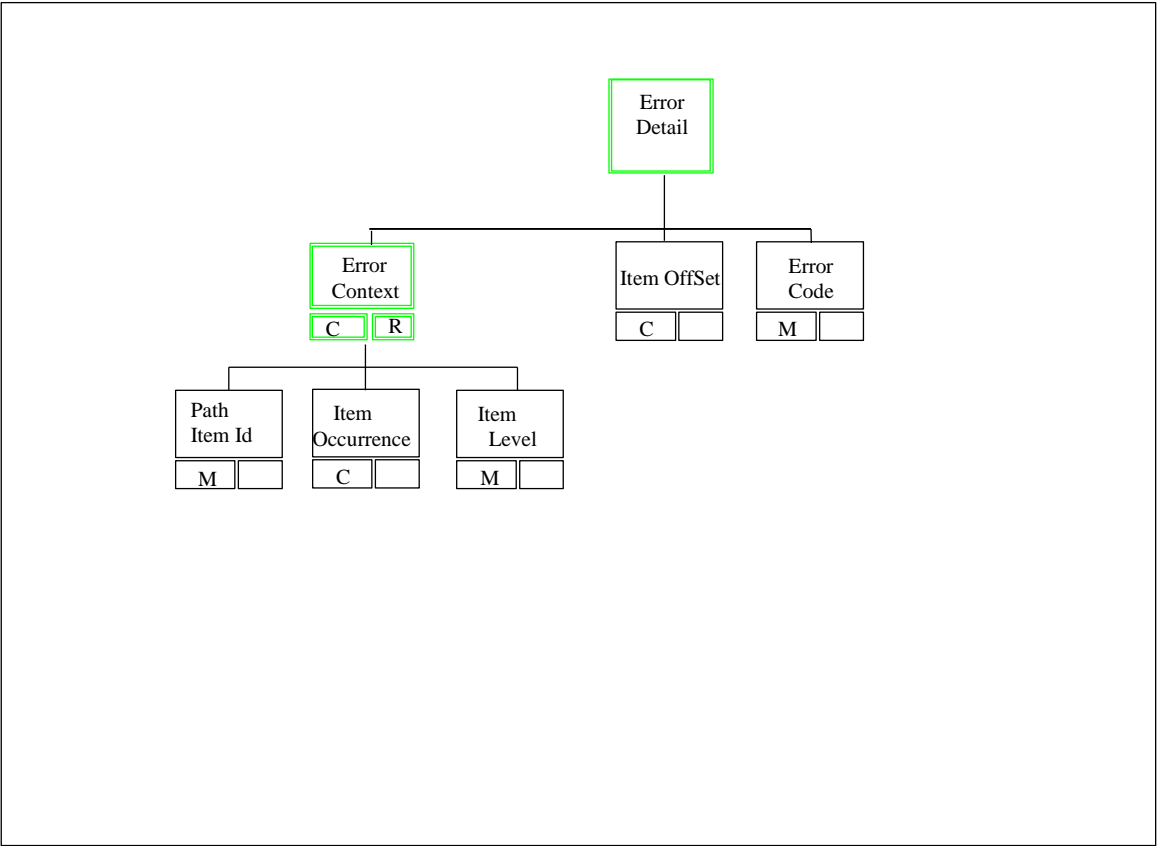


Figure 4: Error Detail Logical Structure

Group element name	Also occurs in	Detail shown in
Error Detail	Figure 1: Figure 3:	
Error Context		

Table 4: Error Detail Group Elements

3.1.5 RAP Audit Control Information

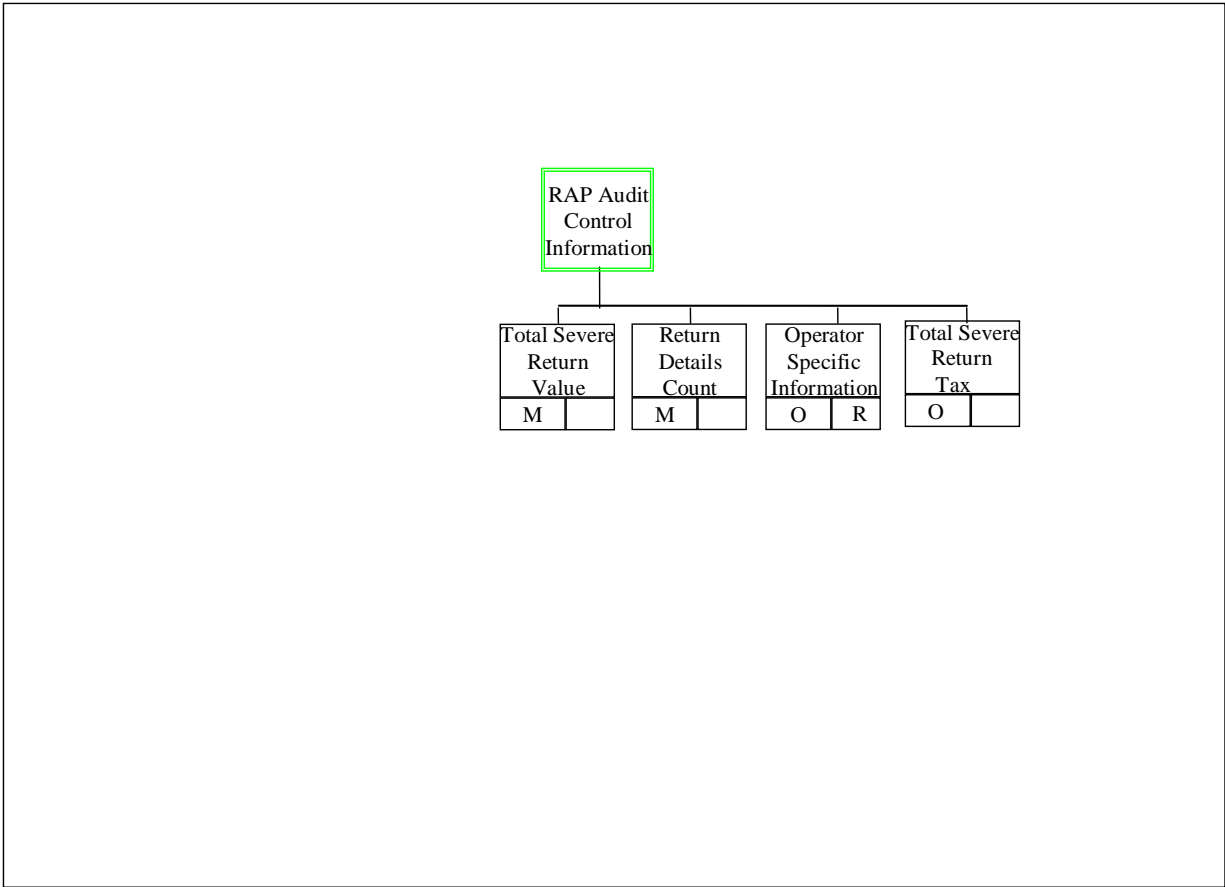


Figure 5: RAP Audit Control Information Logical Structure

Group element name	Also occurs in	Detail shown in
RAP Audit Control Information	Figure 1:	

Table 5: RAP Audit Control Information Group Elements

3.1.6 RAP Acknowledgement File

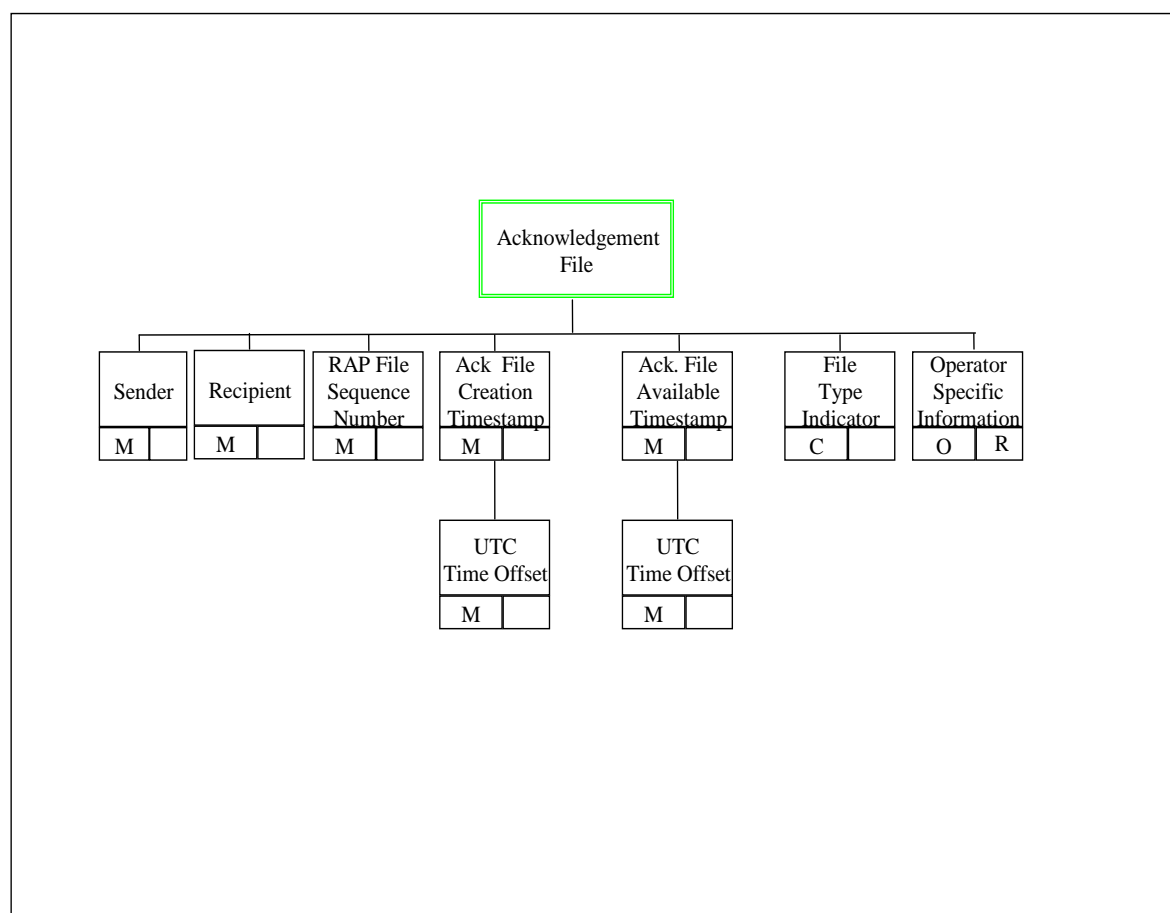


Figure 6: Acknowledgement File Logical Structure

Group element name	Also occurs in	Detail shown in
Acknowledgement File		

Table 6: Acknowledgement File Group Elements

4 Data Dictionary

This data dictionary gives a listing of all data items unique to the Returned Account Procedure (RAP). As well as providing values for the items, it describes conditionality in greater detail.

The data dictionary also contains entries and cross-references for all other data items and groups referenced.

Finally, the data dictionary contains the appropriate validation rules that must be used to report errors within a RAP File or Acknowledgement File.

Element	Description
Accounting Information	The specific TAP file accounting information that caused the fatal error.

Element	Description
	<p><i>Conditionality:</i></p> <p>Mandatory in the Accounting Information Error group.</p> <p>See appropriate TAP standard for full definition and content.</p>
Accounting Information Error	<p>The group identifies Accounting Information related fatal errors.</p> <p><i>Conditionality:</i></p> <p>Present within group Fatal Return where the Error Detail relates to a fatal error at TAP group Accounting Information level.</p>
Ack File Available Timestamp	<p>The date and time the Acknowledgement file was made available to the Recipient PMN. The time is given in the local time of the Sending PMN. There must be a UTC Time OffSet associated with this field.</p> <p>Physically this will normally be the timestamp when the file was transferred to the Recipient PMN (start of push), however on some systems this will be the timestamp when the file was made available to be pulled.</p> <p><i>Conditionality:</i></p> <p>Mandatory in the group Acknowledgement File.</p>
Ack File Creation Timestamp	<p>The timestamp at which the Acknowledgement File was created.</p> <p>The time is given in the local time of the Sending PMN. There must be a UTC Time OffSet associated with this field.</p> <p><i>Conditionality:</i></p> <p>Mandatory in the group Acknowledgement File.</p>
Acknowledgement File	<p>In the case of a RAP file transmission, an Acknowledgement file is sent by the VPMN to the HPMN to acknowledge the receipt of a RAP file.</p>
Audit Control Information	<p>The specific TAP file audit control information that caused the fatal error.</p> <p><i>Conditionality:</i></p> <p>Mandatory in the Audit Control Information Error group.</p> <p>See appropriate TAP standard for full definition and content.</p>
Audit Control Information Error	<p>The group identifies Audit Control Information related fatal errors.</p> <p><i>Conditionality:</i></p> <p>Present within group Fatal Return where the Error Detail relates to a fatal error at TAP group Audit Control Information level.</p>
Batch Control Error	<p>The group identifies Batch Control Information related fatal errors.</p> <p><i>Conditionality:</i></p> <p>Present within group Fatal Return where the Error Detail relates to a fatal error at TAP group Batch Control Information level.</p>
Batch Control	<p>The specific TAP file batch control information that caused the fatal error.</p>

Element	Description
Information	<p>Conditionality:</p> <p>Mandatory in the Batch Control Information Error group.</p> <p>See appropriate TAP standard for full definition and content.</p>
Call Event Details	<p>The group contains details of the call/event that contains the reported error (see Error Detail).</p> <p>Conditionality:</p> <p>Mandatory within group Severe Return.</p> <p>When a Call Event Detail is returned with more than one severe error it must only be returned once. This means that it must not be present more than once within a given RAP file or present in more than one RAP file.</p> <p>Note: A resubmitted (corrected) Call Event Detail is deemed to be a new call/event. If more than one error is found in the Call Event Detail it is reported by the repeating group Error Detail.</p> <p>See appropriate TAP standard for full definition and content.</p>
End Missing Sequence Number Range	<p>Part of the Return Detail in the RAP file when sequence numbers are missing. This will be the last sequence number missing from the series. This is a conditional field used when multiple TAP files are missing.</p> <p>Range of valid values:</p> <p>00001 – 99999</p> <p>Conditionality:</p> <p>Present if there is a range of missing sequence numbers in the Missing Return information.</p>
Error Code	<p>Code associated to the error found for a particular field. Error codes and validation processes are defined in the appropriate TAP standard.</p> <p>Conditionality:</p> <p>Mandatory within the repeating group Error Detail.</p>
Error Context	<p>Group with information about the full context of the item in error.</p> <p>There will be one occurrence of this group for each level within the TAP file starting at the 'TransferBatch' or 'Notification' (at level 1) and ending with information of the item in error (at level n).</p> <p>The repeating set of records may represent either the "logical" or "physical" structure of the file. When a "physical" path is specified ALL tags present will be included from Tag 1 (Data Interchange) down to (and including) the item in error. A "logical" path will include only Tag numbers, which have corresponding logical entities within the Logical Structure (diagrams).</p> <p>Conditionality:</p> <p>Mandatory for all errors with the exception of ASN.1 errors</p>

Element	Description
	<p>(error codes 50-59 as specified in TD.57 [6]).</p> <p>Note: Error codes 142, 250 through 257, 260 and 261 (duplicate call events, Call age) can be represented using the call event detail (for example TransferBatch.CallEventDetailList.CallEventDetail).</p>
Error Detail	<p>Error Detail is a repeating group identifying the errored item and offset, where applicable, together with the Error Code.</p> <p>Optionally, the group will also contain a repeated occurrence of Error Context.</p> <p><i>Conditionality:</i></p> <ul style="list-style-type: none"> Mandatory within groups <ul style="list-style-type: none"> Severe Return Transfer Batch Error Notification Error Batch Control Error Accounting Information Error Network Information Error VAS Information Error Message Description Error Audit Control Information Error <p>where one occurrence must be present for each error reported.</p>
Fatal Return	<p>Constitutes a TAP file rejected in its entirety and a subset of information describing the fatal error is returned to the VPMN.</p> <p>For a fatal return only specific information pertaining to the fatal error is returned to the VPMN and not the entire file.</p> <p><i>Conditionality:</i></p> <ul style="list-style-type: none"> Present within the group Return Detail if the return resulted from a fatal error. If a fatal error is being returned, Fatal Return is Mandatory.
File Sequence Number	<p>A unique reference which identifies the erroneous TAP file.</p> <p><i>Conditionality:</i></p> <ul style="list-style-type: none"> Mandatory within groups <ul style="list-style-type: none"> Fatal Return Severe Return <p>See appropriate TAP standard for full definition and content.</p>
File Type Indicator	<p>Indicates the type of data contained within the erroneous TAP file. The type of data could be either test or chargeable data.</p> <p><i>Conditionality:</i></p> <ul style="list-style-type: none"> Present within groups <ul style="list-style-type: none"> RAP Batch Control Information

Element	Description
	<p>Acknowledgement File where the file represents test data only.</p> <p>Not present where the data is 'live' chargeable data.</p> <p>Values:</p> <p>T Test Data V (Reserved for proprietary use) H (Reserved for proprietary use) S (Reserved for proprietary use) B (Reserved for proprietary use)</p> <p>See appropriate TAP standard for full definition and content.</p>
Item Level	<p>Indicates the ASN.1 level of the respective item that specifies the context of the error. The level starts with 1 for 'TransferBatch' or 'Notification' and increases by 1 at each group/item that follows in the context. All levels must be in consecutive order; no level may be omitted.</p> <p><i>Conditionality:</i> Must be present within the Error Context Group.</p> <p><i>Values:</i> > 0</p>
Item Occurrence	<p>The occurrence of the path item at the specified level. Starts with one. For example the 4th call event detail within a batch would be specified with occurrence of 4.</p> <p><i>Conditionality:</i> Must be present when the item is repeated (SEQUENCE OF).</p>
Item OffSet	<p>The OffSet in bytes from the beginning of the file to the start of the item in error, beginning with an offset of zero.</p> <p>The Item OffSet must always refer to the original byte stream from the original TAP file.</p> <p><i>Conditionality:</i> Present when available.</p>
Last Sequence Number	<p>Part of the Return Detail in the RAP file when the TAP file stream has stopped. This will be the last sequence number received for this roaming relation.</p> <p><i>Range of valid values:</i> 00001 – 99999</p> <p><i>Conditionality:</i> Mandatory within group Stop Return.</p>

Element	Description
	<p>Note: The term “last sequence number received” refers to the last sequence number from a sequence perspective rather than from a receipt time perspective. This will be equal to the next expected sequence number reduced by one when the next expected sequence number is greater than 00001. When the next expected sequence number is 00001 then the Last Sequence Number is 99999.</p>
Message Description Error	<p>The group identifies Message Description Information related fatal errors.</p> <p><i>Conditionality:</i> Present within group Fatal Return where the Error Detail relates to a fatal error at TAP group Message Description Information level.</p>
Message Description Information	<p>The specific TAP file Message Description Information that caused the fatal error.</p> <p><i>Conditionality:</i> Mandatory in the Message Description Error group.</p> <p>See appropriate TAP standard for full definition and content.</p>
Missing Return	<p>Attributes used to describe missing TAP file sequence numbers.</p> <p><i>Conditionality:</i> Present within the group Return Detail if the return resulted from a missing file error.</p>
Network Information	<p>The specific TAP file network information that caused the fatal error.</p> <p><i>Conditionality:</i> Mandatory in the Network Information Error group.</p> <p>See appropriate TAP standard for full definition and content.</p>
Network Information Error	<p>The group identifies Network Information related fatal errors.</p> <p><i>Conditionality:</i> Present within group Fatal Return where the Error Detail relates to a fatal error at TAP group Network Information level.</p>
Notification	<p>The specific TAP file Notification that caused the fatal error.</p> <p><i>Conditionality:</i> Mandatory in the Notification Error group.</p> <p>See appropriate TAP standard for full definition and content.</p>
Notification Error	<p>The group identifies Notification related fatal errors. This could include for example error codes 50-54 that must be returned with either a Notification Error or a Transfer Batch Error.</p>

Element	Description
	<p><i>Conditionality:</i></p> <p>Present within group Fatal Return where the Error Detail relates to a fatal error at TAP group Notification level.</p>
Operator Specific Information	<p>This repeating item contains additional information that must be populated when rejecting for an IOT error. This additional information will assist with the investigation and correction of the reported IOT error.</p> <p>The item can also be repeated and contain information at the discretion of the Sender or where it has been bilaterally agreed.</p> <p>The content of the item could be defined by the Sender or defined by bilateral agreement and may vary according to the context.</p> <p>For further information, see Annex A and Annex B.</p> <p><i>Conditionality:</i></p> <p>Three occurrences within group Severe Return are Mandatory when rejecting for error code 200 in any of the following elements:</p> <ul style="list-style-type: none"> Charge Tax Value CAMEL Invocation Fee <p>Is also present when agreed bilaterally within groups</p> <ul style="list-style-type: none"> Missing Return Fatal Return Severe Return (other than IOT error) Stop Return RAP Batch Control Information RAP Audit Control Information Acknowledgement File <p><i>Optionality:</i></p> <p>The Sender can also choose to populate this item at its discretion.</p>
Path Item Id	<p>Tag Id of the item building the path to the item in error. The Tag Id refers to Application Tag Number as defined in the ASN.1 definition in TD.57 [6] and not to the physical tag in the encoded file.</p> <p>Example: For "MobileOriginatedCall" the value is "9".</p> <p><i>Conditionality:</i></p> <p>Must be present within the Error Context Group.</p>
RAP Audit Control Information	<p>The group identifies the end of the Transfer batch.</p> <p>All items are mandatory except Operator Specific Information and Total Severe Return Tax, which are optional.</p> <p><i>Conditionality:</i></p> <p>Mandatory within group Return Batch.</p>
RAP Batch Control	<p>All items are mandatory except the following:</p>

Element	Description
Information	<p>File Type Indicator which is conditional (indicating test data)</p> <p>Roaming Partner which is optional (can only be present when bilaterally agreed)</p> <p>Operator Specific Information which is optional</p> <p>TAP Currency which is conditional</p> <p>TAP Decimal Places which is conditional</p> <p><i>Conditionality:</i></p> <p>Mandatory within group Return Batch.</p>
RAP File Available Timestamp	<p>The date and time the RAP file was made available to the Recipient PMN. The time is given in the local time of the sender PMN. There must be a UTC Time OffSet associated with the item.</p> <p>Physically this will normally be the timestamp when the file was transferred to the Recipient PMN (start of push), however on some systems this will be the timestamp when the file was made available to be pulled.</p> <p><i>Conditionality:</i></p> <p>Mandatory within the group RAP Batch Control Information.</p>
RAP File Creation Timestamp	<p>The timestamp at which the RAP file was created. The time is given in the local time of the sender PMN. There must be a UTC Time OffSet associated with the item.</p> <p><i>Conditionality:</i></p> <p>Mandatory within group RAP Batch Control Information.</p>
RAP File Sequence Number	<p>A unique reference that identifies each RAP data interchange sent by one PMN to another, specific, PMN.</p> <p>The sequence number starts at 1 and is incremented by one for each subsequent Return Batch sent by the Sender PMN to a particular Recipient PMN.</p> <p>Note: In case of retransmission for any reason this number is not incremented.</p> <p>RAP file sequence numbers are independent from TAP file sequence numbers.</p> <p><i>Conditionality:</i></p> <p>Mandatory within groups</p> <p>RAP Batch Control Information</p> <p>Acknowledgement File</p> <p><i>Range:</i></p> <p>00001 – 99999</p> <p>See appropriate TAP standard for full definition and content.</p>
RAP Release Version Number	<p>Indicates the RAP release version associated with the RAP Specification Version Number.</p>

Element	Description
	<p><i>Conditionality:</i> Mandatory within group RAP Batch Control Information.</p> <p><i>Values:</i> 5 for RAP1.5</p>
RAP Specification Version Number	<p>To enable a PMN to encode and/or read a RAP file it is necessary to uniquely identify the format. This is achieved through the RAP Specification Version Number.</p> <p>There must be a RAP Release Version Number present associated with this item.</p> <p><i>Conditionality:</i> Mandatory within group RAP Batch Control Information.</p> <p><i>Values:</i> 1 for RAP version 1</p>
Recipient	<p>A unique identifier used to determine to whom (normally a PMN) the data is being sent, that is the Recipient.</p> <p>This can also represent a third party such as a data clearing house, but only if bilaterally agreed.</p> <p><i>Derivation:</i> TD.13 [4]: TADIG Code Naming Conventions.</p> <p><i>Conditionality:</i> Mandatory within groups RAP Batch Control Information Acknowledgement File</p> <p><i>Example content:</i> GBRCN GBRVF DEUD1 DEUD2</p>
Release Version Number	<p>Indicates the release version associated with the Specification Version Number of the TAP file being returned.</p> <p><i>Conditionality:</i> Must be present within group RAP Batch Control Information where the Return Detail contains Severe Return or a Fatal Return with errors other than Transfer Batch Error.</p> <p>See appropriate TAP standard for full definition and content.</p>

Element	Description
Return Batch	Consists of RAP Batch Control Information, Return Detail, and RAP Audit Control Information. All information for these attributes is obtained from the original TAP file submitted and the validation process.
Return Detail	<p>Must consist of a Missing Return, Stop Return, Fatal Return, or Severe Return depending on the type of error found in the TAP file. One and only one of these return types must be found in the Return detail.</p> <p>Note: There can be only one Missing Return per RAP file, only one Stop Return per RAP file, and only one Fatal Return per RAP file, so for these return types the Return Detail cannot be repeated. The Return Detail can only be repeated for Severe Returns.</p> <p><i>Conditionality:</i> Mandatory within the group Return Batch.</p>
Return Details Count	<p>Number of returned details in the RAP file.</p> <p><i>Conditionality:</i> Mandatory within the group RAP Audit Control Information.</p> <p>Note: For RAP files containing a Missing Return, Stop Return or Fatal Return, this field must be 1.</p>
Roaming Partner	<p>A unique identifier used to determine the roaming partner in a RAP file, when the Sender or Recipient element is populated with a TADIG Code that does not belong to an operator (for example the Sender or Recipient is populated with the TADIG Code of a third party such as a clearinghouse). This element can be present only if explicitly agreed to by the receiving operator.</p> <p><i>Derivation:</i> TD.13 [4]: TADIG Code Naming Conventions.</p> <p><i>Conditionality:</i> Optional within group RAP Batch Control Information.</p> <p><i>Example content:</i> GBRCN GBRVF DEUD1 DEUD2</p>
Sender	<p>A unique identifier used to determine the Sender (normally a PMN) of the data.</p> <p>This can also represent a third party such as a data clearing house, but only if bilaterally agreed.</p> <p><i>Derivation:</i> TD.13 [4]: TADIG Code Naming Conventions.</p>

Element	Description
	<p><i>Conditionality:</i></p> <p>Mandatory within groups</p> <p>RAP Batch Control Information</p> <p>Acknowledgement File.</p> <p><i>Example content:</i></p> <p>GBRCN</p> <p>GBRVF</p> <p>DEUD1</p> <p>DEUD2</p>
Severe Return	<p>Call event details Severe Return allows the ability to return specific call event details that fail the validation process from the TAP file without rejecting the entire file.</p> <p><i>Conditionality:</i></p> <p>Mandatory only when returning call event details.</p>
Specification Version Number	<p>The specification version number of the TAP file exchanged between the VPMN and HPMN.</p> <p><i>Conditionality:</i></p> <p>Must be present within group RAP Batch Control Information where the Return Detail contains Severe Return or a Fatal Return with errors other than Transfer Batch Error.</p> <p>See appropriate TAP standard for full definition and content.</p>
Start Missing Sequence Number Range	<p>Part of the Return Detail in the RAP file when (a) TAP file sequence number(s) is/are missing. This is a mandatory field containing the missing sequence number, or when multiple TAP files are missing, the first sequence number of the series of missing TAP files.</p> <p><i>Range of valid values:</i></p> <p>00001 – 99999</p> <p><i>Conditionality:</i></p> <p>Mandatory within the group Missing Return.</p>
Stop Return	<p>Attributes used to describe a situation where the TAP file stream has stopped for a given roaming relation (VPMN/HPMN combination).</p> <p>If the HPMN has not received any TAP files from the VPMN for 7 calendar days, a Stop Return must be produced reporting the TAP file stream as stopped.</p> <p>A new RAP file containing a Stop Return reporting this error must be produced every 7 calendar days, until such time a TAP file has been received from the VPMN.</p> <p>This error must only be raised where at least one commercial (CD) TAP file</p>

Element	Description								
	<p>has been received for that roaming relation.</p> <p>Note: One operator can have more than one TADIG code, and this error must be reported on each TADIG code combination independently. So if files from TADIG code A are received, but no files from TADIG code B are received, then the Stop Return must be raised for the TADIG code B relation.</p> <p><i>Conditionality:</i></p> <p>Present within the group Return Detail if the return resulted from a TAP file stream stopped error.</p>								
TAP Currency	<p>TAP Currency contains the Currency Code which identifies the currency used for charges within the TAP file for which the call records are being returned with RAP, where that currency is not the standard SDR.</p> <p><i>Derivation:</i></p> <p>ISO 4217 Currency Codes standard.</p> <p><i>Conditionality:</i></p> <p>Mandatory within RAP Batch Control Information where Severe Returns are present in the RAP file and currency other than SDR is used as specified in the roaming agreement.</p> <p><i>Example:</i></p> <table> <tr> <td><i>Currency Code</i></td><td><i>Currency name</i></td></tr> <tr> <td>EUR</td><td>Euro</td></tr> <tr> <td>INR</td><td>Indian Rupee</td></tr> <tr> <td>USD</td><td>US Dollar</td></tr> </table>	<i>Currency Code</i>	<i>Currency name</i>	EUR	Euro	INR	Indian Rupee	USD	US Dollar
<i>Currency Code</i>	<i>Currency name</i>								
EUR	Euro								
INR	Indian Rupee								
USD	US Dollar								
TAP Decimal Places	<p>Identifies the number of decimal places used within all absolute monetary values within the TAP file for which the call records are being returned with RAP.</p> <p>The same number of decimal places is applicable for all tax, discount, charge and audit values throughout the whole TAP file.</p> <p><i>Conditionality:</i></p> <p>Mandatory within RAP Batch Control Information where Severe Returns are present in the RAP file.</p>								
Total Severe Return Tax	<p>Total tax value of the Call Event Details being rejected with severe errors. If the tax value of the Call Event Details cannot be determined, for example due to syntax errors in the charges, that Call Event Detail will be counted as zero in calculating the Total Severe Return Tax.</p> <p>If the RAP file contains a Missing Return, Stop Return, or Fatal Return, the Total Severe Return Tax will (when present) have the value zero.</p> <p><i>Conditionality:</i></p> <p>The population of the field is optional and up to the RAP sender.</p>								
Total Severe Return	Total value without tax of the Call Event Details being rejected with severe								

Element	Description
Value	<p>errors.</p> <p>If the value without tax of the Call Event Details cannot be determined, for example due to syntax errors in the charges, that Call Event Detail will be counted as zero in calculating the Total Severe Return Value.</p> <p>If the RAP file contains a Missing Return, Stop Return, or Fatal Return, the Total Severe Return Value will have the value zero.</p> <p><i>Conditionality:</i></p> <p>Mandatory within the group RAP Audit Control Information.</p>
Transfer Batch Error	<p>The group identifies Transfer Batch related fatal errors. This could include for example error codes 50-54 that must be returned with either a Notification Error or a Transfer Batch Error.</p> <p><i>Conditionality:</i></p> <p>Mandatory within group Fatal Return where the Error Detail relates to a fatal error at TAP group Transfer Batch level.</p>
UTC Time Offset	<p>All timestamps are in the local time of the Sender PMN. So that the time can be equated to time in the Recipient PMN, the difference between local time and UTC time must be supplied.</p> <p><i>Derivation:</i></p> <p>UTC Time Offset = Local Time minus UTC Time</p> <p><i>Conditionality:</i></p> <p>Mandatory within items</p> <ul style="list-style-type: none"> RAP File Available Timestamp Ack File Available Timestamp RAP File Creation Timestamp Ack File Creation Timestamp. <p><i>Format:</i></p> <p>±HHMM</p> <p>See appropriate TAP standard for full definition and content.</p>
VAS Information Error	<p>The group identifies VAS Information related fatal errors.</p> <p><i>Conditionality:</i></p> <p>Present within group Fatal Return where the Error Detail relates to a fatal error at TAP group VAS Information level.</p>

Table 7: Data Dictionary

The following validation rule must be used to report ASN.1 syntax errors within a RAP File and Acknowledgement File:

Error Code	Context	Severity level	Validation description
50	Return Batch AcknowFile	Fatal	RAP Encoding Error. This could be one of the following type of errors: <ul style="list-style-type: none"> Unknown tag, meaning that the tag is not recognised as a valid tag within RAP; Non-repeating element occurs more than once within the group; Tag invalid within context; File not encoded according to ASN.1 BER.

Table 8: ASN.1 Syntax Error Validation Rule

Note: This does NOT mean that a physical file is sent back reporting the error. This is only a manual process.

5 Physical Format

This section defines the physical format for the Return Batch and the Acknowledgement File. In accordance with the definitions for the appropriate TAP standard, the physical format uses ASN.1. The specification is complimentary to the definition of the physical TAP format in that data types and groups defined by TAP are referenced within this specification and that the ASN.1 tags for the data types added for the RAP are distinct from the tags used for TAP, so that by merging both ASN.1 specifications, a new ASN.1 specification which covers both RAP and TAP is obtained.

Note: All elements in the TAP specification should be made “OPTIONAL” during the creation of the RAP file. This will make it possible to return structure errors in the TAP file.

The returned ASN.1 group must be the original received from the VPMN, and not re-encoded.

Note: According to the principles laid in TAP specifications, the following must apply for the return batch:

- The size of encoded Integers in the return batch must not exceed 4 bytes except for the data items representing Severe Return Value and Total Severe Return Value.
- The maximum size of the encoded return batch is determined by the maximum size of a TAP file. Please note that the size of a RAP file may be slightly larger than the size of the related TAP file.

The following ranges for tags are currently used:

Tag range	Description
0-6	Reserved for TAP
7-8	In Use for both TAP and RAP
9-142	Reserved for TAP
143	In Use for both TAP and RAP
144-237	Reserved for TAP
238	In Use for both TAP and RAP
239-511	Reserved for TAP

Tag range	Description
512-513	In Use for RAP
514	Reserved for RAP
515-528	In Use for RAP
529-531	Reserved for RAP
532-555	In Use for RAP
556-1023	Reserved for RAP

Table 9: Tag Ranges

```
--
-- The following ASN.1 specification defines the abstract
-- syntax for the Rejects and Returns Returned Accounts Procedure.
--
-- The specification is structured as follows:
--   (1) Structure of a RAP batch
--   (2) Structure of the individual RAP records
--   (3) RAP data items and groups of data items
--

RAP-0105 DEFINITIONS IMPLICIT TAGS ::=

BEGIN
--
-- NOTE: As the RAP can be used to report rejections of any
--       valid TAP release this specification does not indicate
--       explicitly the TAP release to be included.
--
--       Please replace XX in 'FROM TAP-03XX' with the appropriate
--       TAP release version: for example 02, 04, 10, 11, ...
--       making all TAP fields OPTIONAL
--
IMPORTS AbsoluteAmount, AccountingInfo, AuditControlInfo,
        BatchControlInfo, CallEventDetail, DateTimeLong,
        FileSequenceNumber, FileTypeIndicator,
        MessageDescription, MessageDescriptionCode, NetworkInfo,
        Notification, NumberString, OperatorSpecInformation,
        PlmnId, RapFileSequenceNumber, Recipient, ReleaseVersionNumber,
        Sender, SpecificationVersionNumber,
        TapDecimalPlaces, TapCurrency
--       For TAP releases earlier than TAP3.11
--       uncomment the following line
--       ,VasCode, VasDescription, VasShortDescription
FROM TAP-03XX;

--
-- Structure of a RAP batch
--

RapDataInterChange ::= CHOICE
```

```
{
    returnBatch      ReturnBatch,
    acknowledgement  Acknowledgement,
    ...
}
```

ReturnBatch ::= [APPLICATION 534] SEQUENCE

```
{
    rapBatchControlInfoRap  RapBatchControlInfo,
    returnDetails           ReturnDetailList,
    rapAuditControlInfo     RapAuditControlInfo,
    ...
}
```

Acknowledgement ::= [APPLICATION 535] SEQUENCE

```
{
    sender                Sender,
    recipient             Recipient,
    rapFileSequenceNumber RapFileSequenceNumber,
    ackFileCreationTimeStamp AckFileCreationTimeStamp,
    ackFileAvailableTimeStamp AckFileAvailableTimeStamp,
    fileTypeIndicator     FileTypeIndicator OPTIONAL,
    operatorSpecList      OperatorSpecList OPTIONAL,
    ...
}
```

ReturnDetailList ::= [APPLICATION 536] SEQUENCE OF ReturnDetail

ReturnDetail ::= CHOICE

```
{
    stopReturn      StopReturn,
    missingReturn   MissingReturn,
    fatalReturn     FatalReturn,
    severeReturn    SevereReturn,
    ...
}
```

--

-- Structure of the individual RAP records

--

RapBatchControlInfo ::= [APPLICATION 537] SEQUENCE

```
{
    sender                Sender,
    recipient              Recipient,
    rapFileSequenceNumber RapFileSequenceNumber,
    rapFileCreationTimeStamp RapFileCreationTimeStamp,
    rapFileAvailableTimeStamp RapFileAvailableTimeStamp,
    specificationVersionNumber SpecificationVersionNumber OPTIONAL,
    releaseVersionNumber   ReleaseVersionNumber OPTIONAL,
    rapSpecificationVersionNumber RapSpecificationVersionNumber,
    rapReleaseVersionNumber RapReleaseVersionNumber,
    fileTypeIndicator       FileTypeIndicator OPTIONAL,
    roamingPartner          RoamingPartner OPTIONAL,
    operatorSpecList        OperatorSpecList OPTIONAL,
    tapDecimalPlaces        TapDecimalPlaces OPTIONAL,
    tapCurrency             TapCurrency OPTIONAL,
    ...
}
```

StopReturn ::= [APPLICATION 554] SEQUENCE

```
{
    lastSeqNumber      LastSeqNumber,
    operatorSpecList   OperatorSpecList OPTIONAL,
    ...
}
```

MissingReturn ::= [APPLICATION 538] SEQUENCE

```
{
    startMissingSeqNumber StartMissingSeqNumber,
    endMissingSeqNumber   EndMissingSeqNumber OPTIONAL,
    operatorSpecList      OperatorSpecList OPTIONAL,
    ...
}
```

FatalReturn ::= [APPLICATION 539] SEQUENCE

```
{
    fileSequenceNumber FileSequenceNumber,
    transferBatchError TransferBatchError OPTIONAL,
    notificationError NotificationError OPTIONAL,
    ...
}
```


Official Document TD.32 - RAP Format Specification

```

    batchControlError      BatchControlError      OPTIONAL,
    accountingInfoError     AccountingInfoError    OPTIONAL,
    networkInfoError        NetworkInfoError       OPTIONAL,
--    For TAP releases earlier than TAP3.11
--    uncomment the following line
--    vASInformationError    VASInformationError    OPTIONAL,
    messageDescriptionError MessageDescriptionError OPTIONAL,
    auditControlInfoError   AuditControlInfoError  OPTIONAL,
    operatorSpecList        OperatorSpecList       OPTIONAL,

```

```

...

```

```

}

```

```

SevereReturn ::= [APPLICATION 540] SEQUENCE

```

```

{

```

```

    fileSequenceNumber      FileSequenceNumber,
    callEventDetail          CallEventDetail,
    errorDetail              ErrorDetailList,
    operatorSpecList         OperatorSpecList  OPTIONAL,

```

```

...

```

```

}

```

```

RapAuditControlInfo ::= [APPLICATION 541] SEQUENCE

```

```

{

```

```

    totalSevereReturnValue   TotalSevereReturnValue,
    returnDetailsCount       ReturnDetailsCount,
    operatorSpecList         OperatorSpecList    OPTIONAL,
    totalSevereReturnTax     TotalSevereReturnTax OPTIONAL,

```

```

...

```

```

}

```

```

--

```

```

-- RAP data items and groups of data items

```

```

--

```

```

AccountingInfoError ::= [APPLICATION 512] SEQUENCE

```

```

{

```

```

    accountingInfo           AccountingInfo,
    errorDetail              ErrorDetailList,

```

```

...

```

```

}

```

AuditControlInfoError ::= [APPLICATION 513] SEQUENCE

```
{
    auditControlInfo      AuditControlInfo,
    errorDetail           ErrorDetailList,
    ...
}
```

AckFileAvailableTimeStamp ::= [APPLICATION 515] DateTimeLong

AckFileCreationTimeStamp ::= [APPLICATION 516] DateTimeLong

BatchControlError ::= [APPLICATION 517] SEQUENCE

```
{
    batchControlInfo      BatchControlInfo,
    errorDetail           ErrorDetailList,
    ...
}
```

EndMissingSeqNumber ::= [APPLICATION 518] FileSequenceNumber

ErrorCode ::= [APPLICATION 519] INTEGER

ErrorContext ::= [APPLICATION 545] SEQUENCE

```
{
    pathItemId            PathItemId,
    itemOccurrence        ItemOccurrence OPTIONAL,
    itemLevel             ItemLevel,
    ...
}
```

ErrorContextList ::= [APPLICATION 549] SEQUENCE OF ErrorContext

ErrorDetail ::= [APPLICATION 521] SEQUENCE

```
{
    errorContext          ErrorContextList OPTIONAL,
    itemOffset            ItemOffset OPTIONAL,
    errorCode             ErrorCode,
    ...
}
```

ErrorDetailList ::= [APPLICATION 520] SEQUENCE OF ErrorDetail

ItemLevel ::= [APPLICATION 548] INTEGER

ItemOccurrence ::= [APPLICATION 547] INTEGER

ItemOffset ::= [APPLICATION 524] INTEGER

LastSeqNumber ::= [APPLICATION 555] FileSequenceNumber

MessageDescriptionError ::= [APPLICATION 522] SEQUENCE

```
{
    messageDescriptionInfo    MessageDescriptionInfoList,
    errorDetail                ErrorDetailList,
    ...
}
```

MessageDescriptionInfoList ::= [APPLICATION 8] SEQUENCE OF
MessageDescriptionInformationDefinition

MessageDescriptionInformationDefinition ::= [APPLICATION 143] SEQUENCE

```
{
    messageDescriptionCode    MessageDescriptionCode OPTIONAL,
    messageDescription         MessageDescription         OPTIONAL,
    ...
}
```

NetworkInfoError ::= [APPLICATION 523] SEQUENCE

```
{
    networkInfo                NetworkInfo,
    errorDetail                 ErrorDetailList,
    ...
}
```

NotificationError ::= [APPLICATION 552] SEQUENCE

```
{
    notification                Notification,
    errorDetail                  ErrorDetailList,
    ...
}
```

```
}
```

```
OperatorSpecList ::= [APPLICATION 551] SEQUENCE OF OperatorSpecInformation
```

```
PathItemId ::= [APPLICATION 546] INTEGER
```

```
RapFileAvailableTimeStamp ::= [APPLICATION 525] DateTimeLong
```

```
RapFileCreationTimeStamp ::= [APPLICATION 526] DateTimeLong
```

```
RapReleaseVersionNumber ::= [APPLICATION 543] INTEGER
```

```
RapSpecificationVersionNumber ::= [APPLICATION 544] INTEGER
```

```
ReturnDetailsCount ::= [APPLICATION 528] INTEGER
```

```
RoamingPartner ::= [APPLICATION 550] PlmnId
```

```
StartMissingSeqNumber ::= [APPLICATION 532] FileSequenceNumber
```

```
TotalSevereReturnTax ::= [APPLICATION 553] AbsoluteAmount
```

```
TotalSevereReturnValue ::= [APPLICATION 533] AbsoluteAmount
```

```
TransferBatchError ::= [APPLICATION 542] SEQUENCE
```

```
{  
    errorDetail          ErrorDetailList,  
    ...  
}
```

```
--      For TAP releases earlier than TAP3.11
```

```
--      uncomment the following 12 lines
```

```
--VasInfoList ::= [APPLICATION 7] SEQUENCE OF VasInformationDefinition
```

```
--VasInformationDefinition ::= [APPLICATION 238] SEQUENCE
```

```
--{  
--    vasCode          VasCode          OPTIONAL,  
--    vasShortDesc      VasShortDescription  OPTIONAL,  
--    vasDesc           VasDescription      OPTIONAL,
```

```
--...
--}

--VASInformationError ::= [APPLICATION 527] SEQUENCE
--{
--    vasInfo          VasInfoList,
--    errorDetail       ErrorDetailList,
--...
--}

END
```

6 File Naming Conventions

6.1 Commercial RAP Data

RAP Files containing rejected chargeable data that is being returned must follow the naming convention below:

RCxxxxxyyyyySEQNO

Where:

RC = "Returned Chargeable data"
xxxxx = the returning entity (Sender)
yyyyy = the originator of the TAP data (Recipient)
SEQNO = sequence number

6.2 Test RAP Data

RAP Files containing rejected test data that is being returned must follow the naming convention below:

RTxxxxxyyyyySEQNO

Where:

RT = "Returned Test data"
xxxxx = the rejecting entity (Sender)
yyyyy = the originator of the TAP test data (Recipient)
SEQNO = sequence number

6.3 Acknowledgement of Commercial RAP Data

Acknowledgements of RAP Files containing rejected chargeable data that is being returned must follow the naming convention below:

ACxxxxxyyyyySEQNO

Where:

AC = "Acknowledgement of returned Chargeable data"
xxxxx = the acknowledging entity (Sender)
yyyyy = the returning entity (Recipient)

SEQNO = sequence number of the RAP File being acknowledged

6.4 Acknowledgement of Test RAP Data

Acknowledgements of RAP Files containing rejected test data that is being returned must follow the naming convention below:

ATxxxxxyyyySEQNO

Where:

AT = "Acknowledgement of returned Test data"

xxxxx = the acknowledging entity (Sender)

yyyyy = the returning entity (Recipient)

SEQNO = sequence number of the RAP File being acknowledged

7 Migration to a New Release

The rules in this section apply to RAP files exchanged over the public interface. RAP files exchanged over the private interface, for example between an operator and its Agent is out of scope of these migration rules.

There is an Effective Date defined for each release. This is the date on which companies must send and receive the release over the public interface.

Companies must be ready before the Effective Date to send and receive RAP test files in the new release on a bilateral basis.

Appropriate format testing must be completed before the Effective Date for a migration to a release containing major changes.

Companies that have not migrated to the new release, when the Effective Date has been reached, must (prior to the Effective Date) make other provisions (for example using the services of a conversion agent) to send/receive the new release when exchanging RAP files with companies who have implemented the new release.

Where a RAP file created in an old release cannot be read by the RAP recipient and need to be corrected and resubmitted, the RAP file may be resubmitted in either the old or the new release, taking the timescales defined in BA.08 [1] into consideration.

Unless agreed by the recipient, the sender is not allowed to revert to the old release, once the first files of the new release have been exchanged in commercial operation (excluding resubmitted files which have initially been issued before the release switch and test files).

Annex A IOT Related Errors

This annex is mandatory to implement.

The HPMN must provide additional information when rejecting for an IOT related error. This additional information will assist with the investigation and correction of the reported IOT related error. This is done for all errors listed in the table below by populating the Operator Specific Information item with information as shown in the right hand column of the table:

Element name	Error code	Error description	Information in Operator Specific Information
CAMEL Invocation Fee	200	CAMEL Invocation Fee not in line with roaming agreement.	<p>List a minimum of 3 occurrences of Operator Specific Information, each including a unique keyword followed by the information.</p> <p>1) Mandatory: Keyword "IOTDate:" followed by the date (which must be in format YYYYMMDD) from which the IOT (for the rejected call event) is applicable.</p> <p>Note: The IOT could have different dates for different call events, and for different types of call events. Example: IOTDate:20120701</p> <p>2) Mandatory: Keyword "ExpCharge:" followed by the expected charge (in the same TAP Currency, the same format, and with the same number of decimal places as in the TAP file). This expected charge can also represent an expected total invoiceable charge, where, in case of more than one Charge Information group, the added up charge does not comply with the sender's IOT.</p> <p>If the call scenario is not listed in the IOT, then instead of the expected charge the keyword "Not in IOT" is present. Example 1: ExpCharge:1234 Example 2: ExpCharge:Not in IOT</p> <p>3) Mandatory: Keyword "Calculation:" followed by a free text describing what calculation has been performed.</p> <p>If the call scenario is not listed in the IOT, then instead of the calculation the keyword "Not in IOT" is present. Example 1: Calculation:1*30=1.2, X*15~2.5 Example 2: Calculation:Not in IOT (see Table 11: for more examples).</p> <p>4) Conditional: Keyword "BilatTariff:" followed by a Y if there is a special agreement that overrides the standard IOT (for the rejected call event).</p> <p>Note: Different call events, and different types of call events, could have different IOTs, so the BilatTariff could be Y for one type of call event, and N for</p>
Charge	200	Charge not in line with roaming agreement.	
Tax Value	200	Tax Value is not in line with the roaming agreement at the corresponding call event date.	

Element name	Error code	Error description	Information in Operator Specific Information
			another. Example: BilatTariff:Y

Table 10: Charge Related Errors

Example calculation rule	Explanation
$X \cdot 60 \sim 1.6$	Each minute fully charged at 1.6 / minute
$1 \cdot 30 \sim 1.6, X \cdot 10$	First 30 seconds with minute price of 1.6 and afterwards charged each 10 seconds with the same minute price
$X \cdot 3 = 1.2$	Each 3 seconds are charged 1.2 (this will result in a minute price of $1.2 \cdot 60 / 3$)
$1 \cdot 30 = 1.2, X \cdot 15 \sim 2.5$	First 30 seconds cost 1.2 and afterwards each 15 seconds at a minute price of 2.5
$0.5 + 1 \cdot 60 \% 3 \sim 1.5, X \cdot 1$	Access fee 0.5, 1st minute charged from the 3rd second at a price of 1.5 per minute and afterwards charge each second at a price of 1.5 per minute
$X \cdot 1024 = 0.005$	Note: In case of non-duration based services, only the unit price (=) must be used. This is the case in GPRS volume charging, for example $X \cdot 1024 = 0.005$.

Table 11: Examples of different calculation rules

Annex B Other Errors

This annex is optional to implement.

It is also advised that the HPMN provide additional information to support some other reported errors in RAP files. This information will assist the VPMN to investigate and repair the error and thus it will help in reaching a quick settlement between the two parties.

Where the following errors are reported, the HPMN is recommended to populate the Operator Specific Information item with information as shown in the below table:

Element name	Error code	Error description	Information in Operator Specific Information
	250 - 253, 255 - 257	Call is duplicate.	Keyword "SeqNo:" followed by the TAP file sequence number for the previously received duplicate call record. Example: SeqNo:12345
	261	Call older than allowed by BARG in 'Exceptional Situations' in BA.08 [1].	Keyword "Age:" followed by the Age of the Call record in whole days. Example: Age:31
Exchange Rate	200	Exchange Rate less than expected (see BA.11 [2]) and referenced by one or more Call Event Details.	Keyword "ExpRate:" followed by the expected Exchange rate (using same number of decimal places as in the TAP file). Example: ExpRate:123456
Tax Rate Code	200	The referenced Tax Rate is not in line with the roaming agreement at the corresponding call date.	Keyword "ExpRate:" followed by the expected Tax Rate. Example: ExpRate:1500000

Table 12: Other Errors

Annex C Minimum Content of RAP Disputes and Denials

The following information must be provided together with all RAP disputes and RAP dispute denials:

Information	Comments
RAP File Names	List of RAP file names covered by the dispute or denial.
TAP File Names	TAP file name listed for each RAP file.
RAP dispute raised timestamp	The time the dispute was raised, given in local date and time with UTC offset. The party raising the dispute may optionally include its own local date and time into the e-mail body, although the timestamp generated by the e-mail application (delivery to the recipient's domain) must be used for calculation of related timescales.
RAP dispute denial raised timestamp	The time the denial was raised, given in local date and time with UTC offset. The party denying the dispute may optionally include its own local date and time into the e-mail body, although the timestamp generated by the e-mail application (delivery to the recipient's domain) must be used for calculation of related timescales.
Reason	Free text to explain the reason the RAP is disputed or the dispute is denied.

Table 13: Minimum Content of RAP Disputes and Denials

The following additional information must also be provided together with all RAP IOT disputes and denials, where the RAP file has rejected calls due to error code 200 on the Charge, Tax Value or CAMEL Invocation Fee elements, or on error code 203 on the Charge element:

Information	Comments
IOT Date	The date the IOT became applicable (as taken from the IOT and not from the RAP file).
Calculation	Free text describing what calculation has been performed. Example: 1*30=1.2, X*15~2.5. Mandatory to provide at least one calculation (except where noted below). At maximum, only need to provide information sufficient to cover all CDRs rejected. Not one calculation for each rejected CDR. Optional to provide when IOT Date is identified as different between disputing parties.

Table 14: Minimum Content of IOT RAP Disputes and Denials

Note: It is possible that more than one IOT may cover a specific set of calls within the RAP file. In this case information on all IOTs applicable needs to be provided.

Annex D Document Management

D.1 Document History

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
3.0.0	23 Apr 1999	New PRD (TADIG Doc 016/99).	TADIG #46 Plenary #41	Christer Gullstrand / Syniverse
3.1.0	22 Oct 1999	CRs 1-5 (TADIG Docs 39/99, 44/99rev1, and 73/99-75/99). Inclusion of Transfer Batch level Fatal errors. Rewrite of section 7 - Scenarios. Clarification of Return Value. Addition of fields to make RAP release management possible. Removal of unnecessary items from the Acknowledgement File.	TADIG #47 Plenary #42	Christer Gullstrand / Syniverse
3.2.0	27 Apr 2000	CRs 6-10 (TADIG Docs 22/00, 24/00rev1, 23/00rev1, 32/00 and 39/00). Changes to physical format Value of a rejected TAP file must not be present in the RAP file New optional error context presentation in the RAP file The RAP File Sequence Number must not be included when a TAP file previously reported missing is sent Error correction: RAP File Sequence Number is not present in Audit Control Information	TADIG #48 Plenary #43	Christer Gullstrand / Syniverse
3.3.0	12 Oct 2000	CRs 11-13, 15-19 (TADIG Docs 81/00-83/00, 85/00-88/00 and 123/00). CR14 was withdrawn as it was redundant after the approval of CR12.	TADIG #49 Plenary #44	Christer Gullstrand / Syniverse
	15 Dec 2000	Correction of erroneous incorporation of CR13.	TADIG	Christer Gullstrand / Syniverse
3.4.0	5 Mar 2001	CRs 20-23 (TADIG Docs 09/01-12/01), and CR 25 (approved by e-mail). Note that CR 24 was not approved, but agreed to in principle by TADIG #50, subject to further detailed specification work by the FSS.	TADIG #50 E-mail vote	Christer Gullstrand / Syniverse
3.5.0	6 Jul 2001	CRs 26-30 (TADIG Docs 94/01-98/01). Note that CR 24 was withdrawn and reworked into CR 29 that was approved by TADIG #51.	TADIG #51	Christer Gullstrand / Syniverse

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
3.5.1	9 Nov 2001	CRs 31 and 33 (TADIG Docs 199/01 and 201/01). Note that CR 32 is a format change and will therefore form part of RAP1.2 (TD.32 version 3.6.0).	TADIG #52	Christer Gullstrand / Syniverse
3.6.0	6 Jun 2002	This version is the first version to specify RAP1.2. CR 32 and 34-38 (TADIG Docs 200/01 and 48/02-52/02).	TADIG #52 TADIG #53 EC #31	Christer Gullstrand / Syniverse
3.6.1	20 Nov 2002	NSCRs 39-42 (TADIG Docs 138/02-140/02 and 141/02rev1). Update of scenarios to RAP1.2.	TADIG #54	Christer Gullstrand / Syniverse
3.6.2	20 Dec 2002	NSCR 43 (TADIG Doc 004/03).	TADIG E-mail vote	Christer Gullstrand / Syniverse
3.6.3	2 Jun 2003	NSCR45 (TADIG Doc 39_03). Editorial clarification to RAP1.2. Note: CR 44 was rejected.	TADIG #55	Christer Gullstrand / Syniverse
3.6.4	18 Sep 2003	NSCRs 46-48 (TADIG Docs 105/03-107/03).	TADIG E-mail vote	Christer Gullstrand / Syniverse
3.7.0	Jun 2004	NSCRs 049-051 (TADIG Docs 57_055, 57_056rev1 and 57_057). SCR 052 (TADIG Doc 57_067rev3).	TADIG #57 EMC #21	Christer Gullstrand / Syniverse
3.8	May 2005	Minor CR 053 (TADIG Doc 59_028). Removal of text moved into BA.13 [3].	TADIG #59	Christer Gullstrand / Syniverse
3.9	14 Oct 2005	Minor CRs 054 and 055 (TADIG Docs 60_022 and 60_023rev1). Reduce maximum size of RAP file. Add scenario for missing returns.	TADIG #60	Christer Gullstrand / Syniverse
3.10	9 Nov 2006	Minor CR 058 (TADIG Doc 62_021). Editorial corrections.	TADIG #62	Christer Gullstrand / Syniverse
3.11	7 Jun 2007	Minor CR 060 (TADIG Doc 63_042). Editorial Updates to Reference List.	TADIG #63	Christer Gullstrand / Syniverse
4.0	27 Jun 2007	Major CR 061 (TADIG Doc 63_075rev1).	TADIG #63 EMC #55	Christer Gullstrand /

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
		RAP1.4. Adding TAP Decimal Places and TAP Currency.		Syniverse
4.1	26 Dec 2007	Major CR 062 (TADIG Doc 64_018). Minor CR 063 (TADIG Doc 64_019). Additional IOT Information. RAP Release Version Number.	TADIG #64 EMC #60	Christer Gullstrand / Syniverse
4.2	27 Mar 2008	Major CR 064 (TADIG Doc 65_006). Adding Total Severe Return Tax. New GSMA template applied (4 December 2008).	TADIG eVote EMC #62	Christer Gullstrand / Syniverse
5.0	2 Jul 2009	Major CR 065 (TADIG Doc 67_044). Changing the creation rules for ACK files, implementation date 1 Dec 2009. Editorial corrections to sections 7.4.3, 7.5.3 and 7.6.2.	TADIG #67 EMC #74	Christer Gullstrand / Syniverse
5.1	26 Nov 2009	Minor CR 066 (TADIG Doc 68_036). Editorial corrections to the Annex.	TADIG #68	Christer Gullstrand / Syniverse
6.0	24 Jun 2010	Major CRs 067 and 068 (TADIG Docs 69_011 and 69_012). RAP1.5, effective 1 May 2011. Mandatory OSI for IOT Errors. TAP File Stream Stopped Error.	TADIG #69 EMC #84	Christer Gullstrand / Syniverse
6.1	11 Jan 2011	Editorial Correction of name of ASN.1 syntax from RAP-0104 to RAP-0105.	N/A	Christer Gullstrand / Syniverse
6.2	24 Feb 2011	Minor CR 069 (TADIG Doc 71_008). Adding Stop Return to a few data dictionary entries where it was previously missing.	TADIG eVote	Christer Gullstrand / Syniverse
6.3	2 Jun 2011	Minor CR 070 (TADIG Doc 71_047). Clarifications to OSI (Annex 1). Implementation of new GSMA PRD template.	TADIG #71	Christer Gullstrand / Syniverse
6.4	2 Sep 2011	Minor CR 071 (TADIG Doc 72_011). Clarifications to OSI date and charge format (Annex 1).	TADIG eVote	Christer Gullstrand / Syniverse
6.5	26 Oct	Major CR 072	TADIG eVote	Christer

Version	Date	Brief Description of Change	Approval Authority	Editor / Company
	2011	(TADIG Doc 72_012). Stop returns are only raised when at least one CD file has been received	EMC #97	Gullstrand / Syniverse
6.6	15 Dec 2011	Minor CRs 073 - 076 (TADIG Docs 72_023 – 72_026). Clarification on global errors without data items and on Last Sequence Number in Stop Return. OSI Information for IOT Related Validations. Removal of RAP scenarios.	TADIG #72	Christer Gullstrand / Syniverse
6.7	15 Mar 2012	Minor CR 077 (TADIG Doc 73_010). Annex 1: Removal of validation rule in line with TD.57 [6]. New Annex 3: Minimum content of RAP disputes and denials moved from BA.13 [3].	TADIG eVote	Christer Gullstrand / Syniverse
6.8	30 Mar 2012	Editorial change: Added a note to the end of Annex 3. The note was lost by mistake when moving the text from BA.13 [3].	N/A	Christer Gullstrand / Syniverse
6.8	13 Nov 2012	Editorial change: New GSMA template	N/A	Christer Gullstrand / Syniverse
6.9	22 Nov 2012	Minor CR 078 (TADIG Doc 74_011) New section 2.4 on Public interface within one DCH	TADIG #74	Christer Gullstrand / Syniverse
6.10	23 May 2013	Minor CR 1001 Error corrections and clarifications on Annex A IOT related errors	TADIG #75	Christer Gullstrand / Syniverse
6.11	5 Dec 2013	Major CR 1002 RAP release management	TADIG #76	Christer Gullstrand / Syniverse
6.12	18 Nov 2015	Minor CR 1003 Total invoiceable charge where more than one populated Charge Information Group exists	IDS #80	Christer Gullstrand / Syniverse

D.2 Other Information

Type	Description
Document Owner	IDS
Editor / Company	Christer Gullstrand / Syniverse

It is our intention to provide a quality product for your use. If you find any errors or omissions, please contact us with your comments. You may notify us at prd@gsma.com.

Your comments or suggestions & questions are always welcome.