

## **NGA-Telephony; Management**

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## Foreword

This NICC Document (ND) has been produced by NICC TSG/Management

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## Introduction

NGA-Telephony interconnect management processes are those processes that are required to plan, establish and operate a NGA-Telephony interconnect, and account for its usage.

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# 1 Scope

The scope of this specification is the management aspects of NGA-Telephony interconnect. This document specifies management activities that require co-ordination between the NGA-Telephony Access Provider and the NGA-Telephony Service Provider.

The functional interaction between the NGA-Telephony Access Provider Network and the NGA-Telephony Service Provider Network is carried out via a B2B interface. This document scope is Rm1 and Rm2 as defined in ND1645 [2]. Rm3 and Rm4 (potentially utilising TR-069 [i.1]) is out of scope of the present version of this document.

The architecture and specification of NGA-Telephony service sessions are specified in the Architecture Document [2], and the current document should be read in conjunction with that architecture document.

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# 2 References

For the particular version of a document applicable to this release see [ND1610](#) [1].

## 2.1 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ND1610 “Next Generation Networks, Release Definition”
- [2] ND1645 “NGA Telephony; Architecture & Requirements”
- [3] SR 001 262; “ETSI Drafting Rules” Section 23:- Verbal Forms for The Expression Of Provisions.
- [4] RFC3435 “Media Gateway Control Protocol (MGCP)”
- [5] ND1033 “NGA Telephony SIP User Profile”
- [6] RFC3551 “RTP Profile for Audio and Video Conferences with Minimal Control”
- [7] ND1030 “Ethernet ALA Service Definition”
- [8] ETSI TS124.229 “Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3”
- [9] RFC2617 “HTTP Authentication: Basic and Digest Access Authentication”

## 2.2 Informative references

- [i.1] TR-069 “CPE WAN Management Protocol v1.1 (Broadband Forum)”
- [i.2] ITU-T Recommendation M.3000 “Overview of TMN Recommendations”

## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions in Table 3.1-2 below apply:

**Table 3.1-1 Terms used within this document**

<b>Term (Abbreviation)</b>	<b>Explanation</b>
<b>NGA-Telephony</b>	The delivery of voice services over a fibre access using a packet based transport and session based protocols.
<b>NGA-Telephony Service Provider</b>	Communication Provider providing NGA-Telephony service to end-users
<b>NGA-Telephony Access Provider</b>	Access Provider facilitating provision of NGA-Telephony using their access network
<b>NGA-Telephony End-User</b>	End Customer consuming NGA-Telephony from NGA Telephony Service Provider

### 3.2 Key Words

The key words “**shall**”, “**shall not**”, “**must**”, “**must not**”, “**should**”, “**should not**”, “**may**”, “**need not**”, “**can**” and “**cannot**” in this document are to be interpreted as defined in the ETSI Drafting Rules [3]

### 3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ALA	Active Line Access
ATA	Analogue Telephone Adapter
AUC	Active Line Access User Connection
CP	Communications Provider
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
ETSI	European Telecommunication Standards Institute
IP	Internet Protocol
MCID	Malicious Call Identity
NGA	Next Generation Access
NGA-T	NGA-Telephony
OLT	Optical Line Termination
ONT	Optical Network Termination
OMCI	Optical network termination Management and Control Interface
PSTN	Public Switched Telephone Network
RTP	Real-time Transport Protocol
SIP	Session Initiation Protocol
SRV	Service
UA	User Agent
VLAN	Virtual Local Area Network

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## 4 Document Structure

In common with other TSG Management documents, this document is structured into standard M.3000 TMN [i.2] categories of Planning, Fulfilment, Assurance, Accounting & Settlement, and Security.

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## 5 PLANNING

### 5.1 NGA-Telephony Service Establishment

During service establishment, points of contacts for the NGA-T Access Provider and NGA-T Service Provider will be exchanged. Commercial arrangements will be agreed, and technical testing will be carried out prior to ordering services to prevent incompatibility issues.

During this phase, the NGA-T Access Provider and NGA-T Service Provider must agree the technical parameters that are to be applied to the AUC supporting the NGA-Telephony VLAN, set out in [7].

The NGA-T Access Provider shall make available the locations of Handover points. NGA-T Access provider shall provide information regarding changes to Handover points

### 5.2 NGA-Telephony Service Provider Planning

It is the responsibility of the NGA-T Service Provider to adequately dimension the handovers between the Access Provider network and their own, taking into account:

- Target Market awareness
- Backhaul as necessary to different Handover points
- Bandwidth considerations – as the service is uncontended, this will be a function of the anticipated number of customers in a given location multiplied by the required bandwidth/customer taking into consideration the implementation of 3-Way calling

The NGA-T Service Provider may request Double Tag VLAN Handover. This would imply the creation of an SVLAN. This SVLAN ID must be subsequently sent as part of the NGA-Telephony Provide order.

### 5.3 Digit Map Planning

The NGA-T Access Provider should provide sufficient digit maps to support UK dial plans. However NGA-T Service Providers may define their own digit map content using attributes defined in Table 5.3 1 below. The NGA-T Access Provider will then return the unique digit map reference to the NGA-T Service Provider to use for subsequent NGA-Telephony Service orders.

The digit map structure shall be based on MGCP [4]. The NGA-T Access Provider shall document and make available the detailed specification of the digit map structure that they support.

**Table 5.3-1: NGA-T Service Provider digit map contents to NGA-T Access Provider**

Name	Type	Range	Description	Mandatory or Optional	Default Value
VAG Configure Info SIP Digit Map					
Digit Map String	string(4000)		Digit map controlling the transmission of dialled digit information. The string defines the criteria to be met as digits are collected before an outgoing request (e.g., a SIP INVITE) can be initiated.	Optional	
InterDigitTimer (L)	unsignedInt	1s to 20s	For description refer to reference [5].	Optional	20s
ShortDigitTimer (S)	unsignedInt	1s to 20s	For description refer to reference [5].	Optional	4s

## 5.4 UA-Profile service settings

The service settings controlled by ua-profile will normally be set to ‘all disabled’ on the ATAs by default and may be modified by the NGA-T Service Provider using the ua-profile mechanism. Where either NGA-T Service Provider or NGA-T Access Provider does not use the ua-profile mechanism then it shall be possible to set a different default set for use by all that NGA-T Service Providers’ ATAs by bilateral agreement.

It should be noted that without the ua-profile being supported end-to-end then the NGA-T Service Provider has no way to modify ATA service settings autonomously and MCID requests can only be communicated manually and shall therefore be set, upon request, by the NGA-T Access Providers’ internal provisioning system.

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## 6 FULFILMENT: Information exchanged to order provision of NGA-T service

This section identifies information which is exchanged between the NGA-T Service Provider and the NGA-T Access Provider in order that NGA-Telephony be provided to an end-user.

### 6.1 NGA-Telephony Service Order Scenarios

#### 6.1.1 Service order scenarios:

Prior to the establishment of NGA-Telephony service, NGA-T End-Users may be in one of many available service states, and there are correspondingly many order scenarios when transferring an End-User from their existing service to the NGA-Telephony provided service.

##### 6.1.1.1 State of the Line:

The End-User’s NGA connectivity may be in one of a number of states:

- ONT physically installed, but with no Telephony or other service.
- ONT physically installed, with Telephony or other service.
- No ONT installed.

In addition, the End-User may have an analogue line, which is to be ceased.

The NGA-T Access Provider shall provide a Pre-Order Check facility to allow the NGA-T Service Provider to determine which state an access currently has.

Where no ONT is installed, one must be ordered, using an ALA service order. The ONT order process is outside the scope of this document.

Where an ONT is present but currently with no services, ALA service will be provided as part of the NGA-Telephony order.

Where an analogue line is present and is to be ceased following the NGA-Telephony service establishment, the cease will follow standard analogue line cease procedures. The cease need not be co-ordinated with the NGA-Telephony service establishment, but should not take place before NGA-Telephony service has been confirmed, to avoid loss of service. If service is to be retained on the analogue line even after NGA-Telephony service is provided, then a new number must be allocated to the End-User for the NGA-T service or, subject to process availability, as a replacement number for the analogue line service.

#### 6.1.1.2 State of Number:

The PSTN number to be assigned to the NGA-Telephony line may be:

- A new provision;
- Transferred from another line served by the NGA-T Service Provider;
- Transferred from another line serviced by a different Service Provider.

Where a number is being transferred from another line, the likelihood is that the transfer is from an analogue line already servicing the End-User. However, in general the number could be transferred from any line, including another NGA-Telephony service.

Where the End-User is allocated a new number for a new NGA-Telephony service provision, no number transfer procedures are applicable. The provision of the new number, and the timing of its delivery to the NGA-Telephony service, is the responsibility of the NGA-T Service Provider.

Where the End-User number is transferred to the NGA-Telephony service from another service provided by the same NGA-T Service Provider, it is the responsibility of the NGA-T Service Provider to arrange the number transfer to the NGA-T service, and the co-ordination of this activity with the NGA-Telephony service activation. This includes the case of transfer from WLR where the NGA-T Service Provider uses the BT network as the number remains on their network.

Where the End-User number is transferred from another CP, the number transfer will be achieved using Geographic Number Portability (GNP). This includes the case of transfer from WLR where the NGA-T Service Provider does not utilise the BT network. Co-ordination will be required between the NGA-Telephony service activation and the GNP process, in order that disruption to service is minimised.

#### 6.1.1.3 State of Commercial Relationship

Where the End-User does not have existing service through the NGA-T Service Provider, the NGA-T Access Provider will require evidence that the End User has authorised the NGA-T Service Provider to take over service.

## 6.1.2 Service Order Fulfilment

### 6.1.2.1 NGA-Telephony services Order

The NGA-T Access Provider shall make available a number of operations, or primitives, to allow NGA-T Service Providers to add orders for NGA-Telephony services. These operations are:

- Pre-Order Check
- ALA order (include ONT provision if necessary)
- NGA-Telephony ATA Order
- NGA-Telephony Port Order (the NGA-T Access Provider should have the ability to associate Ports to ATA)

In addition, the NGA-T Service Provider may make use of a number of functions already offered by the NGA-T Access Provider, including:

- Geographic Number Portability
- Migration Authorisation
- Analogue line cease

The NGA-T Service Provider may invoke these orders separately to NGA-Telephony orders, or alternatively the NGA-T Access Provider may integrate these into the NGA-Telephony order. For example, the provision of NGA-Telephony using a number serviced by WLR3 may incorporate the Number Portability step needed to complete the service order.

In general, for each of these order types the NGA-T Service Provider can request different types of order:

- Provision (request for the provision of a new service)
  - (Incorporating Request Migration Authorisation for Migration scenarios)
- Modify (request to change the existing service) order type.
- Cease (request for the cessation of an existing service)

The NGA-T Access Provider should allow the NGA-T Service Provider to:

- Add an Order
- Amend an In-progress Order
- Cancel an In-progress Order

### 6.1.2.2 Pre-Order Check

The NGA-T Service Provider will be expected to execute a number of dialogue services to bring together all of the information required before raising the NGA-T order (e.g. address dialogue service to get the address key).

The NGA-T Access Provider shall provide information on the type of services available (e.g. ONT is already present at the premises), the ONT type, and shall also provide the identity of the exchange OLT to allow the NGA-T Service Provider to know to which exchange they will be required to have access for handover connectivity service.

### 6.1.2.3 Order – Add Order for Provide

This request message contains an Order which enables the NGA-T Service Provider to make a purchase order request. Several different Provide cases exist:-

1. Provide – NGA-Telephony service – New Installation
2. Provide – NGA-Telephony service – Existing Installation
  - a. Where there is an ONT but no ALA yet.
  - b. Where there is an ONT and ALA but no NGA-Telephony service
  - c. Where there is an ONT, ALA and NGA-Telephony service, and 2<sup>nd</sup> NGA-Telephony service is being enabled
3. Provide – NGA-T to different NGA-T Service Provider

### 6.1.2.4 Order – Add Order for Modify

This allows an NGA-T Service Provider to modify certain features, e.g. re-number or change the digit map.

Modification of the following attributes will result in the loss of active calls. The NGA-T Service Provider should check for active calls before initiating a modify order affecting one of these attributes [5]:

- External IP Address
- Default Gateway
- Proxy Server (currently used in an active registration)
- Home Domain
- Directory Number
- Username
- Password

### 6.1.2.5 Order – Add Order for Cease

This allows an NGA-T Service Provider to place a cease order

### 6.1.2.6 Order Amendment – Amend Order

This request message contains an Order Amendment which enables the NGA-T Service Provider to make a change to an aspect of an order. The change is typically to amend the ‘required by’ date. The possible response documents are “Order Amended” (positive response) and “Order Amend Rejected” (negative response).

### 6.1.2.7 Order Cancellation – Cancel Order

This request message contains an Order Cancellation which enables the NGA-T Service Provider to request cancellation of orders. The possible response documents are “Order Cancel Pending” (positive response) and Order Cancel Rejected (negative response).

### 6.1.2.8 Order Response

The NGA-T Access Provider should send response messages to the NGA-T Service Provider on all different order types keeping the customer informed of order progress and delays or rejection.

## 6.1.3 NGA-Telephony Specific Attributes

### 6.1.3.1 NGA-T Service activation Parameters

It is necessary for certain configurable parameters to be provided by the NGA-T Service Provider to the NGA-T Access Provider across Rm1 as part of the NGA-Telephony service establishment. It should be noted that the parameters exchanged across the management interface are a subset of those parameters requiring configuration on the ATA itself. Informative Annex A provides illustrative examples of the additional parameter types and values that are utilised by a specific NGA-T Access Provider. It should be noted that these illustrative examples are not intended to be prescriptive on other NGA-T Access Providers. Other NGA-T Access Providers are encouraged (but not compelled) to provide similar information for subsequent releases of this document.

The parameters exchanged between NGA-T Service Provider and NGA-T Access Provider are listed in tables 6.1-1, 6.1-2 and 6.1-3 below. It is implementation dependent whether the NGA-T Access Provider implements this exchange by requiring each individual parameter to be explicitly identified on each Provide, or by reference to a predefined Profile, or by some combination of these means.

Tables 6.1-1 and 6.1-2 below show the values provided by the NGA-T Service Provider for the ATA and Port provision respectively. These are set into the ONT by the NGA-T Access Provider, but configurable by NGA-T Service Provider. Where there is no default value, the NGA-T Service Provider must provide the value as required.

**Table 6.1-1: Values per ATA provided by the NGA-T Service Provider**

Name	Type	Range	Description	Mandatory or Optional	Default Value
<b>Handover Port</b>					
SVLAN ID	unsignedInt	[2:4094]	VLAN ID previously set as part of Double Tag Handover at the Handover port	Mandatory on Double Tag Handover	Set By NGA-T Access Provider prior to NGA-T Provide order and provided by NGA-T Service Provider for Provide
DHCP option 82 Remote ID	String		Value allocated by the NGA-T Service provider to identify specific End-User.	Optional	Null
<b>WAN Interface</b>					
Addressing Type	enum	“DHCP” “Static”	The method used to assign an address to the WAN side interface of the ONT for this connection.	Optional	DHCP
External IP Address	String(15) *see Note1		This is the IP Address of the ATA. This can be set either by DHCP if DHCP is enabled or via the OSS config.	Mandatory (See Description)	
Subnet Mask	String(15) *see Note1		This is the Subnet of the IP Address of the ATA. This can be set either by DHCP if DHCP is enabled or via the OSS config.	Mandatory (See Description)	

Name	Type	Range	Description	Mandatory or Optional	Default Value
Default Gateway	String(15) *see Note1		This is the IP Address of the CPs Gateway Server. This can be set either by DHCP if DHCP is enabled or via the OSS config.	Mandatory (See Description)	
DNS Server	String(64)		Comma separated list of DNS server IP addresses for this connection. Support for 1 or more DNS Servers is provided.	Optional	
<b>VAG Configure Info</b>					
DTMF Method	enum	“InBand” “DTMF Relay”	Method by which DTMF digits will be passed. For the “DTMF Relay” details, refer to [5].	Optional	DTMF Relay
<b>VAG Configure Info SIP</b>					
Proxy Server (SBC proxy address)** see Note 3	String(63)		Domain name or IP address of the SIP proxy server. String length as per [5].	Mandatory	
Proxy Server Port	unsignedInt	[0:65535]	Destination port to be used in connecting to the SIP server. Ports which have been reserved or otherwise specifically assigned by IANA may not be available from NGA-T Access Provider.	Optional	5060
Secondary Proxy Server** see Note 3	String(63)		Domain name or IP address of the secondary SIP proxy server for redundancy. String length as per [5].	Optional	
Secondary Proxy Server Port	unsignedInt	[0:65535]	Destination port to be used in connecting to the secondary SIP server. Ports which have been reserved or otherwise specifically assigned by IANA may not be available from NGA-T Access Provider.	Optional	5060
Home Domain	String(63)		Host name of the SIP home domain. String length as per [5]. The ‘@’ is an illegal character and must not be used.	Mandatory	
Local Port	unsignedInt	[1024:41951]	Port used for incoming call control signalling. Ports which have been reserved or otherwise specifically assigned by IANA may not be available from NGA-T Access Provider.	Optional	5060
Registration Period	unsignedInt	[30:65534]	Period over which the user agent must periodically register, in seconds.	Optional	3600
<b>VAG Configure Info RTP Jitter Buffer</b>					
Max.Adaptive JB**see Note 2	unsignedInt	[0:200]	The maximum adaptive jitter buffer time, in milliseconds	Optional	80
Min.Adaptive JB**see Note 2	unsignedInt	[0:200]	The minimum adaptive jitter buffer time, in milliseconds.	Optional	10
Initial Adaptive JB**see Note 2	unsignedInt	[0:200]	The initial adaptive jitter buffer time, in milliseconds.	Optional	10
Initial Fixed JB**see Note 2	unsignedInt	[1:200]	The initial fixed jitter buffer time, in milliseconds.	Optional	80
3-Way Calling Mechanism	enum	“ATA based” “Network based” “Not supported”	Refer to [5] for a description of the implementation options for 3-way calling.	Optional	ATA based
Conference Server (address)	String(63)		Host name or IP address of the Conference Server for Network based 3-Way Calling.	Optional	

\*Note 1: Based on Ipv4. If it is agreed between the parties to use Ipv6, this value should be length 39

\*\*Note 2: Where an implementation supports these attributes per port then the attributes values must be consistent across all ports assign to a single parent ATA.

\*\*\*Note 3: Where a CP wishes to utilise a DNS SRV look up only the Proxy Server parameter must be specified as a Domain Name and the Secondary Proxy server parameter should not be specified. The DNS SRV look up is expected to return one or more SRV

Resource Record (RR) entries with distinct priority settings as per RFC 2782 (preferably together with appended associated A records). The highest priority SRV entry will be used as the Proxy Server entity. The second highest priority SRV entry (if provided) will be used as the Secondary Proxy Server entity.

Where a CP wishes to utilise a DNS Type A look up then the Proxy Server must be specified as a Domain Name. If a Secondary Proxy server is required by DNS Type A look up then this must be specified as a Domain Name also.

Where no DNS look up is provided then the Proxy server parameter must be provided as an IP Address and optionally a Secondary Proxy server parameter can also be provided as an IP Address.

**Table 6.1-2: Values per Port provided by the NGA-T Service Provider**

Name	Type	Range	Description	Mandatory or Optional	Default Value
<b>Physical Interface Extended Attributes</b>					
Send Gain	Int	-60 to -10 in steps of 5 *see Note1	Gain in units of 0.1 dB to apply to the transmitted voice signal prior to FXS.	Optional	-60
Receive Gain	Int	-120 to -60 in steps of 5 **see Note2	Gain in units of 0.1 dB to apply to the receive voice signal prior to FXS.	Optional	-110
<b>VAG Configure Info SIP Digit Map</b>					
Digit Map Name	String(64)		The name of digit map.	Optional	
<b>VAG Configure Info RTP Jitter Buffer</b>					
Fixed/Adaptive Jitter Buffer	Boolean		0 = Adaptive, 1= Fixed.	Optional	0
<b>Configure POTS User</b>					
User Enabled	Boolean		Enables or disables this line, 0 = Disabled/down, 1 = Enabled/up.	Optional	1
Directory Number	String(32)		Directory number associated with this line. May be used to identify the line to the SIP server. The format should be full International Number e.g. (+441473123456). This is referred to as "public user identity". Refer to [8].	Mandatory	
<b>Configure POTS User Authentication</b>					
User Name	String(50)		Username used to authenticate the connection to the SIP server. If empty, the Directory Number will be used as User Name. This is referred to as "private user identity". Refer to [8].	Optional	Default to Directory Number
Password	String(25)		Password used to authenticate the connection to the server. Refer to section 3.1.2 in [9].	Mandatory	
<b>Configure POTS User Calling Features</b>					
Digits Sending mode	enum	"En-Bloc" "Overlap Multiple Invites" "Overlap In Dialogue"	Refer to [5].	Mandatory	
Line Reversal on Answer	Boolean		Line reversal on Called Subscriber Answer, 1 = Enable or 0 = Disable	Optional	0
Voice Codecs List	String(96)		Voice CoDec priority list in codec, ptime tuple format. Encoding Names in the list shall be as per table 4 of [6]. (example; PCMA,10,G.729,20,PCMM,10)	Optional	PCMA,10

\*Note 1: This range is suitable for residential ATAs. For exchange based line cards a wider range (-60 to +50) is permitted.

\*\*Note 2: This range is suitable for residential ATAs. For exchange based line cards a wider range (-120 to +50) is permitted.

Table 6.1 3 below shows the parameters set by the NGA-T Access Provider and returned to NGA-T Service Provider as part of L2C response:

**Table 6.1-3: Parameters returned to NGA-T Service Provider**

Name	Type	Range	Description	Mandatory or Optional	Default Value
WAN Interface					
CVLAN ID	unsignedInt	[2:4094]	This is the VLAN ID at the handover point with the NGA-T Service Provider associated with the ATA. Fixed by the NGA-T Access Provider for a first ATA provision. Must be provided by the NGA-T Service Provider for a request of a second or subsequent port to be associated with an existing ATA/CVLAN.		Set By NGA-Telephony Access Provider

## 6.2 Fulfilment Security arrangements

The NGA-T Access Provider shall guarantee security for all NGA-T Service Provider fulfilment order transactions.

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# 7 ASSURANCE

## 7.1 Overall Fault Handling Process

The NGA-T End-User may report a fault on their voice service to their Communications Provider (NGA-T Service Provider). The NGA-T Service Provider should then try to determine if a fault actually exists or not, and arrange solution as necessary.

The following is the recommended process for handling the NGA-T End-User faults; the process is also demonstrated by the flow chart in Figure 7.1-1 below:

1. On a fault raised by the NGA-T End-User or detected by the NGA-T Service Provider, the NGA-T Service Provider to run an In-Band ATA status check
  - a. NGA-T Service Provider to make sure ATA is accessible. E.g. ATA ping
2. NGA-T Service Provider to carry out an internal Configuration Check.
3. NGA-T Service Provider to request a service test from NGA-T Access Provider via the B2B interface.
4. NGA-T Access Provider to initiate service test and report response to the NGA-T Service Provider. The response may indicate one of a number of cases:
  - a. Fault found and will require End-User visit
  - b. Fault found, no "End User" home visit required
  - c. Service test "OK", fault not in NGA-T Access Provider Network.

5. NGA-T Service Provider to raise a fault report

Fault report types:

- a. NGA-T Service Provider reports a fault which requires an engineering visit to fix the fault
- b. NGA-T Service Provider reports a fault which does not require an engineering visit to fix the fault.
- c. NGA-T Service Provider requests a Special Service Assure Investigation if the NGA-T Access Provider Service Test cannot find any fault on NGA-T Access Provider's Network but the NGA-T End-User still has no service and the NGA-T Service Provider is not satisfied with NGA-T Access Provider's service test response.

6. NGA-T Access Provider to initiate full service test on the NGA-T Access Provider's Network.

7. NGA-T Access Provider to restore/repair Services

8. NGA-T Access Provider to run "service restore/repair" test.

NGA-T Access Provider to report back to the NGA-T Service Provider only when "Test OK".

9. NGA-T Access Provider sends "Clear" to NGA-T Service Provider.

10. Before accepting/rejecting the Fault "Clear", NGA-T Service Provider to request service test from NGA-T Access Provider via B2B interface.

11. NGA-T Access Provider – Close Fault report

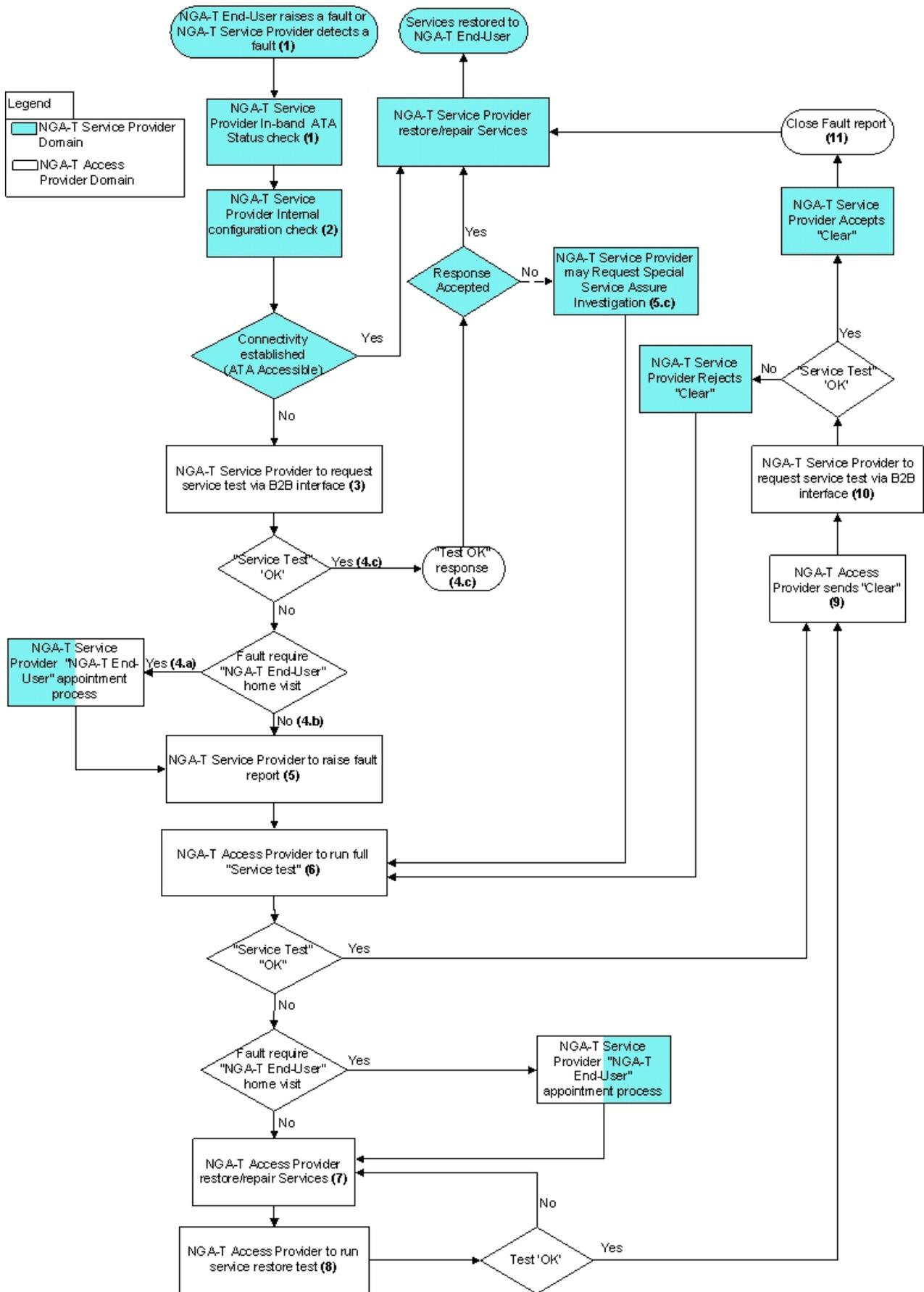


Figure 7.1-1 Fault Process Flow Chart

## 7.1.2 Trouble (Fault) Report Scenarios

### 7.1.2.1 Raising Fault Report

The NGA-T Access Provider shall provide a fault handling process which allows the NGA-T Service Provider to raise, amend and cancel faults reports.

### 7.1.2.2 Fault Notification Request

The fault handling process shall include a Notify of Fault Report Status transaction which allows the NGA-T Access Provider to update NGA-T Service Providers with the fault progress and also to request information and/or action from the NGA-T Service Provider. This includes closure of Fault Reports. The NGA-T Service Provider can respond to requests for information and/or action from NGA-T Access Provider via suitable transactions like 'Request Fault Report Amendment'.

The fault report progress status can be:

1. Service test "OK" (no Fault found)
2. Service test "inconclusive" (e.g. ONT condition "No Power")
3. Fault Found

## 7.2 Notification of Major Fault Conditions

The NGA-T Access Provider shall provide Reportable Incidents Notifications to NGA-T Service Providers on detection and clearance of major faults.

These Reportable Incidents Notifications are only provided on the detection of major service outage conditions.

In the event of a network failure, the NGA-T Access Provider should proactively identify and fix the fault

## 7.3 Notification of Major Planned Engineering Work

The NGA-T Access Provider shall provide NGA-T Service Providers notice of major planned engineering work and Reportable Incident Notifications on start and completion of the work.

On completion of the planned engineering work, the NGA-T Access Provider should proactively restore services.

An example of a planned engineering work is an exchange OLT upgrade.

## 7.4 Configuration Check

The NGA-T Access Provider should provide a mechanism to allow the NGA-T Service Provider to determine the current configuration on the ATA.

- All the NGA-T Service Provider variable configuration parameters, including those at default values, should be reported by NGA-T Access Provider.
- Fixed configuration parameters need not be reported by NGA-T Access Provider.

## 7.5 Assurance Security arrangements

The NGA-T Access Provider shall guarantee security for all NGA-T Service Provider assurance transactions.

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## 7.6 ONT Upgrade Procedure

The NGA-T Access Provider shall maintain ATAs with the latest validated firmware and software releases and patches. The NGA-T Access Provider shall notify NGA-T Service Providers about such upgrades allowing NGA-T Service Providers the option to test the upgrades against their network.

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# 8 ACCOUNTING AND SETTLEMENT

## 8.1 “NGA-Telephony End-User” Billing

NGA-T End-User billing will be a function of the NGA-T Service Provider (not NGA-T Access Provider). The NGA-T Service Provider shall generate sufficiently accurate records to correctly bill the End-User according to prevailing regulatory requirements.

## 8.2 Charges between the NGA-T Access Provider and Service Provider

The charges levied by NGA-T Access Provider to the NGA-Telephony Provider for provision of service, and associated documentary backup for such billing, are beyond the scope of this document. However, for the avoidance of doubt the NGA-T Access Provider will not be expected to charge on a usage basis or to provide information to facilitate usage-based (i.e. call duration) billing of the End-User.

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# 9 SECURITY

The NGA-Telephony management security requirements are:

1. NGA-T Access Provider and NGA-T Service Providers must ensure that the management protocols on the ATA (e.g. the SNMP protocol) are not accessible on any non-management interfaces of the ATA (e.g. internet interfaces, data interfaces etc.). The NGA-T Access Provider must prevent anyone from sending packets to the IP stack of the ATA from anywhere other than the NGA-T Access Provider’s servers.
2. Authentication for any management protocols including SSH, TFTP, SNMP (and any local logon) must use both (i) a unique (per device) password and (ii) the IP address of the management server to prevent unauthorised access. [Stronger alternatives, e.g. public key authentication may be considered]
3. Passwords must make use of the maximum length available on each type of device and must be randomly generated using at least [A-Za-z0-9]. Ideally this should be enforced by the management interface generating passwords using a well designed algorithm and providing them to the NGA-T Service Provider for use in authentication, however other mechanisms may be proposed.
4. The management systems must prevent one NGA-T Service Provider modifying services belonging to another provider. This protection must be effective against deliberate and accidental attack.

5. It must be possible for the NGA-T Access Provider to identify an optical circuit, and from that deduce the rough physical location for an ATA.
6. The ATA shall not accept a TFTP request without it being authorised by a command over a more secure management channel.
7. The Access Provider shall assess the authentication needed on the management interface, and implement a secure interface accordingly.

## Annex A (informative):

### Example Fixed attributes and Standard functionalities

It should be noted that the parameters exchanged across the management interface are a subset of those parameters requiring configuration on the ATA itself. This Annex provides illustrative examples of the additional parameter types and values that are utilised by an NGA-T Access Provider. It should be noted that these illustrative examples are not intended to be prescriptive on other NGA-T Access Providers. Other NGA-T Access Providers are encouraged (but not compelled) to provide similar information for subsequent releases of this document.

#### A.1 Openreach

**Table A1-1: Fixed per ATA attributes**

Name	Type	Range	Description	Fixed Value
<b>WAN Interface</b>				
WAN Interface Name	String(32)		User-readable name of this connection.	e.g. FVA
WAN Enabled	boolean		Enables or disables the connection instance. On creation of a WAN	1-enable
Priority	unsignedInt	[0:7]	Ethernet priority code (as defined in 802.1D) to be used for this WAN	To Be Discussed & Agreed
<b>Physical Interface</b>				
Interface ID	unsignedInt	[1:65535]	The unique identifier of the physical port (ATA port). This value MAY be used in the 'Interface ID' parameter in the POTS User configure to indicate which physical ports are associated with a line.	By NGA-Telephony Access Provider pre-assign ports 1 & 2. By NGA-Telephony Service Provider can associate their service with the relevant port as agreed.
<b>VAG Configure Info</b>				
Region	String	ISO3166 or International E164 Country Code (dependant on the ONT supplier choice)	The geographic region associated with this profile. This may be used by the ONT to customize localization settings. An empty value indicates that the region is unspecified and the ONT should use default	UK Or 44
<b>VAG Configure Info SIP</b>				
DSCP Mark	unsignedInt	[0:63]	Diffserv code point to be used for outgoing SIP signalling packets. AF31	26
<b>VAG Configure Info RTP</b>				
Base of Port	unsignedInt	[0:65535]	Base of port range to be used for incoming RTP streams for this profile. Ports which have been reserved or otherwise specifically assigned by IANA may not be available from NGA-T Access Provider.	50000
Top of Port	unsignedInt	[0:65535]	Top of port range to be used for incoming RTP streams for this profile. Ports which have been reserved or otherwise specifically assigned by IANA may not be available from NGA-T Access Provider.	50020

Name	Type	Range	Description	Fixed Value
DSCP Mark	unsignedInt	[0:63]	Diffserv code point to be used for outgoing RTP packets for this profile. EF	46

**Table A1-2: Fixed per Port attributes**

Name	Type	Range	Description	Fixed Value
Physical Interface Extended Attributes				
Reverse Pole Enabled	boolean		Enable or disable to reverse pole when send CLIP fsk to FXS	enable

**Table A.1-3: Standard per ATA Functionalities**

Name	Description	Standard Value
Signalling Protocol	The NICC agreed SIP protocol is supported	“SIP”
Timer T1	Value of SIP timer T1, in milliseconds, as defined in RFC 3261	500
Timer T2	Value of SIP timer T2, in milliseconds, as defined in RFC 3261.	4000
Timer T4	Value of SIP timer T4, in milliseconds, as defined in RFC 3261.	5000
Register Retry Interval	The register retry method is defined in the NICC SIP UNI spec. On initial registration failure the ATA will retry to register 5 times followed by a sleep interval.  The sleep timer is 5 minutes for initial registration and 30 minutes for re registration.	
Priority In SDP Response	Codec priority is obtained from the SDP list.	
SIP Response Number	SIP Responses values to Tones are built in to the standard ATA.	
Packed Loss Concealment	Packet Loss Concealment is enabled.	
Function	Events e.g. “Busy” “Dial” “RingBack” “CallWaiting” “Congestion” ... will be mapped to Tones	
Fax Modem Negotiation	Fax/Modem Passthrough operates as follows: Upon detection of Fax. Modem stimuli, the ATA shall fallback to a static G.711 RTP PT (0 or 8). The G.711 PT should be selected from SDP if available, else from Local Codec list.	
Pattern	The number of map entry	Static table
Ringing Name	The name of ring which may appear in the ‘alert-info’ header field of SIP signalling.	Static Table
Cadence Ring Type	The type num of cadence ring	Static Table
Initial Ring Type	The type num of initial ring	Static Table
Voice Codecs Support	Voice CoDecs G711, G722 and G729 are supported	Note: further codecs may be supported by the CPE.
Packetisation Rate Support	Voice CoDec Packetisation	Note: various packetisation sizes may be supported by the CPE
RTCP-XR	RTCP-XR Support	Not all CPE types may support this feature, but the interface supports the feature activation.
SRTP	SRTP support	Not all CPE types may support this feature, but the interface

Name	Description	Standard Value
		supports the feature activation
NGA-T Service Providers per ATA	Number of NGA-T Service Providers across FXS ports	1 initially, 2 later

**Table A.1-4: Standard per Port Functionalities**

Name	Description	Standard Value
Dial Mode	Dial Mode of "First" is supported	"First"
Hook Flash Upper Timer	Value of hook flash upper timer limit, in milliseconds	190
Hook Flash Lower Timer	Value of hook flash lower timer limit, in milliseconds	20
Current	Feeding Current in mA	25mA
Ring Voltage	Feeding voltage, 0 means 74 volts, 1 means 65 volts and 2 means 50 volts.	50 Volts
FirstDigitTimer (T)	The amount of time allowed for the user to enter the first digit. When this timer expires, the readiness to receive new digits has expired and the ATA shall start the Call release sequence.	20

### A.1.1 Openreach Modify Order loss of active calls

In addition to the parameters listed in section 6.1.2.4, the following parameters may also result in a loss of active calls:

- Addressing Type
- Subnet Mask
- DNS Server
- Proxy Server Port
- Secondary Proxy Server
- Secondary Proxy Server Port
- Local Port
- Registration Period
- User Enabled

Tables A.1-5 to A.1-12 depict the ALA parameters (as defined in [7]) to be used where Openreach is the NGA-T Access Provider.

**Table A.1-5: ([7] Table 9) – UNI Attributes**

Attribute Name	Description	Openreach Value
UNI Identifier	Identifier for the UNI	Voice port on ONT
UNI Type	Whether the interface supports multiple AUCs (S-Tagged) or an EPL service (Port-based), or a single AUC and a single multicast AUC (Customer Edge Port Based)	Port-based Service
UNI TPID	TPID of VLAN tags at the UNI	Not Applicable
AUC End-Point Map	A table with rows associating VLAN IDs with AUC End-Point Identifiers at the UNI	Not Applicable
Untagged S-VLAN	The S-VLAN configured as the untagged S-VLAN at this UNI	Not Applicable

Attribute Name	Description	Openreach Value
UNI MEG exists	A Boolean value indicating whether the UNI MEG has been configured	MD L2

**Table A.1-6: ([7] Table 10) – UNI AUC End Point Map Attributes**

Attribute Name	Description	Openreach Value
VLAN ID	VLAN-ID at the UNI	Not Applicable
AUC End Point	AUC End Point Identifier for the associated AUC End Point object	FVA Service ID

**Table A.1-7: ([7] Table 11) – NNI Attributes**

Attribute Name	Description	Openreach Value
NNI Identifier	Identifier for the NNI	GEA Cable Link Service ID
VLAN architectures	The VLAN architectures supported by this NNI	1:1
NNI TPID	TPID of S-VLAN tags at the NNI	8100 or 88A8 for Outer Tag configured as part of GEA cable link order
AUC End-Point Map	A table with rows associating VLAN IDs with AUC End-Point Identifiers at the UNI	TBA
AUCs Supported	The number of AUCs this NNI can support	4000 TBC
NNI MEG exists	A Boolean value indicating whether the NNI MEG has been configured	Not Applicable

**Table A.1-8: ([7] Table 12) – NNI AUC End Point Map Attributes**

Attribute Name	Description	Openreach Value
S-VLAN ID	S-VLAN-ID at the NNI	2-4094
C-VLAN ID*	C-VLAN ID at the NNI	2-4094
AUC End Point	AUC End Point Identifier for the associated AUC End Point object	FVA Service ID

\*Note 1: The C-VLAN ID is only required at the NNI for a double-tagged AUC End-Point.

Table A.1-9 performs the mapping of AUCs to a bandwidth profile that can be used to police the downstream NGA-T traffic.

**Table A.1-9: ([7] Table 13) – AUC End Point Service Attributes**

Attribute Name	Description	Openreach Value
EndPoint Identifier	AUC End Point Identifier	Each AUC service policed individually
AUCGroup	AUC Group Identifier	TBA
ClassB_SUP	Support for Class B traffic	ClassA TBC
ClassD_SUP	Support for Class D traffic	Not Applicable

There is one set of attributes in Table A.1-10 for each Class of Service for each direction supported by the AUC Group.

**Table A.1-10: ([7] Table 14) – AUC Group Service Attributes**

Attribute Name	Description	Openreach Value
AUCGroup	AUC Group Identifier	TBA
CoS	Class of Service	ClassA TBC
Direction	Egress or ingress profile	Both
CIR	Committed Information Rate (bps)	256kbps (one line) 512kbps (two lines)
CBS	Committed Burst Size (bytes)	7000 bytes (one line) 14000 bytes (two lines)
EIR	Excess Information Rate (bps)	0
EBS	Excess Burst Size (bytes)	0
CM	Colour Mode	Not applicable (if NGA-T does not use Class C)
Weight	The weighting between Class C and Class D	Not applicable (if NGA-T does not use Class C)

**Table A.1-11 ([7] Table 15) – Point to Point AUC Service Attributes**

Attribute Name	Description	Openreach Value
AUC Identifier	Identifier for the AUC	TBA
AUC End Point List	A list of AUC End Points	Not Applicable
MTU	Maximum Transmission Unit in bytes	1532 bytes
Color Forwarding	Color Forwarding	Not Applicable
SLS	Service Level Specification	TBA
PPPoE Intermediate Agent	Controls whether the PPPoE Intermediate Agent is enabled	Not Applicable
L2 DHCP Relay Agent	Controls whether the L2 DHCP Relay Agent is enabled	Supported
Circuit ID	Circuit ID field inserted into DHCP and PPPoE packets	See SIN 506
Remote ID	Remote ID field inserted into DHCP and PPPoE packets	Specified by CP see SIN 506
ALA User MEG exists	A Boolean value indicating whether the ALA User MEG has been configured	TBA
ALA User MEG NNI MIP Exists	A Boolean value indicating whether the ALA User MEG has a MIP configured at the NNI	TBA
ALA User MEG AIS	A Boolean value indicating whether the ALA Provider will generate AIS on the ALA user MEG	TBA
ALA User MEG AIS interval	The transmission interval for AIS on the ALA User MEG	TBA
Extended-AUC MEG NNI MIP Exists	A Boolean value indicating whether the ALA Provider has configured a level 3 MIP on a double-tagged NNI	TBA
Extended-AUC MEG CC transmission Interval	A value indicating the transmission interval for continuity check on the Extended-AUC MEG. A value of 0 indicates that CC is disabled.	TBA
Extended-AUC MEG AIS support	A Boolean value indicating whether the ALA Provider supports the generation of AIS on the Extended-AUC MEG	TBA
Broadcast Max	Maximum number of broadcast frames per second	Not Applicable. These attributes apply to N:1 VLAN backhaul.
MAT	Controls whether MAC address translation is activated on the AUC	Not Applicable. These attributes apply to N:1 VLAN backhaul.
VMAC range	Range of Virtual MAC addresses associated with the AUC	Not Applicable. These attributes apply to N:1 VLAN backhaul.
MAC Max	Maximum number of end-user MAC addresses	Not Applicable. These attributes apply to N:1 VLAN backhaul.

**Table A.1-12 ([7] Table 16) – Point-to-Point AUC SLS Attributes**

Attribute Name	Description	Openreach Value
AUC Identifier	Identifier for the AUC	TBA
CoS	Class of Service	TBA
Direction	Upstream or Downstream SLS	TBA
Time interval	The time interval over which SLS attributes are measured (seconds). This is the MEF performance attribute T.	TBA
One-way Frame Delay Percentile	Percentile for Frame Delay Performance	TBA
One-way Frame Delay Performance Objective	Frame Delay Performance Objective corresponding to the defined percentile	TBA
Inter-Frame Delay Variation Percentile	Percentile for Inter-Frame Delay Variation Performance	TBA
Inter-Frame Delay Variation Performance	Frame Delay Performance Objective corresponding to the defined percentile	TBA

Attribute Name	Description	Openreach Value
Objective		
Frame Loss Ratio	The performance objective for the frame loss ratio	TBA
Availability Interval	This is the MEF 10.2 performance attribute $\Delta t$ .	TBA
Availability Intervals	Number of consecutive small time intervals for assessing availability. This is the MEF 10.2 performance attribute n.	TBA
Unavailability frame loss ratio threshold	This is the MEF 10.2 performance attribute $C_u$ .	TBA
Availability frame loss ratio threshold	This is the MEF 10.2 performance attribute $C_a$ .	TBA
AUC Availability Performance objective	AUC Availability Performance objective. This is the MEF 10.2 performance attribute $\hat{A}$ .	TBA

The security requirements described in section 9 are met by Openreach implementation as per Table A.1-13 below:

**Table A.1-13: Openreach Management Security Compliance**

Security Requirement	Openreach Compliance Statement
1. NGA-T Access Provider and NGA-T Service Providers must ensure that the management protocols on the ATA (e.g. the SNMP protocol) are not accessible on any non-management interfaces of the ATA (e.g. internet interfaces, data interfaces etc.). The NGA-T Access Provider must prevent anyone from sending packets to the IP stack of the ATA from anywhere other than the NGA-T Access Provider's servers.	Compliant The ONT is managed via OMCI, GPON standard management protocol, there is no IP management for the ATA.
2. Authentication for any management protocols including SSH, TFTP, SNMP (and any local logon) must use both (i) a unique (per device) password and (ii) the IP address of the management server to prevent unauthorised access. [Stronger alternatives, e.g. public key authentication may be considered]	Compliant ATA is managed via OMCI as stated in No.1 above. The ONT is managed internally within Openreach domain, which is a secure management network.
3. Passwords must make use of the maximum length available on each type of device and must be randomly generated using at least [A-Za-z0-9]. Ideally this should be enforced by the management interface generating passwords using a well designed algorithm and providing them to the NGA-T Service Provider for use in authentication, however other mechanisms may be proposed.	Compliant The ATA passwords are provided by the NGA-T Service Provider as part of End-User Authentication value. Hence the password is generated by the NGA-T Service provider's network systems.
4. The management systems must prevent one telephony provider modifying services belonging to another provider. This protection must be effective against deliberate and accidental attack.	Compliant See section 6.2
5. It must be possible for the NGA-T Access Provider to identify an optical circuit, and from that deduce the rough physical location for an ATA.	Compliant Within 32 End-Users at the moment and up to 128 in the future.
6. The ATA shall not accept a TFTP request without it being authorised by a command over a more secure management channel.	Compliant Not applicable, TFTP is not used as TR069 architecture is not supported for NGA-T Service.
7. The Access Provider shall assess the authentication needed on the management interface, and implement a secure interface accordingly.	Compliant The security needed on the ATA management interfaces within the PON has been assessed by Openreach and a secure interface has been implemented.

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## History

<b>Document history</b>		
V1.1.1	2011-04-18	NICC approved Version
V1.2.1	25/11/2012	Second publication