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NICC Document

Active Line Access: Management and Provisioning Architecture

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Contents

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Foreword

This NICC Document (ND) has been produced by the NICC TSG Ethernet Access Working Group.

Introduction

Active Line Access is a network solution to enable Next Generation Access (NGA) networks to provide connectivity between residential and business consumers and their respective Service Providers in an open and flexible way. It is a technology agnostic connectivity solution, being applicable to DSL, PON and also Active Ethernet access networks. It provides a solution that allows a Tier one network provider to offer logically unbundled access solutions and it can also be used by a small community network operator as an industry standard interconnect to allow their community to connect to any number of Service Providers.

This document describes the Management Architecture for ALA. It sets out how services are defined and provisioned within ALA and provides a point of reference from which to understand the ALA Business to Business management interface as defined in [8] and [9].

1 Scope

ALA has been defined by NICC to satisfy requirements from Ofcom and NGN UK and the full set of ALA requirements are described in [i.2].

ALA is fully defined in the following documents that have been published by NICC

- The ALA Architecture document [2]
- The ALA Service definition [3]
- The ALA UNI definition [4]
- The ALA NNI definition [5]

By deploying ALA the access network operator not only ensures that they can wholesale services to multiple service providers but they also ensure that Service Providers can connect to their networks because the underlying services are compatible with the Service Providers deployment models.

In order for this to be practical however it is essential to define the OSS between the ALA provider and the ALA User (i.e. the open access network operator and the Service Provider) so that the Service Provider can use the same OSS to connect subscribers to any number of different ALA provider networks. This requires a defined set of automated business to business (B2B) processes and an agreed machine to machine interface.

Previous NICC initiatives have produced a set of B2B specifications to support Next Generation Networks, of which the most relevent are the NICC B2B Trouble to Resolve (T2R) interface [6] and the NICC B2B Lead to Cash (L2C) interface [7].

The NICC Ethernet Working Group, in conjunction with the Broadband Stakeholder Group COTS project have therefore produced a B2B interface for Active Line Access. This builds on the approach taken by the previous NICC B2B work but simplifies it and extends it specifically for NGA solutions using ALA.

The ALA B2B standards are defined in the following documents.

- This management architecture document
- ND1649 Active Line Access NICC B2B Lead-to-Cash (L2C) ALA Interface Standard [8]
- ND1651 ALA B2B Lead-to-Cash (L2C) XML standard [9]

This document describes the management architecture within which the ALA B2B interface fits and it sets out a mapping of the ALA standards and concepts to an Open Access Network product set that can be managed and provisioned using the ALA B2B interface.

This document also provides a set of annexes containing ALA product description templates. These templates allow an ALA provider to describe the key aspects of their ALA products in a standard and unambiguous way allowing ALA Users to easily understand what services they offer and which products they might wish to use to deliver their specific service set to end users.

It is recommended that any ALA provider fill these templates out for the products that they offer and include them in their generic set of product documentation.

2 References

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication NICC cannot guarantee their long term validity.

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] NICC ND1644 Architecture for Ethernet Active Line Access (ALA)
[3] NICC ND1030 Ethernet ALA Service Definition
[4] NICC ND1031 Etherenet ALA UNI
[5] NICC ND1036 Ethernet ALA NNI
[6] NICC ND1626:2007 NICC B2B Trouble-To-Resolve (T2R) Interface Standard
[7] NICC ND1627:2007 NICC B2B Lead-To-Cash (L2C) Interface Standard.
[8] ND1649 Active Line Access NICC B2B Lead-to-Cash (L2C) ALA Interface Standard
[9] ND1651 ALA B2B Lead-to-Cash (L2C) XML Standard

2.2 Informative references

[i.1] Sr 001 262 (V2.0.0): ETSI drafting rules Section 23:- Verbal Forms For The Expression of Provisions
[i.2] NICC ND1642 Requirements for Ethernet Interconnect and Ethernet ALA, 2010.

3 Key Words, Definitions and Abbreviations

3.1 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 [i.1].

3.2 Definitions

For the purposes of the present document the following terms and definitions apply.

Aggregation End Point: A location within the ALA providers network where a backhaul product can be purchased to a chosen NNI
ALA provider: Operator of the access network segment supporting Ethernet ALA
ALA user: Direct user of Ethernet ALA
Buyer: The party placing the order for service, in an ALA compliant network this will be the ALA User.
Supplier: The party receiving the order for service and providing the service, i.e. the access network operator. In an ALA compliant network this will be the ALA provider
Touchpoint: A business transaction between the buyer and the supplier. This is in

effect a point of interaction between their two OSS systems, and typically at the lowest level results in a command or message being passed between two automated systems using a mechanism such as XML.

3.3 Abbreviations

ALA	Active Line Access	(Ofcom)
AUC	ALA User Connection	(ND1644)
DSL	Digital Subscriber Line	(G.992)
NNI	Network Network Interface	(ND1644)
OAN	Open Access Network	(Ofcom)
OSS	Operational Support Systems	
PON	Passive Optical Network	
SLA	Service Level Agreement	
UNI	User Network Interface	(ND1644)
XML	Extensible Markup Language	

4 ALA Management and Provisioning Architecture

4.1 UK B2B Architecture

In order to support the automated provisioning and management of NGA services provided using ALA both the retail service provider (ALA User) and the open access network provider (ALA Provider) must implement the NICC B2B interfaces required to support ALA defined in [8] and [9].

This standardised and automated process provide an API between the ALA User and the ALA Provider that allow the ALA Users orders and trouble reports to be provisioned and resolved within the ALA Providers business and network systems. In addition within the UK another role exists that of a third party integrator. These are OSS experts that provide a simplified interface to smaller retail service providers whilst exposing the full B2B API to the Open Access Network provider.

This architecture is shown in figure 1 below.

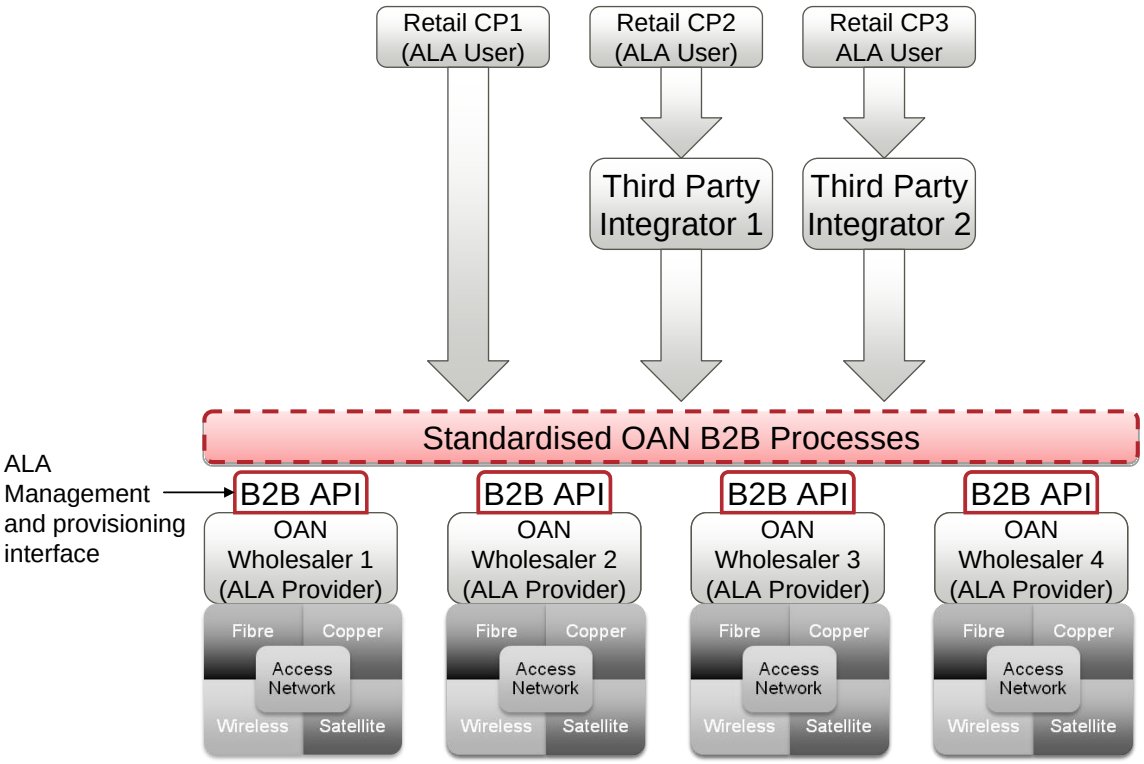

Figure 1 B2B OSS Architecture as it applies to ALA

The ALA management and provisioning interface provides a B2B API that is sufficient for provisioning and management of services over a network that implements ALA.

4.2 ALA Management interfaces and the ALA architecture

There are a number of interfaces that can be used to manage individual aspects of an ALA service. These are as follows.

- The ALA provisioning and management interface.

- The ALA NNI which supports Ethernet Service OAM.

- CPE management interfaces (for ALA User equipment deployed at their end customer premises).

These interfaces and how they relate to the ALA Architecture described in [2] are shown in the following diagram.

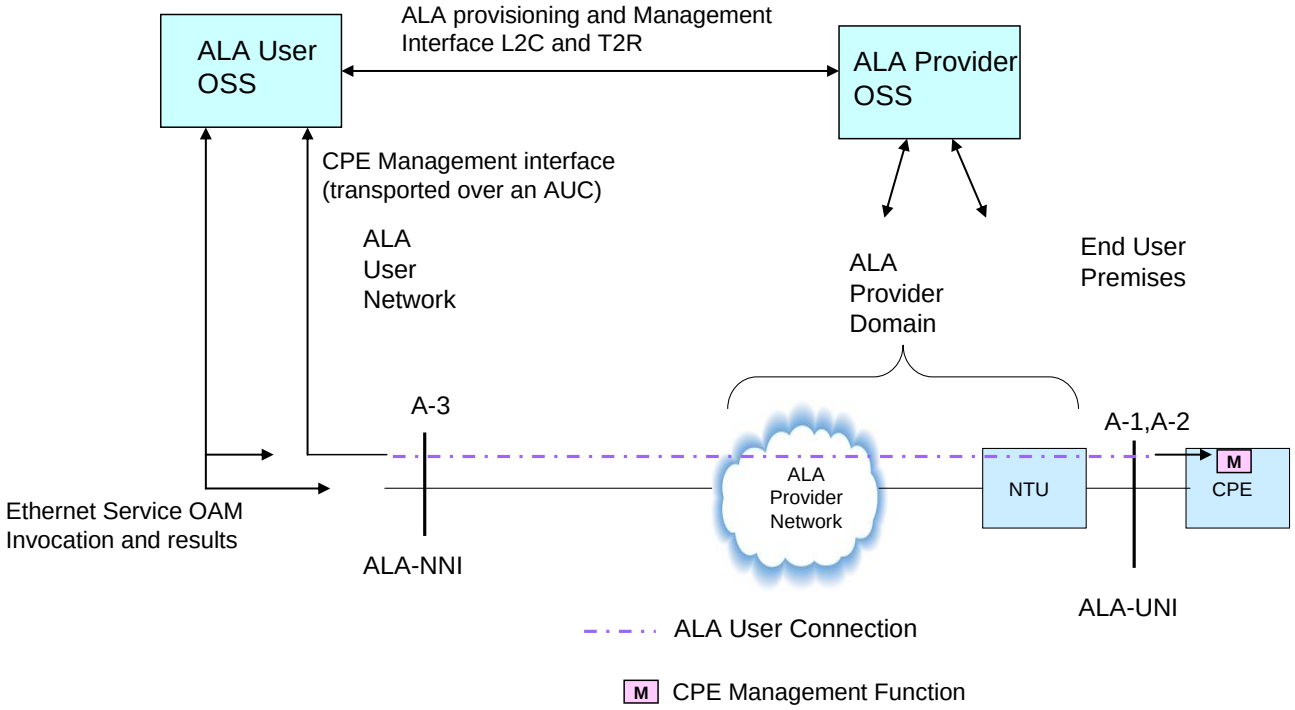

Figure 2 ALA Management Interfaces

The ALA provisioning and management interface is used for the provisioning, modification and ceasing of ALA services. It is also used for raising and resolving faults that are identified with a particular service that the ALA User has purchased from the ALA provider.

Ethernet Service OAM is used by the ALA User to verify that their service is operating correctly. As described in [1] ALA supports the following MEGs that can be utilised by the ALA User
.

- The ALA User MEG which supports Ethernet service OAM on a per ALA User Connection basis. This includes support for MIPs at the ALA UNI and the ALA NNI.

- The Extended User MEG which allows the ALA User to monitor the Frame Delay and Frame Loss performance of the AUC without deploying ALA User CPE.

- The UNI MEG allows the ALA User to verify the ALA UNI performance for a given end user premises.

- The NNI MEG allows the ALA User to verify the ALA NNI performance at a given interconnect point.

The Ethernet Service OAM functionality is not invoked via the ALA provisioning and management interface however it provides for a diagnostic tool that can be used indirectly to raise trouble reports over the ALA provisioning and management interface. In order to simplify the ALA B2B interface there is no requirement to configure the various Ethernet Service OAM maintenance entities because these are supported using a set of default configurations within the ALA standard. The ALA provider may choose to support none, some or all of these Service OAM features in each of their access products. The ALA product description templates provided in the annexes at the end of this document provide a mechanism for the ALA provider to publish their Service OAM configurations for each product.

CPE management as described in [2] is the responsibility of the ALA User and is not part of the ALA management and provisioning architecture. CPE management traffic is transported transparently by the ALA service.

4.3 ALA Management and ALA Backhaul Providers

The ALA architecture supports the concept of ALA Backhaul providers. An ALA Backhaul provider offers a service to transport one or more ALA AUCs from the ALA User network NNI to an ALA Provider network NNI. The ALA Backhaul provider will also have their own OSS that they use for service provisioning and trouble resolution of their ALA transport services.

In this case the ALA user must provision and manage services that run over the ALA Providers network and also over the ALA Backhaul Providers network. The ALA User implements the ALA provisioning and management interface to the ALA Provider and the ALA User also implements the ALA provisioning and management interface to the ALA Backhaul Provider.

The ALA User is responsible for the end to end configuration and trouble resolution of the service, dealing with the ALA Backhaul Provider and the ALA Provider as necessary. The ALA User is responsible for ensuring each side of the interface between the ALA Backhaul Provider and the ALA Provider is correctly configured to support the service.

The ALA Provider and the ALA Backhaul Provider do not require an OSS interface since neither entity is ordering service from the other. The ALA Provider and the ALA Backhaul Provider may however have an OSS interface to support basic NNI functions and to assist in the operation of their networks. Such an interface is beyond the scope of the ALA specifications.

The ALA Backhaul provider should implement sufficient Ethernet Service OAM functions (or an equivalent technology) to allow the verification of connectivity over their network and the ALA backhaul provider must not prevent the operation of ALA Ethernet Service OAM functions between the ALA User and the ALA Provider.

5 Example provisioning scenario

This section provides additional context to the ALA management architecture. It provides an example of how an ALA provider and an ALA user might use the ALA management interface to provision service and the types of actions that the management interface must support.

This provides a high level example of an ALA service provision which is described in greater detail in [8].

5.1 Example of service provision

This simple example shows how an order is placed using the ALA Lead to Cash (L2C) process.

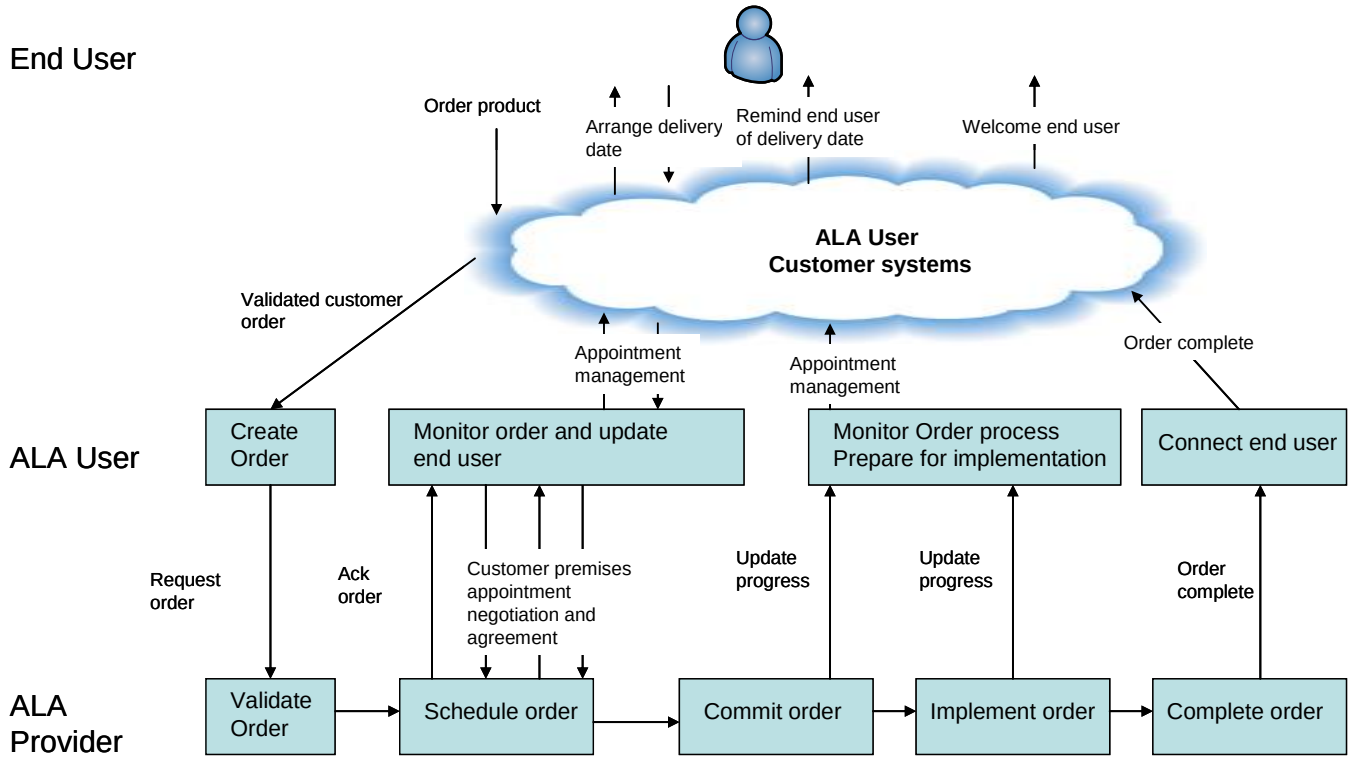

Figure 3 A high level service provisioning example

In this example (which is an abstraction of the ALA B2B order process) the following steps are performed.

1) The end user orders a retail product from the ALA User (for example a 100 Mbps broadband service bundle) using their existing retail customer systems.

2) The ALA user validates that the customer can pay for the service and that the service should be available in their area. Note it is possible that the ALA user might request information via the NICC management interface to determine the availability of the service in a given location, but for simplicity this is not shown in the example.

3) The ALA user having determined they believe the customer service to be valid places an order with the ALA provider to connect the customer to the network. This request includes a defined service profile (Request order). The ALA user is the buyer and the ALA provider

is the supplier in the ALA management architecture.

4) The ALA provider must first validate that the order can be fulfilled and having confirmed this acknowledges the order (Ack order). The ALA provider can now start the process of scheduling the actual implementation. This implementation might involve a physical fibre drop and customer visit, it might involve building an AUC over new and existing interfaces and it might require modification to an existing NNI. In this example it involves a customer premises visit to fulfil the order and so this has to be negotiated with the ALA user as part of scheduling.

5) The ALA user schedules an appointment with the end user and a date is agreed whereby the service can be delivered by the ALA provider and the end user. Once this date is confirmed the ALA provider commits the order.

6) Once the ALA provider is ready to implement the order it updates the ALA user, who may wish to remind the end user of the appointment date to reduce the chances of missed appointments. Depending on how the service is delivered it may also be necessary for the ALA user to schedule their own staff to go to customer premises or to carry out configuration changes within their network.

7) Having received no instructions to the contrary the ALA Provider now moves to the implementation phase and the ALA user, the ALA provider and to a degree the end user will perform a set of actions to deliver the service. The ALA Provider may need to notify the ALA User of their progress in this phase.

8) Once the implementation has been completed the ALA Provider informs the ALA User that the order is completed (this may have commercial and payment implications) and the ALA User can connect the customer to their network and welcome them to their new working super fast broadband service

The purpose of the ALA management interface is to provide a machine to machine interface between the ALA user and the ALA provider that allows this process to be fully automated and hence scaled up to large numbers of end users. The points where the ALA User and ALA provider (buyer and supplier) systems interact are known as touchpoints.

It is possible that some platforms may offer a more manual process with the same supported methods using web interfaces or even emailed spreadsheets. These would typically used for ALA providers or ALA users with a small number of customers, however a given ALA User or ALA provider may choose not to offer this facility for operational reasons.

It should be noted that although [2], [3], [4] and [5] describe the ALA service, architecture and UNI/NNI in terms of an Ethernet transport service much of the ALA management interface is concerned with the fundamentals of provisioning a generic service and that the ALA specific aspects of this service are only a small, if important, part of this process. This is the reason that the ALA B2B interface inherits capabilities from the more general NICC B2B interface defined in [6] and [7]. It is important however to consider how any ALA specific products and services are structured and what this means for the overall provisioning process. This is described in the following section.

6 Product components within an ALA service offering

Any ALA service can be split into at least three components. These components are:

- The NNI product
- The Backhaul product
- The ALA product

These products are related as shown in the following diagram.

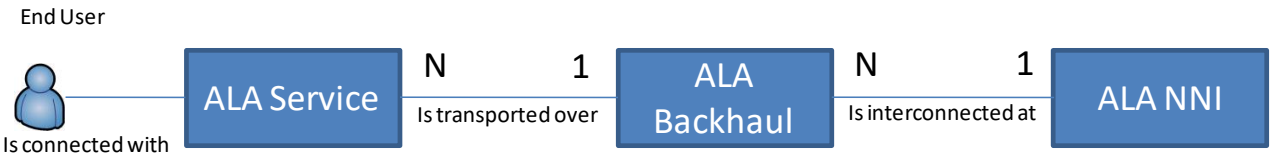

Figure 4 ALA Product relationships

6.1 Overview of an ALA NNI product

The ALA NNI product is purchased by the ALA User from the ALA provider in order to physically interconnect their own network to the ALA Providers network. The ALA NNI itself is defined by [5].

An ALA User may purchase one or more ALA NNI products from a given ALA provider depending on their interconnect requirements. Each ALA NNI can support many ALA backhaul services and many ALA services. It is possible to purchase resilient ALA NNI products in which case the same ALA NNI will be instantiated on two separate physical interfaces using Link Aggregation or Multi-Chassis Link Aggregation.

6.2 Overview of an ALA backhaul product

While backhaul may be provided by a separate ALA backhaul provider (which is outside the scope of the ALA standards) it is also possible that an ALA provider may need to offer backhaul services to the ALA users.

The ALA User purchases the backhaul product to connect a number of ALA services from a specific ALA Aggregation End Point within the ALA providers network to a specific NNI. Once a backhaul product has been purchased (with a defined bandwidth, QoS classes and end points) the ALA user can assign individual ALA services to that backhaul. The ALA user can mix and match the allocation of ALA services to backhaul products and can chose to contend the backhaul product as required. In the case of class C services (which are best effort) this is likely to be a simple matter of contention, in the case of class A and class B services then the ALA user may contend these services by over-booking and the use of Connection Admission Control to limit the number of simultaneous sessions that can be accepted. This is particularly true of VoIP services and real time Video On Demand (VOD) services.

The relationship between ALA services and the ALA backhaul product is shown in the following diagram.

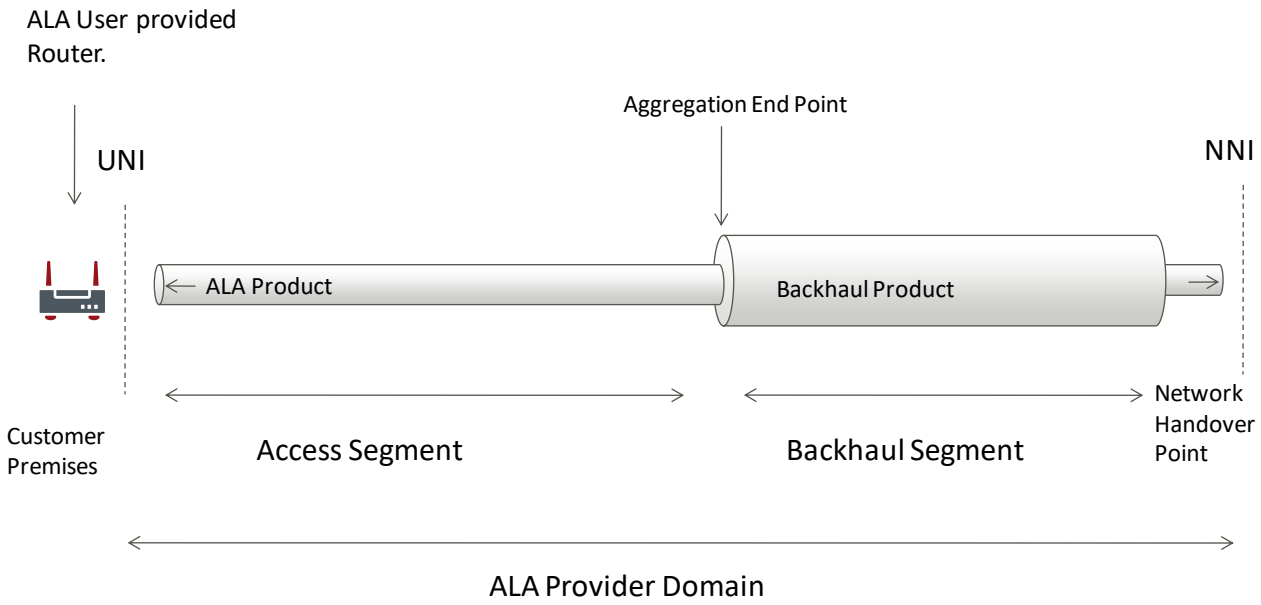

Figure 5 The ALA Backhaul product within the ALA architectrue

The decision as to the number and location of ALA Aggregation end points is a matter for the ALA provider. However it should be noted that contending ALA services into a backhaul service may require per service flow policing and shaping and as such will require a more capable network element than a low cost Ethernet switch. Since these products will by their nature command a cost premium the ALA provider is likely to minimize the number of ALA aggregation points they support. The typical reasons that would require a given node in an ALA providers network to be an ALA aggregation point are as follows:

- Where significant routing choices have to be made within the access network.
- Where a large number of services require aggregation into multiple 10 Gbps links.
- Where there is a bottle neck in transport bandwidth because the ALA provider is leasing a backhaul service from a third party.
- Where the additional costs imposed by the UK Fibre Tax means it is necessary to aggregate multiple high bandwidth services onto a single (or smaller number of) link(s).

At the access network, at least for FTTP, and to a more limited extent for FTTC, backhaul fibre and bandwidth will be plentiful where the ALA provider owns their own fibre infrastructure. In this case it makes more sense for the ALA provider to run the links relatively lightly contended and use simple class based queueing to keep infrastructure costs down.

This means that a large number of access nodes are likely to fan into a smaller number of aggregation nodes (where aggregation end points are located) and these in turn will send traffic to a smaller number of NNIs. This is shown in the following diagram.

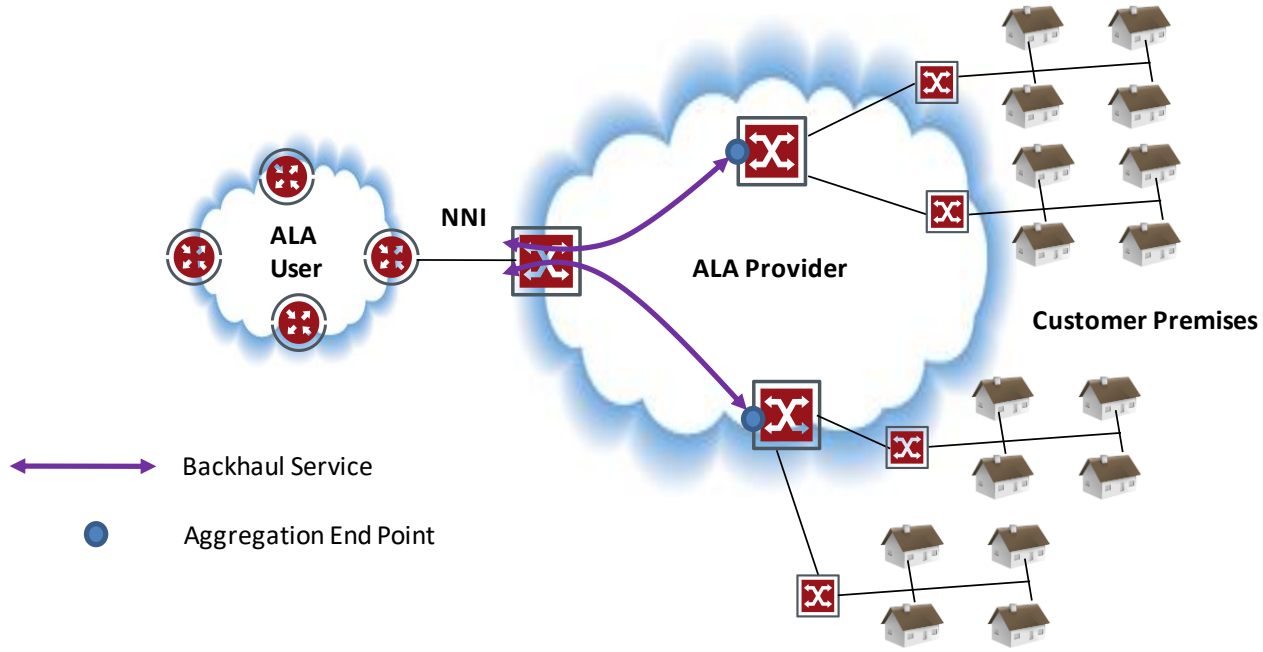

Figure 6 ALA Aggregation End Points within an ALA provider network

The ALA provider must publish information as to the location of the aggregation nodes in their network and the subscriber locations that each one supports. This will allow the ALA user's network planners to plan and build their backhaul network by purchasing the required number of ALA backhaul products.

Where a resilient NNI is provided the ALA backhaul service will also provide resilience, terminating on the logical protected NNI which is itself supported by two physical NNIs.

7. Provisioning ALA products using the NICC ALA Management interface

The ALA management interface defines a set of B2B processes that can be used to build ALA services. As previously discussed much of this is related to the business processes needed to support broadband services (for example arranging appointments and surveys). Part of this provisioning process is related specifically to building the ALA service to the end user and its supporting NNI and backhaul products.

The ALA service is defined in [3], the ALA UNI in [4] and the ALA NNI in [5]. The service, the UNI and the NNI have a large number of attributes that must be defined as part of any ALA offering. However only a small amount of this information needs to be provisioned dynamically while the remainder is statically defined as part of the ALA product definition.

The ALA management architecture defines the set of dynamic data associated with an ALA service and its supporting products and it provides an ALA product description template that when completed for a given service offering unambiguously describes the service that is being offered by the ALA provider.

Any ALA service can be fully defined by the combination of a completed ALA product description template and the dynamic commands used over the automated B2B interface (or a manual fallback option) used at provisioning time.

The following sections outline the dynamic information that is provided when an ALA NNI, an ALA backhaul service and an ALA service is built. Annex A provides a product description template for an ALA NNI, Annex B provides a template for a backhaul service and Annex C provides a template for an ALA service.

7.1 ALA NNI service build parameters

The following high level service build shows how an ALA NNI service is created.

Command:	Build ALA NNI
Parameters:	Product Name = string
	NNI Location = NNI location key
Response:	Success
Parameters:	NNI Identifier = NNI Location identifier, e.g. NodeId.ChassisId.slotId.InterfaceId

Notes:

1) The product name is an identifier provided by the ALA provider that uniquely identifies the chosen NNI product. Each NNI product will have a product description template that describes it.

2) The NNI location key uniquely identifies the location of the NNI. It is likely to map to a node location from a list of available interconnects.

3) The NNI identifier is returned by the ALA provider and contains sufficient information to unambiguously identify the physical interface that supports the NNI e.g. NodeId.ChassisId.slotId.InterfaceId.

4) Before service can be provided a physical provisioning of the NNI will have to take place.

5) The ALA B2B L2C interface does not currently automate the provisioning of the NNI because it is a process that is executed relatively infrequently. This process will be performed using an alternative method (e.g. email, spreadsheets or web portal).

7.2 ALA Backhaul service build parameters

When building a backhaul service the ALA User selects an Aggregation Node from a published list provided by the ALA provider and one of their already purchased NNIs. The mapping between a given UNI and an Aggregation node must also be provided by the ALA provider.

The following high level service build shows the command to create the backhaul service.

Pre-Condition:	An NNI has been purchased by the ALA User.
Command:	Build ALA AUC Aggregate
Parameters:	Product Name = string
	Aggregation End Point = Aggregation Node Location key
	NNI Identifier = NNI Location identifier
Response:	Success
Parameters:	NNI S-VLAN id = VLAN id
	NNI AUC Group Identifier = AUC Group Identifier

Notes:

1) The product name is an identifier provided by the ALA provider that uniquely identifies the chosen product from which the backhaul is being built. Each backhaul product will have a product description template that describes it.

2) The NNI AUC Group identifier is sufficient to identify both ends of the AUC Group. However only the ALA provider needs to understand the interface and sub-interface characteristics at the Aggregation Node.

3) The ALA B2B L2C interface does not currently automate the provisioning of the backhaul because it is a process that is executed relatively infrequently. This process will be performed using an alternative method (e.g. email, spreadsheets or web portal).

7.3 ALA service build example parameters

The ALA service build process may vary depending on an individual operators service design and the XML has therefore been defined in a flexible way. The following sections show examples of how an ALA service (of various flavours) can be built.

For all of these services the pre-condition is that the NNI and backhaul service has already been provisioned as described in sections 7.1 and 7.2

These examples only include the ALA service build parameters, the L2C order process is described in [8] and [9].

7.3.1 Example point to point service for an S-tagged UNI

The following high level service build shows the command to connect a single subscriber to the ISPs network using an ALA point to point AUC. This example assumes that the service is an S-tagged UNI.

The ALA service build parameters are contained within the Order Request message sent between the ALA User and the ALA Provider and the response is provided in the Keep Customer Informed (Order Complete) message that is sent from the ALA Provider to the ALA User

ALA Parameters sent within the Order Request (See [3] for details on the parameters):

Service Build Parameter	Notes
Product Name	The product name is used to identify the service being provisioned.
UNI identifier	This is the physical point of attachment to the network as far as it is known by the ALA provider. It may fully or partially identify the UNI depending on the deployment model. For example for a wires only service it identifies the physical interface. For a active NTE model it may define the NTE that the device is to be attached to but not necessarily the port (since this might be allocated by the ALA Provider).
UNI VLAN-ID	Required for an S-VLAN service, although the product may have a default VLAN id specified for it which can be used if this is omitted.
Untagged S-VLAN	
UNI AUC Group Identifier	See point 4 below.
PPPoE Intermediate Agent	
L2DHCP Relay Agent	
AUC Remote ID	
NNI Identifier	This will define the physical location at the NNI that the ALA User will connect their network to.
NNI AUC Group Identifier	This defines the AUC group that will be used to backhaul the service to the NNI. The NNI AUC Group Id also implicitly determines the Aggregation End Point.

The ALA parameters sent from the ALA Provider to the ALA User within the order complete message are as follows.

Service Build Parameter	Notes
AUC UNI End Point	Uniquely identifies the point of attachment and the service at the UNI. If the ALA provider allocated a port on their NTE for the service (i.e. the UNI was not fully specified in the original service build by the ALA User) this parameter can be used to inform the ALA User of the port that was allocated.
UNI AUC Group Identifier	If this was not specified on the service build by the ALA User then this will have been allocated by the ALA provider. This can

	be used if future if the ALA User wishes to provision another service that shares bandwidth at the UNI with the service.
AUC Circuit Id	
NNI S-VLAN-ID	The S-VLAN that the service has been allocated at the NNI.
NNI C-VLAN-ID	The C-VLAN if any that the service has been allocated at the NNI by the ALA provider.
AUC NNI End Point	Uniquely identifies the point of attachment and the service at the NNI.

The end result of this service build is that an AUC has been built from the UNI at the customer premises to the NNI at the ALA User interconnect point. The AUC will use a previously built backhaul service which it will share with other AUCs as determined by the ALA Users provisioning policy.

Notes:

1) The product name is an identifier provided by the ALA provider that uniquely identifies the chosen product that is being used to build the ALA service. Each ALA product will have a product description template that describes it.

2) The subscriber location key is unique to a given premises and provides sufficient information to permit the ALA Provider to determine exactly which UNI can be used to serve the premises.

3) It is expected that ALA Users will want to use the same VLAN value at each UNI for volume residential services to make the CPE provisioning and management more straightforward. If more than one ALA user serves a given premises from a UNI then this may require co-ordination between ALA Users. Note if a default VLAN is defined in the product definition then the VLAN is not specified in the service build. All services built using the product will have the same S-VLAN.

4) The UNI AUC Group Identifier need not be specified by the ALA User if they serve the premises with a single AUC. If the ALA User were to purchase a second AUC to the customer premises then they would have the option to re-use the pre-existing AUC Group (in which case sharing bandwidth between the two services) or they would create a new AUC group in which case they would not share bandwidth. For VDSL services the total bandwidth available at the UNI may be a limiting factor. The most typical use of an AUC Group Id would be where a multicast service provided by a Multicast AUC was required to share bandwidth with the unicast service provided by a point to point AUC.

7.3.2 Example point to point service for a port based UNI.

The port based UNI is a simpler service build because the port is used as the service discriminator rather than the VLANs at the UNI.

ALA Parameters sent within the Order Request (See [3] for details on the parameters):

Service Build Parameter	Notes
Product Name	The product name is used to identify the service being provisioned.
UNI identifier	This is the physical point of attachment to the network as far as it is known by the ALA provider. It may fully or partially identify

	the UNI depending on the deployment model. For example for a wires only service it identifies the physical interface. For an active NTE model it may define the NTE that the device is to be attached to but not necessarily the port (since this might be allocated by the ALA Provider).
PPPoE Intermediate Agent	
L2DHCP Relay Agent	
AUC Remote ID	
NNI Identifier	This will define the physical location at the NNI that the ALA User will connect their network to.
NNI AUC Group Identifier	This defines the AUC group that will be used to backhaul the service to the NNI. The NNI AUC Group Id also implicitly determines the Aggregation End Point.

Since a port based UNI can support only one service the UNI AUC Group Identifier will not be specified by the ALA User at provisioning time.

The ALA parameters sent from the ALA Provider to the ALA User within the order complete message are as follows.

Service Build Parameter	Notes
AUC UNI End Point	Uniquely identifies the point of attachment and the service at the UNI. If the ALA provider allocated a port on their NTE for the service (i.e. the UNI was not fully specified in the original service build by the ALA User) this parameter can be used to inform the ALA User of the port that was allocated.
UNI AUC Group Identifier	The AUC Group Identifier will be generated by the ALA Provider
AUC Circuit Id	
NNI S-VLAN-ID	The S-VLAN that the service has been allocated at the NNI.
NNI C-VLAN-ID	The C-VLAN if any that the service has been allocated at the NNI by the ALA provider.
AUC NNI End Point	Uniquely identifies the point of attachment and the service at the NNI.

7.3.3 Example multicast AUC service build

A multicast service provides a multicast AUC that enters the ALA provider's network at a single NNI but may provide content to multiple end users via multiple ALA UNIs. The end users use a conditional forwarding mechanism (IGMPv3) to obtain service from the multicast AUC.

The reality of provisioning a multicast AUC is that the ALA user must provision the service at the NNI and reserve bandwidth for the service at the NNI. They must also provision the ALA multicast AUC at each UNI where customers require it. The ALA providers network is responsible for providing the multicast connectivity for the AUC between the NNI and the various UNIs.

For a multicast AUC therefore the NNI is provisioned only once but the UNI must be provisioned every time a customer is connected that requires access to the service. For this reason there is no requirement to automate the multicast AUC provisioning at the NNI and this can assumed to be pre-provisioned via some other mechanism.

Therefore the automated B2B interface can assume that:

- The NNI related components of the multicast AUC exist and have been pre-provisioned by the ALA provider according to the instructions of the ALA User. The multicast service can be identified by the NNI AUC Group Identifier associated with it.

- The B2B interface must permit the configuration of the multicast UNI for a given multicast AUC.

- The product name will identify the service as a multicast service.

These assumptions mean that following ALA service build parameters are used.
ALA Parameters sent within the Order Request (See [3] for details on the parameters):

Service Build Parameter	Notes
Product Name	The product name is used to identify the service being provisioned. This identifies the service as a multicast AUC.
UNI identifier	This is the physical point of attachment to the network as far as it is known by the ALA provider. It may fully or partially identify the UNI depending on the deployment model. For example for a wires only service it identifies the physical interface. For a active NTE model it may define the NTE that the device is to be attached to but not necessarily the port (since this might be allocated by the ALA Provider).
UNI VLAN-ID	The S-VLAN to be used for the multicast AUC. Note this could be the untagged S-VLAN.
Untagged S-VLAN	This parameter may be required if no AUC has previously been defined for the UNI and the multicast VLAN is intending to use the untagged S-VLAN.
UNI AUC Group Identifier	The ALA User will specify the UNI AUC Group Identifier that the multicast AUC can share bandwidth with over the UNI. Typically in a triple play service this will be the point to point AUC that has been provisioned on the UNI.
NNI AUC Group Identifier	The NNI AUC Group Identifier implicitly identifies the multicast service that the UNI is connecting to.

Parameters related to services such as PPPoE Intermediate Agent and L2 DHCP Relay are not valid for a multicast AUC as the only upstream traffic permitted is IGMP.
The ALA parameters sent from the ALA Provider to the ALA User within the order complete message are as follows:

Service Build Parameter	Notes
AUC UNI End Point	Uniquely identifies the point of attachment and the service at the UNI.

7.3.4 ALA Service build for a customer edge port UNI

A customer edge port service will have an point to point AUC, which is untagged and it may have a multicast AUC which is tagged at the UNI. The ALA service build for a point to point AUC are as follows.

ALA Parameters sent within the Order Request (See [3] for details on the parameters):

Service Build Parameter	Notes
Product Name	The product name is used to identify the service being provisioned.
UNI identifier	This is the physical point of attachment to the network as far as it is known by the ALA provider. It may fully or partially identify the UNI depending on the deployment model. For example for a wires only service it identifies the physical interface. For a active NTE model it may define the NTE that the device is to be attached to but not necessarily the port (since this might be allocated by the ALA Provider).
UNI AUC Group Identifier	
PPPoE Intermediate Agent	
L2DHCP Relay Agent	
AUC Remote ID	
NNI Identifier	This will define the physical location at the NNI that the ALA User will connect their network to.
NNI AUC Group Identifier	This defines the AUC group that will be used to backhaul the service to the NNI. The NNI AUC Group Id also implicitly determines the Aggregation End Point.

The ALA parameters sent from the ALA Provider to the ALA User within the order complete message are as follows:

Service Build Parameter	Notes
AUC UNI End Point	Uniquely identifies the point of attachment and the service at the UNI. If the ALA provider allocated a port on their NTE for the service (i.e. the UNI was not fully specified in the original service build by the ALA User) this parameter can be used to inform the ALA User of the port that was allocated.
UNI AUC Group Identifier	If this was not specified on the service build by the ALA User then this will have been allocated by the ALA provider. This can be used if future if the ALA User wishes to provision another service that shares bandwidth at the UNI with the service.
AUC Circuit Id	
NNI S-VLAN-ID	The S-VLAN that the service has been allocated at the NNI.
NNI C-VLAN-ID	The C-VLAN if any that the service has been allocated at the NNI by the ALA provider.
AUC NNI End Point	Uniquely identifies the point of attachment and the service at the NNI.

Although these parameters are the same as for a port based UNI a customer edge port UNI can support a separate multicast AUC which would be built as per 7.3.3, typically sharing the UNI AUC Group Identifier with the point to point AUC.

7.4 An example XML fragment showing ALA Service Build

This section contains an example XML extract showing an ALA service build for a new installation. This example is for a point to point AUC built on an S-tagged UNI. It is assumed that the NNI and the backhaul service has already been provisioned.

This is example XML which was correct at the time of publication of this document, but may subsequently have been updated. For the current XML definition please refer to [9].

7.4.1 Example Order Request

```
<orderRequest xmlns="http://www.niccstandards.org.uk/ala_1.0.xsd"
xmlns:sp="dummy">

  <message>
    <messageId>b68b2cf4-475e-11e1-a92e-fb2ff6467c99</messageId>
    <correlationId>bac72cfa-475e-11e1-a92e-fb2ff6467c99</correlationId>
    <sentAt>2012-01-20T18:30:43Z</sentAt>
  </message>

  <orderReferences>
    <buyerOrderReference>234567</buyerOrderReference>
  </orderReferences>

  <buyer>
    <buyerIdentifier>1234567890</buyerIdentifier>
  </buyer>

  <buyerContactDetails>
    <email>buyer@example.com</email>
    <telephoneNumber>+12345678987654</telephoneNumber>
  </buyerContactDetails>

  <seller>
    <sellerIdentifier>1234567890</sellerIdentifier>
  </seller>

  <alaNewInstall>

    <location>
      <addressKey>1234567</addressKey>
    </location>

    <site>
      <accessRestrictions>
      </accessRestrictions>
      <hazards>
      </hazards>
      <onSiteContactDetails>
        <primaryContact>
          <email>bob@bob.com</email>
          <telephoneNumber>+12345678987654</telephoneNumber>
        </primaryContact>
        <additionalContacts>
          <additionalContact>
            <email>bob@bob.com</email>
            <telephoneNumber>+12345678987654</telephoneNumber>
          </additionalContact>
        </additionalContacts>
```

```
      </onSiteContactDetails>
    </site>

    <appointment>
      <appointmentReservationKey>1234567</appointmentReservationKey>
    </appointment>

    <!-- or required by date -->

    <costAuthorisation>
      <constructionCostAuthorisation>0</constructionCostAuthorisation>
      <timeCostAuthorisation>200</timeCostAuthorisation>
    </costAuthorisation>

    <serviceItem>
      <product>
       <productName>NetCo 100Mbps Symmetric Broadband</productName>
      </product>
      <alaServiceConfiguration>
        <uniVlanId>20</uniVlanId>
        <untaggedSVlanId>20</untaggedSVlanId>
        <uniAucGroupIdentifier>Default</uniAucGroupIdentifier>
        <pppoeIntermediateAgent><disabled/></pppoeIntermediateAgent>
        <l2DhcpRelayAgent><disabled/></l2DhcpRelayAgent>
        <aucRemoteId>4758903948</aucRemoteId>
        <nniIdentifier>4758903948</nniIdentifier>
        <nniAucGroupIdentifier>NetCoNode47Service80</nniAucGroupIdentifier>
      </alaServiceConfiguration>
      <auxiliaryServices>
        <auxiliaryService>
          <auxiliaryServiceName>Home Install</auxiliaryServiceName>
        </auxiliaryService>
      </auxiliaryServices>
    </serviceItem>

  </alaNewInstall>

  <notes></notes>

</orderRequest>
```

7.4.2 Example Order Completed.

The response to the service build is received in a number of messages as the order progresses. The final message notify order completed confirms to the ALA User that the ALA provider has fulfilled the order and contains the set of ALA service build parameters that are provided by the ALA provider. This message is shown below.

```
<notifyOfOrderStatus xmlns="http://www.niccstandards.org.uk/ala_1.0.xsd">

  <message>
    <messageId>b68b2cf4-475e-11e1-a92e-fb2ff6467c99</messageId>
    <correlationId>bac72cfa-475e-11e1-a92e-fb2ff6467c99</correlationId>
    <sentAt>2012-01-20T18:30:43Z</sentAt>
  </message>

  <buyer>
    <buyerIdentifier>1234567890</buyerIdentifier>
  </buyer>

  <seller>
```

```
  <sellerIdentifier>1234567890</sellerIdentifier>
</seller>

<orderReferences>
  <buyerOrderReference>1234567</buyerOrderReference>
  <sellerOrderReference>1234567</sellerOrderReference>
</orderReferences>

<issuedAt>2012-01-20T18:30:43Z</issuedAt>
<sequenceNumber>6</sequenceNumber>

<alaOrderCompleted>

  <location>
    <britishAddress>
      <buildingName>490 Example Cottage</buildingName>
      <thoroughfareName>High St</thoroughfareName>
      <dependentLocality>Market Deeping</dependentLocality>
      <postTown>Peterborough</postTown>
      <postcode>PE6 8ED</postcode>
    </britishAddress>
    <addressKey>1234567</addressKey>
  </location>

  <serviceIdentifier>2345432345345</serviceIdentifier>

  <serviceItem>
    <product>
     <productName>NetCo 100Mbps Symmetric Broadband</productName>
    </product>
    <alaServiceConfiguration>
      <uniVlanId>20</uniVlanId>
      <untaggedSVlanId>20</untaggedSVlanId>
      <uniAucGroupIdentifier>Default</uniAucGroupIdentifier>
      <pppoeIntermediateAgent><disabled/></pppoeIntermediateAgent>
      <l2DhcpRelayAgent><disabled/></l2DhcpRelayAgent>
      <aucRemoteId>4758903948</aucRemoteId>
      <nniIdentifier>4758903948</nniIdentifier>
      <nniAucGroupIdentifier>NetCoNode47Service80</nniAucGroupIdentifier>
      <uniAucEndPointIdentifier>4758903948</uniAucEndPointIdentifier>
      <aucCircuitId>234322</aucCircuitId>
      <nniSVlanId>20</nniSVlanId>
      <nniCVlandId>20</nniCVlandId>
      <aucNniEndPoint>243433333323</aucNniEndPoint>
    </alaServiceConfiguration>
    <auxiliaryServices>
      <auxiliaryService>
        <auxiliaryServiceName>Home Install</auxiliaryServiceName>
      </auxiliaryService>
    </auxiliaryServices>
  </serviceItem>

  <completedDate>2012-01-20T18:30:43Z</completedDate>

</alaOrderCompleted>

<slaClock>
  <slaClockStatus><stopped/></slaClockStatus>
  <slaClockTime>P15DT24M</slaClockTime>
</slaClock>

<notes></notes>
```

```
</notifyOfOrderStatus>
```

Annex A ALA NNI product description template

The following terminology is used in the required column of this template

O - Optional. This feature may be supported by the product. The value column should be filled in to indicate if it is supported.

M – Mandatory. This feature is required to be supported by the product and the value must be filled in accordingly. Where the value column contains options that are not mutually exclusive multiple options may be selected.

Attribute Number:M (e.g. 2.1:M). If the option referred to in the attribute number was selected then this feature is mandatory and the value must be filled in accordingly. Otherwise this feature in not applicable.

All references in the clause column are to ND1030 unless explicitly stated otherwise.

A.1 Service identifiers

No.	Attribute	Description	Value	Required	Clause
1.1	Product Name	Name used by the ALA provider for the NNI product.		M	N/A

A.2 NNI Properties

No.	Attribute	Description	Value	Required	Clause
2.1	Physical Interface	The physical presentations offered at the NNI	[ ] 1000Base-LX [ ] 10GBase-SR [ ] 10GBase-LR [ ] 10GBase-ER	M	ND1036 :2.1
2.2	NNI TPID	TPID of S-VLAN tags at the NNI	[ ] 0x8100 [ ] 0x88a8	M	5.3.2.4
2.3	AUCs Supported	The number of AUCs this NNI can support	Integer value	M	5.3.5
2.4	NNI MEG exists	A Boolean value indicating whether the NNI MEG has been configured	[ ] Yes [ ] No	M	5.9.5.1

Annex B ALA Backhaul product description template

An ALA backhaul product is used to backhaul a set of ALA AUCs between a point in the ALA Providers access network and the chosen NNI. All services that share the same ALA backhaul will have the same S-tag at the NNI on which it terminates.

The ALA provider will publish the locations within their access network where backhaul is provided. This is defined in ALA as the Aggregation End Point.

The following terminology is used in the required column of this template:

O - Optional. This feature may be supported by the product. The value column should be filled in to indicate if it is supported.

M – Mandatory. This feature is required to be supported by the product and the value must be filled in accordingly. Where the value column contains options that are not mutually exclusive multiple options may be selected.

Attribute Number:M (e.g. 2.1:M). If the option referred to in the attribute number was selected then this feature is mandatory and the value must be filled in accordingly. Otherwise this feature in not applicable.

All references are to ND1030 unless explicitly stated otherwise.

B.1 Service Identifiers

No.	Attribute	Description	Value	Required	Clause
1.1	Product Name	Name used by the ALA provider for the product.	String	M	N/A

B.2 AUC Group Bandwidth Profile at the NNI

The backhaul product is defined as an AUC group at the NNI. This defines the aggregate bandwidth available to all AUCs that share a particular backhaul service and terminate at the NNI.

No.	Attribute	Description	Value	Required	Clause
2.1	CoS Class A	Class of Service Class A supported	[ ] Yes and complete 2.2 to 2.5 [ ] No and move to 2.6	O	5.4.4.1
2.2	Class A Ingress CIR	Committed Information Rate (bps)	Integer	2.1:M	5.4.4.9
2.3	Class A Ingress CBS	Committed Burst Size (bytes)	Integer	2.1:M	5.4.4.9
2.4	Class A Egress CIR	Committed Information Rate (bps)	Integer	2.1:M	5.4.4.9
2.5	Class A Egress CBS	Committed Burst Size (bytes)	Integer	2.1:M	5.4.4.9
2.6	CoS Class B	Class of Service Class B supported	[ ] Yes and complete 2.7 to 2.10 [ ] No and move to 2.11	O	5.4.4.1
2.7	Class B Ingress CIR	Committed Information Rate (bps)	Integer	2.6:M	5.4.4.9
2.8	Class B Ingress CBS	Committed Burst Size (bytes)	Integer	2.6:M	5.4.4.9
2.9	Class B Egress CIR	Committed Information Rate (bps)	Integer	2.6:M	5.4.4.9
2.10	Class B Egress CBS	Committed Burst Size (bytes)	Integer	2.6:M	5.4.4.9
2.11	CoS Class C	Class of Service Class C supported	[ ] Yes and complete 2.12 to 2.20 [ ] No and move to end	O	5.4.4.1
2.12	Class C Ingress CIR	Committed Information Rate (bps)	Integer	2.11:M	5.4.4.9
2.13	Class C Ingress CBS	Committed Burst Size (bytes)	Integer	2.11:M	5.4.4.9
2.14	Class C Ingress EIR	Excess Information Rate (bps)	Integer	2.11:M	5.4.4.9
2.15	Class C Ingress EBS	Excess Burst Size (bytes)	Integer	2.11:M	5.4.4.9
2.16	Class C Egress CIR	Committed Information Rate (bps)	Integer	2.11:M	5.4.4.9
2.17	Class C Egress CBS	Committed Burst Size (bytes)	Integer	2.11:M	5.4.4.9
2.18	Class C Egress EIR	Excess Information Rate (bps)	Integer	2.11:M	5.4.4.9
2.19	Class C Egress EBS	Excess Burst Size (bytes)	Integer	2.11:M	5.4.4.9
2.20	CM	Color Mode	[ ] Color Blind [ ] Color Aware	2.11:M	5.4.4.7

Annex C ALA Product description template

This template is provided to allow open access network providers offering services over ALA to describe the service in a consistent manner. The tables in this annex must be completed for each service that is defined by the ALA provider.

The following terminology is used in the required column of this template:

O - Optional. This feature may be supported by the product. The value column should be filled in to indicate if it is supported.

M – Mandatory. This feature is required to be supported by the product and the value must be filled in accordingly. Where the value column contains options that are not mutually exclusive multiple options may be selected.

Attribute Number:M (e.g. 2.1:M). If the option referred to in the attribute number was selected then this feature is mandatory and the value must be filled in accordingly. Otherwise this feature in not applicable.

All references are to ND1030 unless explicitly stated otherwise.

C.1 Service identifiers

No.	Attribute	Description	Value	Required	Clause
1.1	Product Name	Name used by the ALA provider for the product.		M	N/A

C.2 ALA VLAN Model

No.	Attribute	Description	Value	Required	Clause
2.1	1:1 VLAN support	Does the service support 1:1 VLANs	[ ] Yes and set 2.2 to No. [ ] No and set 2.2 to Yes.	M	ND1644 7.1
2.2	N:1 VLAN support	Does the service support N:1 VLANs	[ ] Yes [ ] No	M	ND1644 7.2

C.3 UNI Configuration

No.	Attribute	Description	Value	Required	Clause
3.1	Presentation	Is the service delivery provided via an ALA provider owned active NTE or is it a wires only service	[ ] Active NTE [ ] Wires only	M	ND1644 6.1, 6.2
3.2	Physical interface	The Physical interface over which the service is presented to the customer at the UNI.	[ ] 10/100/1000 Base-T [ ] VDSL2 [ ] ADSL2+ [ ] 100 Base BX10 [ ] 1000 Base BX10	M	
3.2	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)	[ ] S-tagged [ ] Port Based [ ] Customer Edge Port	M	5.2.2
3.3	UNI TPID	TPID of VLAN tags at the UNI	[ ] 0x8100 [ ] 0x88a8	M	5.2.3.1
3.4	UNI MEG exists	Indicates whether the UNI MEG has been configured for this service	[ ] Yes [ ] No	M	5.9.4.1
3.5	Default point to point AUC VLAN	Indicates whether the product specifies a default VLANid for the point to point AUC at the UNI	[ ] Yes and complete 3.6 [ ] No and move to 3.7	M	
3.6	Default point to point AUC VLAN id	Defines the default VLAN id that will be used for the product at the UNI if not specified in the service build	Integer[1]	3.5:M	
3.7	Default multicast AUC VLAN	Indicates whether the product specifies a default VLANid for the multicast AUC at the UNI	[ ] Yes and complete 3.8 [ ] No and move to end	M	
3.8	Default multicast AUC VLAN id	Defines the default VLAN id that will be used for the multicast VLAN at the UNI if not specified in the service build	Integer[2]	3.7:M	

[1] Must be a valid VLAN number, the ALA provider may restrict the range of VLAN ids they offer as default values for the point to point AUC at the UNI.

[2] Must be a valid VLAN number, the ALA provider may restrict the range of VLAN ids they offer as default values for the multicast AUC at the UNI.

C.4 NNI Configuration

No.	Attribute	Description	Value	Required	Clause
4.1	NNI tags	Whether the NNI requires one or two VLAN tags to identify the service	[ ] Single tag [ ] Double tag	M	5.3.4.1 5.3.4.2

C.5 AUC Group Bandwidth Profile at the UNI

No.	Attribute	Description	Value	Required	Clause
5.1	CoS Class A	Class of Service Class A supported	[ ] Yes and complete 5.2 to 5.5 [ ] No and move to 5.6	O	5.4.4.1
5.2	Class A Ingress CIR	Committed Information Rate (bps)	Integer	5.1:M	5.4.4.9
5.3	Class A Ingress CBS	Committed Burst Size (bytes)	Integer	5.1:M	5.4.4.9
5.4	Class A Egress CIR	Committed Information Rate (bps)	Integer	5.1:M	5.4.4.9
5.5	Class A Egress CBS	Committed Burst Size (bytes)	Integer	5.1:M	5.4.4.9
5.6	CoS Class B	Class of Service Class B supported	[ ] Yes and complete 5.7 to 5.10 [ ] No and move to 5.11	O	5.4.4.1
5.7	Class B Ingress CIR	Committed Information Rate (bps)	Integer	5.6:M	5.4.4.9
5.8	Class B Ingress CBS	Committed Burst Size (bytes)	Integer	5.6:M	5.4.4.9
5.9	Class B Egress CIR	Committed Information Rate (bps)	Integer	5.6:M	5.4.4.9
5.10	Class B Egress CBS	Committed Burst Size (bytes)	Integer	5.6:M	5.4.4.9
5.11	CoS Class C	Class of Service Class C supported	[ ] Yes and complete 5.12 to 5.20 [ ] No and move to end	O	5.4.4.1
5.12	Class C Ingress CIR	Committed Information Rate (bps)	Integer	5.11:M	5.4.4.9
5.13	Class C Ingress CBS	Committed Burst Size (bytes)	Integer	5.11:M	5.4.4.9
5.14	Class C Ingress EIR	Excess Information Rate (bps)	Integer	5.11:M	5.4.4.9
5.15	Class C Ingress EBS	Excess Burst Size (bytes)	Integer	5.11:M	5.4.4.9
5.16	Class C Egress CIR	Committed Information Rate (bps)	Integer	5.11:M	5.4.4.9
5.17	Class C Egress CBS	Committed Burst Size (bytes)	Integer	5.11:M	5.4.4.9
5.18	Class C Egress EIR	Excess Information Rate (bps)	Integer	5.11:M	5.4.4.9

5.19	Class C Egress EBS	Excess Burst Size (bytes)	Integer	5.11:M	5.4.4.9
5.20	CM	Color Mode	[ ] Color Blind [ ] Color Aware	5.11:M	5.4.4.7
5.21	CoS Class D	Class of Service Class D supported	[ ] Yes and complete 5.22 [ ] No and move to end	5.11:M	5.4.4.9
5.22	Weight	The weighting between Class C and Class D	Integer in the range 1-99	5.21:M	5.4.4.8

C.6 Point to Point AUC properties

If the service uses a point to point AUC the following table must be completed.

No.	Attribute	Description	Value	Required	Clause
6.1	MTU	Maximum Transmission Unit in bytes	Integer	M	5.5.4
6.2	Color Forwarding	Is Color Forwarding supported for the AUC	[ ] Yes [ ] No	M	5.5.6
6.3	ALA User MEG exists	Indicates whether the ALA User MEG is configured for this service.	[ ] Yes [ ] No and go to 6.7	M	5.9.1.1
6.4	ALA User MEG NNI MIP Exists	Indicates whether the ALA User MEG has a MIP configured at the NNI for this service.	[ ] Yes [ ] No	M	5.9.1.4
6.5	ALA User MEG AIS	Defines whether the ALA Provider will generate AIS on the ALA user MEG	[ ] Yes [ ] No and go to 6.7	M	5.9.1.6
6.6	ALA User MEG AIS interval	The transmission interval for AIS on the ALA User MEG.	[ ] 1 second [ ] 60 seconds	7.5:M	5.9.1.6
6.7	Extended-AUC MEG NNI MIP Exists	Defines whether the ALA provider has configured a level 3 MIP if the service uses a double tagged NNI.	[ ] Yes [ ] No [ ] N/A[3]	M	5.9.2.5
6.8	Extended-AUC MEG CC transmission Interval	A value indicating the transmission interval for continuity check on the Extended-AUC MEG in seconds. A value of 0 indicates that CC is disabled.	[ ] 0 (disabled) [ ] 1 second [ ] 10 seconds [ ] 60 seconds [ ] 600 seconds	M	5.9.2.7
6.9	Extended-AUC MEG AIS support	Defines whether the ALA Provider supports the generation of AIS on the Extended-AUC MEG	[ ] Yes [ ] No	M	5.9.2.8
6.10	Broadcast Max	Maximum number of broadcast frames per second	Integer [ ] N/A	2.2:M	5.10.2.1
6.11	MAT	Controls whether MAC address translation is activated on the AUC	[ ] Yes [ ] No [ ] N/A	2.2:M	5.10.3.1
6.12	MAC Max	Maximum number of end-user MAC addresses	Integer [ ] N/A	2.2:M	5.10.4

[3] Only permitted if 4.1 is single tag.

C.7 Multicast AUC properties

If the service uses a multicast AUC then this table must be completed

No.	Attribute	Description	Value	Required	Clause
7.1	MTU	Maximum Transmission Unit in bytes	Integer	M	5.6.4
7.2	Frame delivery	Whether IGMP snooping is enabled	[ ] Yes [ ] No and go to end of table	M	5.6.7
7.3	IGMP reporting mode	Whether IGMP proxy reporting or Transparent Snooping is used	[ ] Proxy Reporting [ ] Transparent Snooping	7.2:M	5.6.8.5
7.4	Forwarding Mode	Whether Ethernet MAC or IP based forwarding is used for IP Multicast groups in the data plane	[ ] MAC [ ] IP	7.2:M	5.6.8.8
7.5	IGMP messages per second	The maximum number of IGMP messages per second permitted at the UNI	Integer	7.2:M	5.6.8.14
7.6	Max Channels per UNI	The maximum number of IP multicast channels per UNI	Integer	7.2:M	5.6.8.15
7.7	Max Channels per NNI	The maximum number of IP multicast channels per NNI	Integer	7.2:M	5.6.8.15

History

Document History		
Version	**Date**	**Milestone**
1.1.1	03/05/13	First publication