# Path object in NSI Connection Service WSDL

**Scope**

This document describes a proposal for the WSDL for requesting the path of an NSI Connection.

**‘Path’ in Connection Requests in NSI v2.0**

In v2.0 a connection request includes a <path> object. The ‘Path’ describes the endpoints and routing constraints of a requested connection.

StpType

StpListType

*order* int

*stp* StpType

PathType

*ero* [0..n] StpListType

*sourceSTP* StpType

*destSTP* StpType

*localId*

*networkId*

*label* labelType[0..1]

LabelType

*type* VLAN

*value* list/range of integers [1..4094]

*directionality* DirectionalityType

**Path**

* A <path> has a directionality attribute which indicates if the path is of type uni or bi directional. Unidirectional Connections transport data from sourceSTP to destSTP.
* *Add ‘orientation’ attribute here? This would be used to assign a direction to a bidirectional STP*
* *Add ‘symetric’ attribute here? This would be used to indicate if the go and return directions of a bi-directional path must use the same routing.*
* A <path> contains sourceSTP which is the STP of the beginning of the path. This can be either a uni-directional or bi-directional.
* A <path> contains destSTP which is the STP of the end of the path. This can be either a uni-directional or bi-directional.
* A <path> object may also contain an optional Explicit Route Object (ERO). The ERO is an ordered list of STPs which are to be used as transit points for the Connection. These transit points must be incorporated into the path in the sequence provided in the ERO. The path computation may return a path with additional STPs beyond those in the ERO list.

**STP**

* An STP is constituted of networkId, localId and Label

**NetworkId**

* The networkId is a globally unique identifier that identifies the Network. Rather than forcing parsing of an STP to determine the Network, a separate Network object is defined to allow an intermediate NSA to forward the message to the target Network without needing to know about the STPs within that domain.
* The syntax of <networkId> is urn:ogf:network:<DNSname>:<date>:nsi:net:<NSInetwork>, where:
	+ urn:ogf:network:<DNSname>:<date> conforms to GFD.191 and ensures that the STP is globally unique.
	+ <DNSname> is a registered domain name.
	+ <date> is a year in case the domain name is reused.
	+ <NSInetwork> is the name of the dynamic service network.

**localId**

* A <localId> is an opaque string which is unique to the NSI network. The string must conform to URN characters.

**Label**

* A <Label> conforms to type LabelType

**LabelType**

* LabelType is a type-value pair describing an optional technology label.
* Type is a string which defines a technology specific attributes. Currently only ‘VLAN’ is supported. In this case VLAN is defined in the Service Definition to conform to <http://schemas.ogf.org/nml/2013/10/ethernet/vlan>. No other technology types are currently defined. In future other technology specific attributes may be added.
* For type ‘VLAN’, the value can be a list or range of integer values of 1 through 4094.

**Candidate/Instance**

* Connection ***requests*** are made up of ‘candidate STPs’ where a candidate STP describes a list or range of labels (VLANs). E.g 118-259 or 118, 342,4,259
* Connection ***confirmations*** will return an ‘STP instance’ i.e no label part.

**Service Definitions and STPs**

The Service Definition will state the framing of the service. For example if the service type is 802.1q, then the sourceSTP and destSTP LocalId part of an STP instance must point to a VLAN. In the case where a candidate STPs is requested, the Label must be of type VLAN and no other type will be accepted.

**Example of Network/port/label mapping**

|  |  |  |
| --- | --- | --- |
| **Requested STP candidate** |  | **Returned STP instance** |
| VLAN range 3000-3600Ethernet port 2-3-4Switch sw1.lon.ukPoP LondonNSA 62.40.112.34NSI network BoDserviceDNSname geant.net |  | VLAN 3450Ethernet port 2-3-4Switch sw1.lon.ukPoP LondonNSA 62.40.112.34NSI network BoDserviceDNSname geant.net |

|  |  |
| --- | --- |
| **NML object** | **STP type example** |
| NML:Ethernet port | <networkId> == urn:ogf:network:geant.net:2013:nsi:net:BoDservice<localId> == sw1.lon.uk:2-3-4 |
| NML:VLAN instance | <networkId> == urn:ogf:network:geant.net:2013:nsi:net:BoDservice<localId > == sw1.lon.uk:2-3-4:3450 |
| A range of candidate ML:VLAN | <networkId> == urn:ogf:network:geant.net:2013:nsi:net:BoDservice<localId> == sw1.lon.uk:2-3-4<label type> == VLAN<label value> == 3000-3600 |

## Re-advertising STPs (network indirection)

It is legitimate for a Network to advertise a set of STPs some of which come from underlying providers. Eg NorthernLightDS advertises an STP as being part its own network when it is in fact originally assigned as SunetDS STP.

**Option 1**: the STP is advertised as a local STP and the SUnet local identifier is mapped to a new local identifier. Syntax for this case:

original STP:

<networkId>==urn:ogf:network:su.net:2007:nsi:net:SUnetDS

<localId>==s01p03

Nordunet would advertise this:

<networkId>== urn:ogf:network:nordu.net:2007:nsi:net:NorthernLightDS <localId>==NL\_s01p03

So there is a new local port identifier generated which NorthernLightDS can easily locally map to a SUnet port. (how mapping to new localId is done is not part of NSI protocol standard)

**Option 2**: If a NSA wishes to advertise that it can handle a 3rd party STP. In this case NorthernLightDS will simply advertise STP:

<networkId>==urn:ogf:network:su.net:2007:nsi:net:SUnetDS

<localId>==s01p03

**Path computation**

* The NSI Connection Service supports only v2.0 flat pathfinding i.e layer adaptations are assumed to not be present.

## Appendix 1: Examples

**Example v1.1 NSI Connection request**

 <path>

 <directionality>Bidirectional</directionality>

 <sourceSTP>

 <stpId>urn:ogf:network:stp:czechlight.ets:ps-80</stpId>

 </sourceSTP>

 <destSTP>

 <stpId>urn:ogf:network:stp:czechlight.ets:ams-80</stpId>

 </destSTP>

 </path>

**Example v2.0 NSI Connection request**

<!-- Example 1: bidirectional path request, untagged port instances, no ERO -->

 <path>

 <!-- Two STPs - a bidirectional path -->

 <directionality>Bidirectional</directionality>

 <sourceSTP>

 <networkId>urn:ogf:network:cesnet.cz:2011:nsi:net:czechlight</networkId>

 <localId>intf3-2-1</localId>

 </sourceSTP>

 <destSTP>

 <networkId>urn:ogf:network:surfnet.nl:2001:nsi:net:netherlight</networkId>

 <localId>switchAport2-1</localId>

 </destSTP>

 </path>

<!-- Example 2: bidirectional path request, tagged port instances, no ERO -->

 <path>

 <!-- Two STPs - a bidirectional path -->

 <directionality>Bidirectional</directionality>

 <sourceSTP>

 <networkId>urn:ogf:network:nordu.net:2012:nsi:net:northernlight</networkId>

 <localId>intf3-2-1VLAN=2310</localId>

 </sourceSTP>

 <destSTP>

 <networkId>urn:ogf:network:sne.science.uva.nl:2012:net:science.uva.nl</networkId>

 <localId>switchAport2-1VLAN=2322</localId>

 </destSTP>

 </path>

<!-- Example 3: bidirectional path request, Port candidate - use a VLAN within label range, no ERO -->

 <path>

 <!-- Two STPs - a bidirectional path -->

 <directionality>Bidirectional</directionality>

 <sourceSTP>

 <networkId>urn:ogf:network:nordu.net:2012:nsi:net:northernlight</networkId>

 <localId>intf3-2-1</localId>

 <label>

 <type>VLAN</type>

 <value>1719-1834,2103-2106</value>

 </label>

 </sourceSTP>

 <destSTP>

 <networkId>urn:ogf:network:sne.science.uva.nl:2012:net:science.uva.nl</networkId>

 <localId>switchAport2-1</localId>

 <label>

 <type>VLAN</type>

 <value>451,341,486</value>

 </label>

 </destSTP>

 </path>

<!-- Example 4: bidirectional path, tagged port instances, with ERO -->

 <path>

 <!-- Two STPs - a bidirectional path -->

 <directionality>Bidirectional</directionality>

 <sourceSTP>

 <networkId>urn:ogf:network:nordu.net:2012:nsi:net:northernlight</networkId>

 <localId>intf3-2-1VLAN=2310</localId>

 <label>

 <type>VLAN</type>

 <value>1719-1834,2103-2106</value>

 </label>

 </sourceSTP>

 <destSTP>

 <networkId>urn:ogf:network:sne.science.uva.nl:2012:nsi:net:science.uva.nl</networkId>

 <localId>switchAport2-1VLAN=2322</localId>

 <label>

 <type>VLAN</type>

 <value>451,341,486</value>

 </label>

 </destSTP>

 <eroList>

 <!-- first STP in ERO list, order = 1. -->

 <order>1</order>

 <stp>

 <networkId>urn:ogf:network:nordu.net:2012:nsi:net:northernlight</networkId>

 <localId>intf7-2-1:VLAN=2310</localId>

 </stp>

 </eroList>

 <eroList>

 <!-- second STP in ERO list, order = 2. -->

 <order>2</order>

 <stp>

 <networkId>urn:ogf:network:sne.science.uva.nl:2012:nsi:net:science.uva.nl</networkId>

 <localId>switchZport3-1</localId>

 </stp>

 </eroList>

 </path>