# NSI fundamental principles

## NSI Architecture

The Network Service Interface (NSI) provides secure and reliable sessions for service-related communication between two NSAs. [Ref: OGF GFD.213, pg. 4, sec. 3.2, para. 1]

NSI supports the ability to add new Network Services as they emerge. [Ref: OGF GFD.213, pg. 3, sec. 2.1.1, para. 1]

The basic building block of the NSI architecture is Network Service Agents (NSAs) that communicate using the Network Service Interface (NSI) protocol. [Ref: OGF GFD.213, pg. 4, sec. 3.1, para. 1]

The NSA that initiates a service request is known as a Requester Agent (RA). The NSA that responds to an incoming request is known as the Provider Agent (PA). [Ref: OGF GFD.213, pg 6, sec. 3.6]

The ultimate Requester Agent (uRA) is the originator of a service request. Service requests may originate from an application, from grid middleware, or from a network provider. [Ref: OGF GFD.213, pg 6, sec. 3.6]

The Aggregator (AG) has more than one child NSA, and has the responsibility of aggregating the responses from each child NSA. [Ref: OGF GFD.213, pg 6, sec. 3.6]

The ultimate Provider Agent (uPA) services requests, the ‘ultimate’ designation indicates that this is the final Provider Agent, and has management control over resources in the transport plane. [Ref: OGF GFD.213, pg 6, sec. 3.6]

The Message Transport Layer (MTL) provides a message delivery mechanism, which is decoupled from the NSI layer. In NSI v2.0 only a SOAP MTL has been defined. [Ref: OGF GFD.213, pg. 5 sec. 3.3, para. 1]

## NSI Topology

In the NSI Topology the Transport Plane is modelled as interconnected Networks. [Ref: OGF GFD.213, pg. 9, sec. 4.1, para. 1]

A Network is a grouping of Service Termination Points (STPs). [Ref: OGF GFD.213, pg. 9, sec. 4.1, para. 1]

Each Network topology can only be associated with a single NSA. [Ref: OGF GFD.213, pg. 9, sec. 4.2, para. 1]

STPs are identifiers that refer to a network resource that is capable of terminating an NSI Connection. [Ref: OGF GFD.213, pg. 9, sec. 4.1, para. 1]

A Network is divided into Service Domains that groups a set of STP that has a common Service Definition. [Ref: OGF GFD.213, pg. 9, sec. 4.3, para. 1]

A Network can include one or more Service Domains. [Ref: OGF GFD.213, pg. 9, sec. 4.3, para. 1]

Each STP within a Service Domain will be able to be connected to every other STP in the same service domain. [Ref: OGF GFD.213, pg. 9, sec. 4.3, para. 1]

Each Service Domain has an associated Service Definition that describes the service offered by the domain. [Ref: OGF GFD.213, pg. 9, sec. 4.3, para. 1]

Externally visible STP are used for inter-domain interconnection to peer networks or customer sites. Internal STP are used to connect the internal Service subdomain as well as to the Domain’s external STP points. [Ref: OGF GFD.213, pg. 11, sec. 4.5, para. 1-2]

Service Demarcation Points (SDPs) are NSI topology objects that identify a grouping of two Edge Points at the boundary between two Networks. [Ref: OGF GFD.213, pg. 10, sec. 4.5]

By definition, Service Domains of different Service Types cannot be directly connected due to the differing Service Definitions, however, an Adaptation can be defined that permits interconnection of STP from two different Service Domains using the concepts of encapsulation and adaptation. [Ref: OGF GFD.213, pg. 10, sec. 4.4, para. 1]

Adaptation STP are added to each Service Domain to anchor the transitional SDP associated with the Adaptation. [Ref: OGF GFD.213, pg. 10, sec. 4.4]

## Service Plane, NSI Signalling and Pathfinding

The NSAs and NSI interface exist in a notional NSI Service Plane.

The NSA signalling plane topology does not need to be congruent with data plane topology. [Ref: OGF GFD.213, pg. 9, sec. 3.8, para. 3; NSI\_Signaling\_and\_Path\_Finding, pg. 2, sec. 2, para. 2, pt. 1]

No assumptions are made about the reachability of participating NSAs. Reachability is determined by the peering policy between providers. [Ref: OGF GFD.213, pg. 7, sec 3.7, para. 1]

Aggregator NSAs may be “stand-alone” and may not be associated with any uPAs or network domains (i.e. dataplane resources). [Ref: OGF GFD.213, pg 6, sec. 3.6]

Requests may result in arbitrary (message) tree workflows with only the leaf NSAs controlling resources (i.e. uPAs). [Ref: OGF GFD.213, pg. 7, sec. 3.7]

Not all NSAs will be directly interconnected with every other NSA through the signalling plane. [Ref: NSI\_Signaling\_and\_Path\_Finding, pg. 2, sec. 2, para. 2, pt. 2]

Pair-wise peering arrangements will dictate the signalling plane topology. [Ref: NSI\_Signaling\_and\_Path\_Finding, pg. 2, sec. 2, para. 2, pt. 2]

NSA inter-connectivity will be guided by security and administration considerations and NOT exclusively data plane considerations. [Ref: NSI\_Signaling\_and\_Path\_Finding, pg. 2, sec. 2, para. 2, pt. 2]

Users may request a reservation from an NSA that is not directly managing resources in the data plane (i.e. AG). [Ref: NSI\_Signaling\_and\_Path\_Finding, pg. 2, sec. 2, para. 2, pt. 3]

The NSA servicing the request may not have direct signalling plane peering with all the NSAs involved in the reservation request. [Ref: NSI\_Signaling\_and\_Path\_Finding, pg. 2, sec. 2, para. 3]

Users may request reservations between endpoints that are not in their network, or the network of their NSA, which implies the user request may not originate from the NSA managing the source end of the data path. [Ref: NSI\_Signaling\_and\_Path\_Finding, pg. 2, sec. 2, para. 2, pt. 4]