Network Services Interface

NSA Description Document

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Introduction

- The NSA Description Document provides syntax for describing metadata associated with Network Service Agents (NSA)

  - Making the NSI protocol and its agents more self-descriptive, new features, protocols, or protocol versions can be added to agents within the network and then be discovered by peer agents through these meta-data documents.

- Contains information to drive peer NSA interface version discovery, feature discovery, control plane connectivity discovery, and managed network discovery

  - Information conveyed in this document allows an NSA to perform basic protocol bootstrapping with minimal configuration by exposing an NSA's identity, enabling version negotiation, and communicating protocol capabilities supported by that NSA.

- Currently implemented and running in a number of NSAs.

The *<nsa>* element

- The *<nsa>* element is the parent element for the NSA Description Document.

- An instance of this document must contain a single *<nsa>* element documenting the meta-data associated with the NSA.

NSA attributes

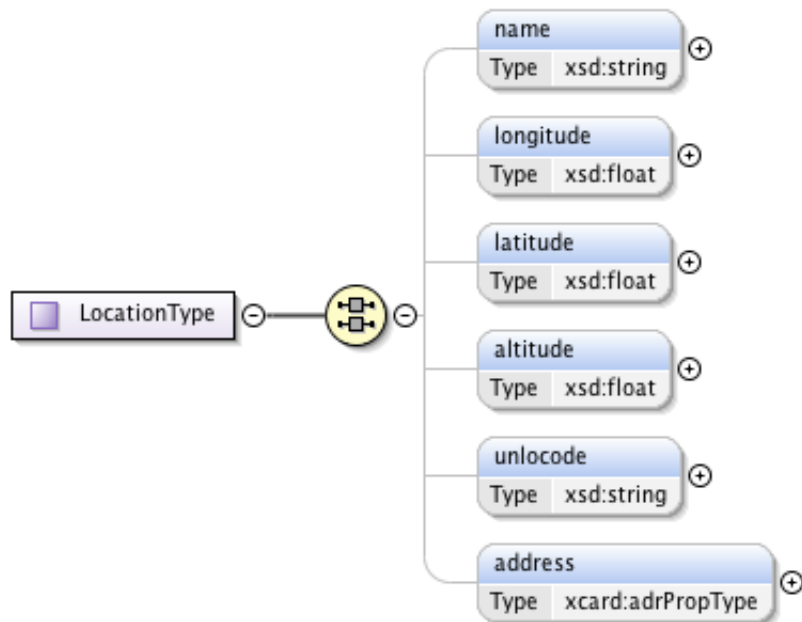| Parameter	M/O	Description
id	M	The globally unique NSA identifier for this resource.
version	M	The version of document based on date and time the entry was created at the source NSA.
expires	O	The date this version of the document expires and after which should no longer be considered valid.
anyAttribute	O	Permit inclusion of attributes from other namespaces for flexible extension without needing to update this schema definition.

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NSA elements (1)

Parameter	M/O	Description
name	O	A descriptive name for this NSA. This value is typically used for display purposes.
softwareVersion	O	A descriptive string describing the NSA software type and version.
startTime	O	The time at which this NSA last started to provide uninterrupted service.
adminContact	O	A list of zero or more administrative contacts associated with this NSA.
location	O	The physical location of the logical NSA entity.
networkId	O	A list of zero or more network identifiers for which this NSA is providing the listed service interfaces and features.
interface	O	A list of zero or more NSI interfaces supported by the NSA.

NSA elements (2)

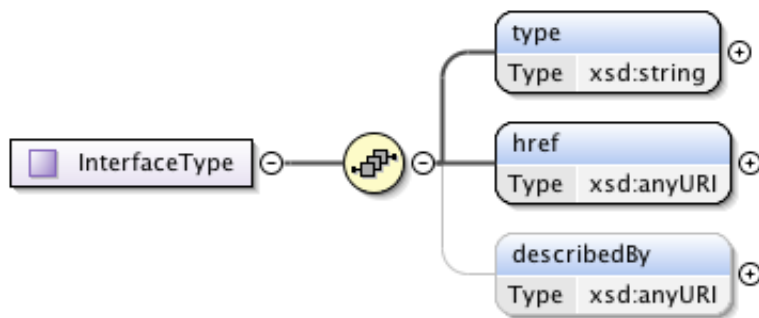| Parameter	M/O	Description
feature	O	A list of zero or more features supported by the NSA.
peersWith	O	A list of zero or more NSA identifiers enumerating peer NSA that have had a trusted control plane relationship provisioned with this NSA.
any element	O	Provides a flexible mechanism allowing additional elements to be provided from other namespaces without needing to update this schema definition.

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Location

Parameter	M/O	Description
name	O	A human readable string naming this location.
longitude	O	The longitude of the NSA in WGS84 coordinate system (in decimal degrees).
latitude	O	The latitude of the NSA in WGS84 coordinate system (in decimal degrees).
altitude	O	The altitude of the NSA in WGS84 coordinate system (in decimal meters).
unlocode	O	The UN/LOCODE location identifier for the NSA location.
address	O	The address of the NSA location specified in vCard address format.

The ***LocationType*** definition models the location elements of an NSA. A *<location>* is a reference to a geographical location or area for the NSA.

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Interface

Parameter	M/O	Description
type	M	The unique string identifying the type and version of the NSA interface. Application Internet media types (Content-types) are used to identify the NSI interface, version, and supported encoding type.
href	M	Contains the protocol endpoint for the interface identified in this interface reference.
describedBy	O	This attribute contains a reference to the WSDL or WADL file corresponding to this interface's version (if available).

The ***InterfaceType*** definition models an NSA protocol interface. This type encapsulates the meta-data needed to determine the version, location, and schema associated with a specific NSA interface.

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Interface example

```
<interface>
    <type>application/vnd.ogf.nsi.dds.v1+xml</type>
    <href>https://agg.netherlight.net/dds</href>
    <describedBy>https://agg.netherlight.net/dds?wadl</describedBy>
</interface>
<interface>
    <type>application/vnd.ogf.nsi.dds.v1+json</type>
    <href>https://agg.netherlight.net/dds</href>
    <describedBy>https://agg.netherlight.net/dds?wadl</describedBy>
</interface>
<interface>
    <type>application/vnd.ogf.nsi.cs.v2.requester+soap</type>
    <href>https://agg.netherlight.net/nsi-v2/ConnectionServiceRequester</href>
    <describedBy>https://agg.netherlight.net/nsi-v2/ConnectionServiceRequester?wsdl</describedBy>
</interface>
<interface>
    <type>application/vnd.ogf.nsi.cs.v2.provider+soap</type>
    <href>https://agg.netherlight.net/nsi-v2/ConnectionServiceProvider</href>
    <describedBy>https://agg.netherlight.net/nsi-v2/ConnectionServiceProvider?wsdl</describedBy>
</interface>
```

# Versioning

| Version | Type | MIME Media Type |
|---|---|---|
| NSI CS version 1.0 | Provider | "application/vnd.ogf.nsi.cs.v1.provider+soap" |
| NSI CS version 1.0 | Requester | "application/vnd.ogf.nsi.cs.v1.requester+soap" |
| NSI CS version 1.1 | Provider | "application/vnd.ogf.nsi.cs.v1-1.provider+soap" |
| NSI CS version 1.1 | Requester | "application/vnd.ogf.nsi.cs.v1-1.requester+soap" |
| NSI CS version 2.0 | Provider | "application/vnd.ogf.nsi.cs.v2.provider+soap" |
| NSI CS version 2.0 | Requester | "application/vnd.ogf.nsi.cs.v2.requester+soap" |
| NSI Topology version 1.0 | Provider | "application/vnd.ogf.nsi.topology.v1+xml" |
| NSI Topology version 2.0 | Document | "application/vnd.ogf.nsi.topology.v2+xml" |
| NSA Description Document version 1.0 | Document | "application/vnd.ogf.nsi.nsa.v1+xml" |
| NSI Document Distribution Service version 1.0 | Requester/ Provider | "application/vnd.ogf.nsi.dds.v1+xml" |

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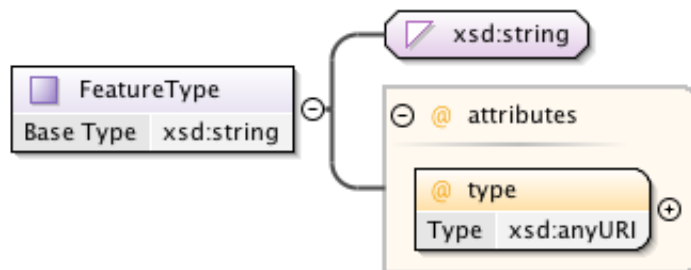
# Feature



| Parameter | M/O | Description |
|---|---|---|
| *type* | M | Identifies the type of feature modeled by the supplied value. |
| *string* | O | An optional value associated with the feature type. |

The ***FeatureType*** definition is a simple type value pair used to model an NSA feature within the network. An NSA feature is a piece of metadata attached to the NSA Description Document that describes a specific capability offered by that NSA, or configuration value on that NSA, that is not specifically defined by an element in the NSA Description Document schema, but still needs to be communicated to requester agents within the network.

`<feature type="org.ogf.nsi.cs.v2.commitTimeout">120</feature>`

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# Formal feature definitions

We formally define three values to model an NSA's CS "role" within the network as shown below:

```
<feature type="org.ogf.nsi.cs.v2.role.aggregator"/>


<feature type="org.ogf.nsi.cs.v2.role.uPA"/>


<feature type="org.ogf.nsi.cs.v2.role.uRA"/>
```

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org.ogf.nsi.cs.v2.role.aggregator

- An NSA MUST include a *<feature>* element of this type if the NSA is performing an aggregator NSA role as defined in the NSI CS Version 2 specification.

- Presence of this *<feature>* element type communicates the NSA's willingness to perform reservation path finding and CS protocol message forwarding through to connected peers on the control plane.

- The NSA must populate all control plane peered "PA-role" (uPA, AG) NSA using the *<peersWith>* element. This will allow a remote NSA to determine control plane paths to this aggregator, and control plane reachability through the aggregator to other networks.

`<peersWith>PA 1</peersWith>`   AG → PA 1

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org.ogf.nsi.cs.v2.role.uPA

- An NSA MUST include a *<feature>* element of this type if the NSA is performing uPA NSA role as defined in the NSI CS Version 2 specification.

- The NSA should populate all control plane peered RA-role (uRA, AG) NSA to the uPA using the *<peersWith>* element.

- Population of the <peersWith> element is purely optional, but will allow a remote NSA to determine incoming control plane paths to the uPA.

RA 1 → uPA   <peersWith>RA 1</peersWith>

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org.ogf.nsi.cs.v2.role.uRA

- An NSA MUST include a *<feature>* element of this type if the NSA is performing uRA NSA role as defined in the NSI CS Version 2 specification.

- The NSA should populate all control plane peered PA-role (uPA, AG) NSA to the uRA using the *<peersWith>* element.

- Population of the <peersWith> element is purely optional, but will allow a remote NSA to determine control plane paths from the uRA to connected PA.

<peersWith>PA 1</peersWith>   (uRA) → (PA 1)

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<peersWith> summary

- RA <peersWith> implies an RA->PA relationship when the target is a PA (AG or uPA). There is no <peersWith> relationship for RA->RA.
- AG <peersWith> implies an RA->PA relationship when the target is a PA (AG or uPA). There is no <peersWith> relationship for AG->RA.
- PA <peersWith> implies a *->PA relationship and is for information only.

- Feature type of AG+uPA has an implicit <peersWith> for itself with an RA->PA relationship.
- Feature type of uRA+AG has an implicit <peersWith> for itself with an RA->PA relationship.

- <peersWith> relationships are unidirectional following the RA->PA role direction (with the exception of the uPA informational entry).
- Two AG with a bidirectional peering must each contain a <peersWith> entry to model the bidirectional relationship.

In my mind
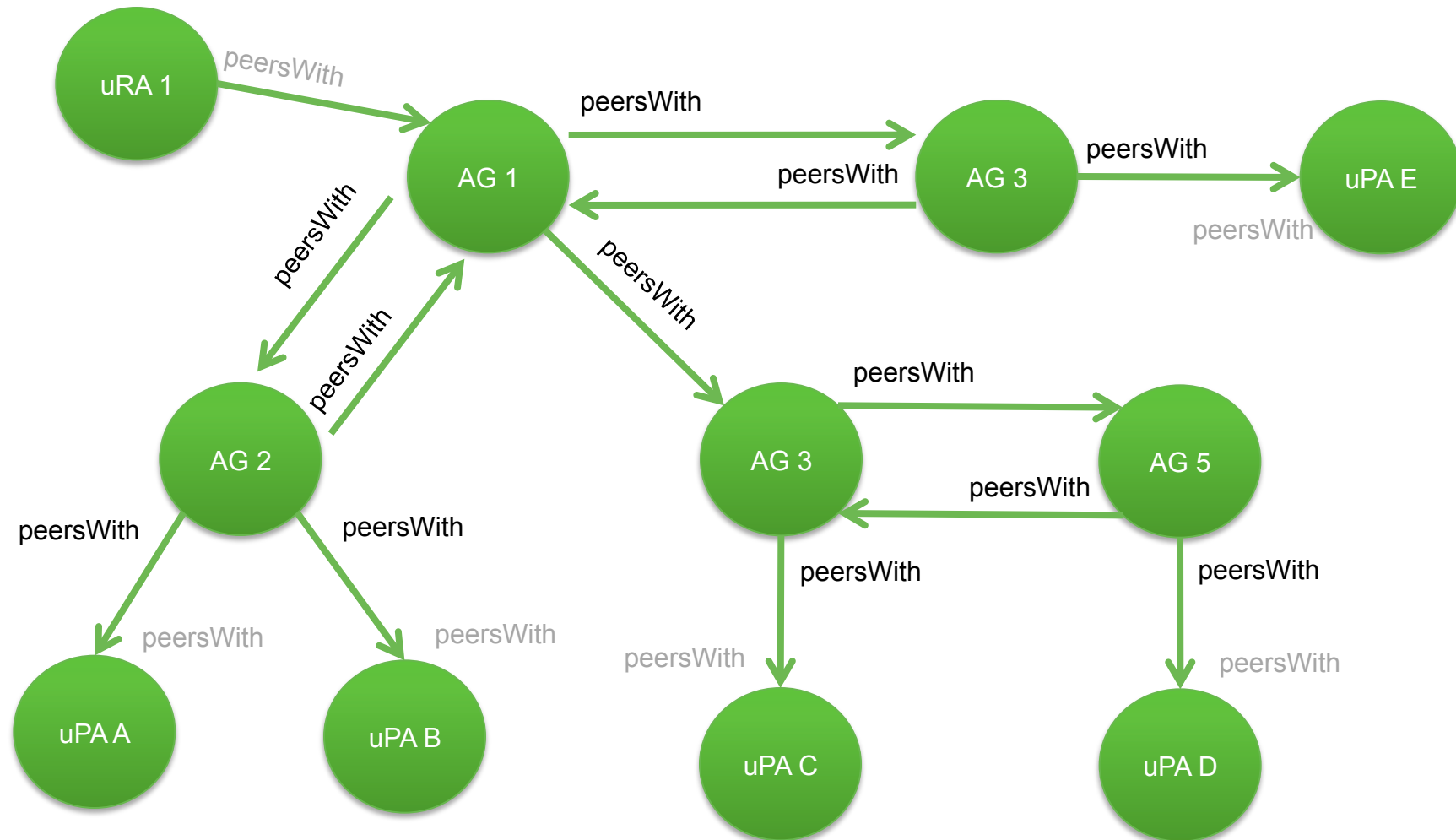
uRA/uPA <peersWith> not used in building directed control plane graph.

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Do we want to…

- Explicitly model the peersWith relationships?
- "RA" would be default to avoid backwards compatibility issues in a schema upgrade.

uRA 1:
<peersWith role="RA">AG2</peersWith>

AG2:
<peersWith role="PA">uRA1</peersWith>
<peersWith role="RA">AG3</peersWith>
<peersWith role="PA">AG3</peersWith>

AG3:
<peersWith role="PA">AG2</peersWith>
<peersWith role="RA">AG2</peersWith>
<peersWith role="RA">uPA4</peersWith>

AG3:
<peersWith role="PA">AG3</peersWith>

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