

# Network Description Language Update

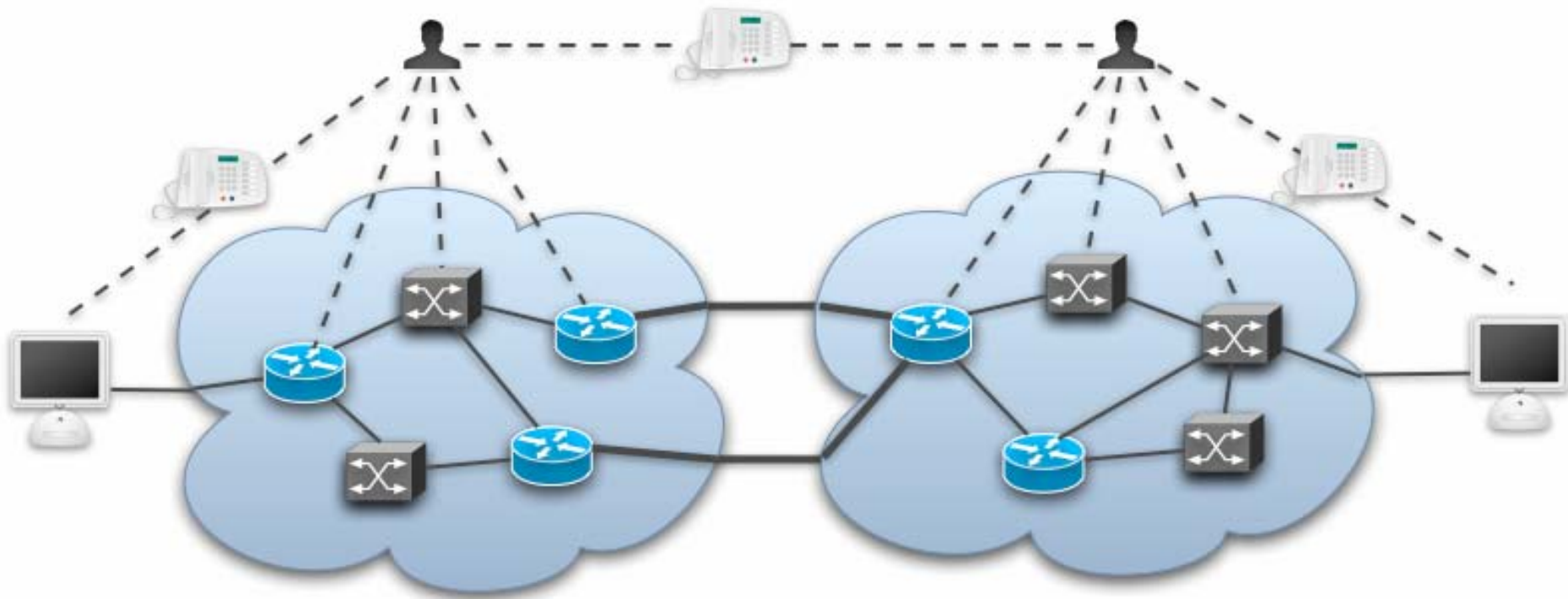
Jeroen van der Ham  
System and Network Engineering  
Research Group  
Universiteit van Amsterdam

# Outline

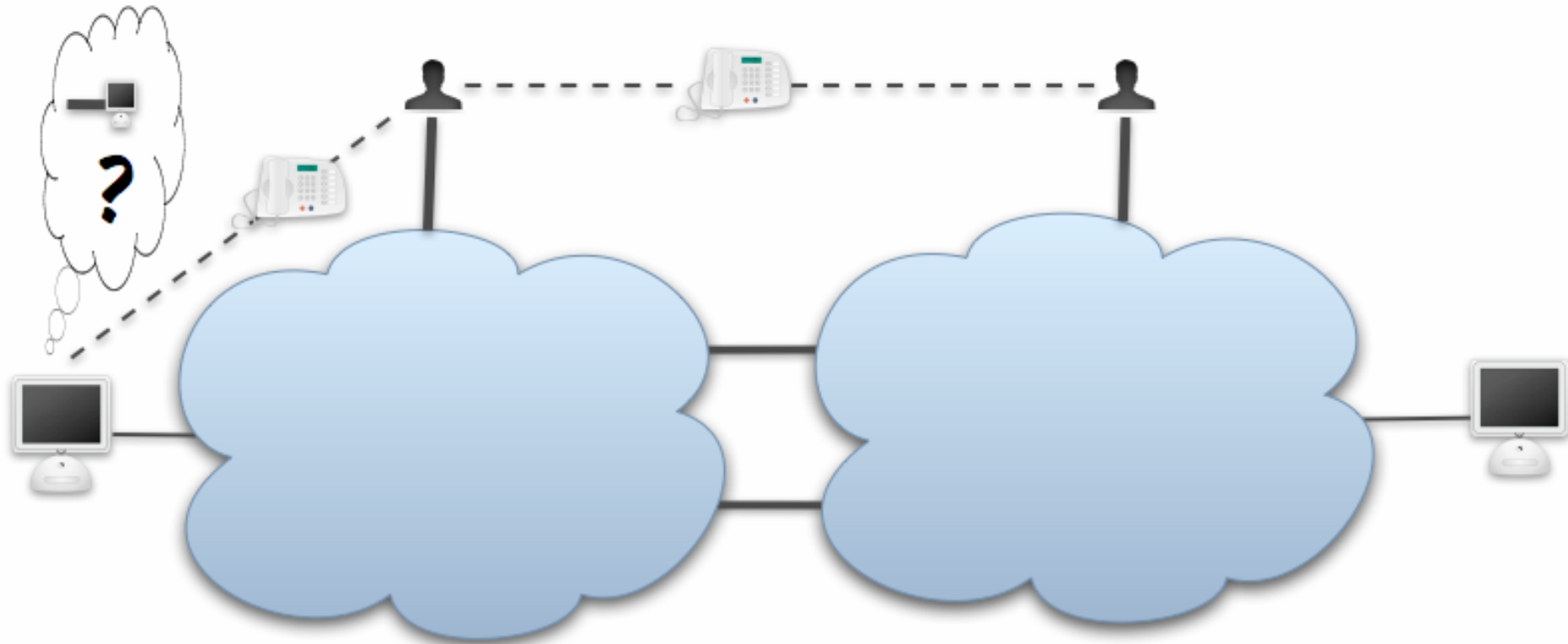
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- Current Provisioning
- Network Descriptions
- NDL Recap
- Tools for NDL

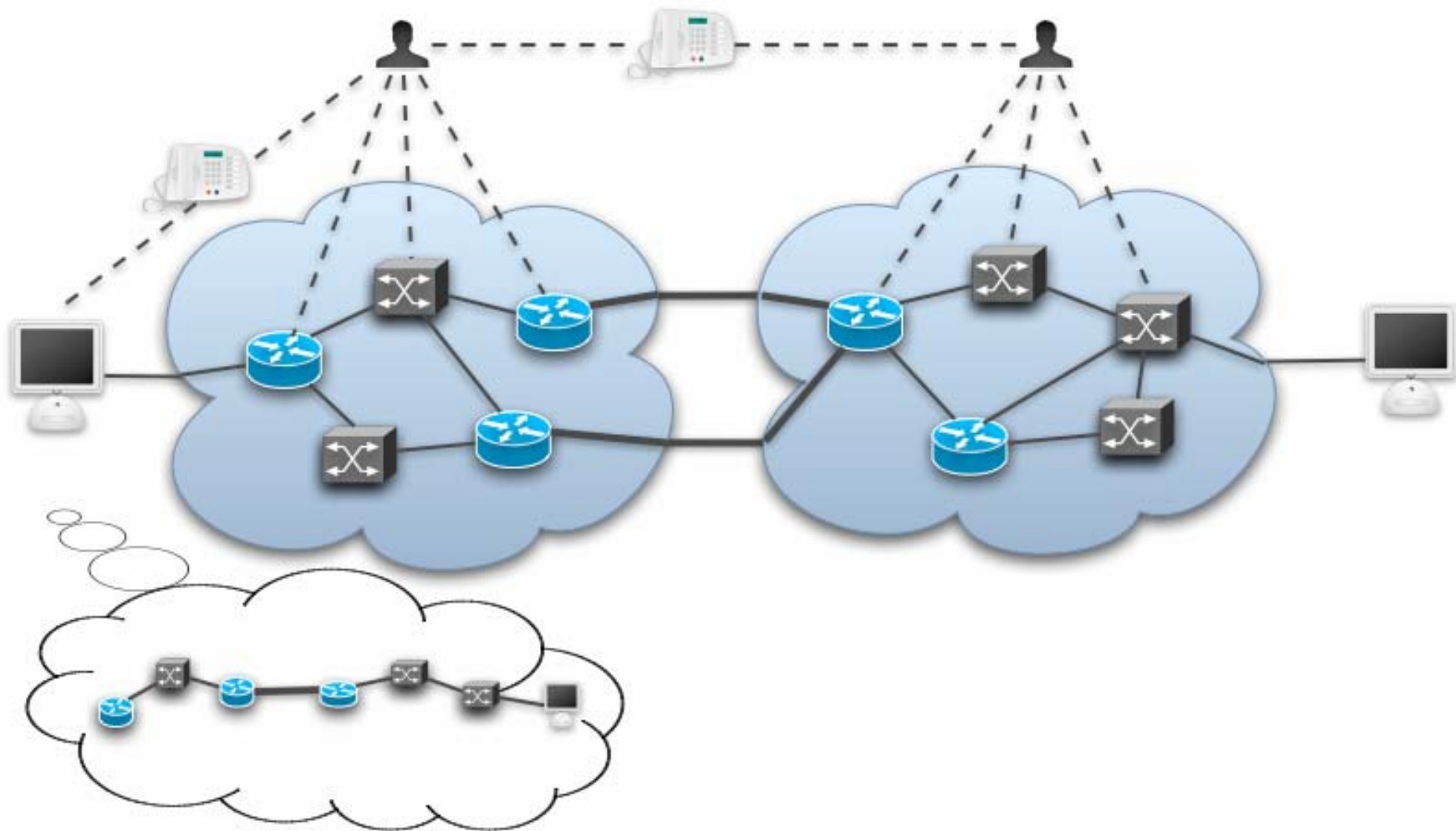
# Current Control Plane



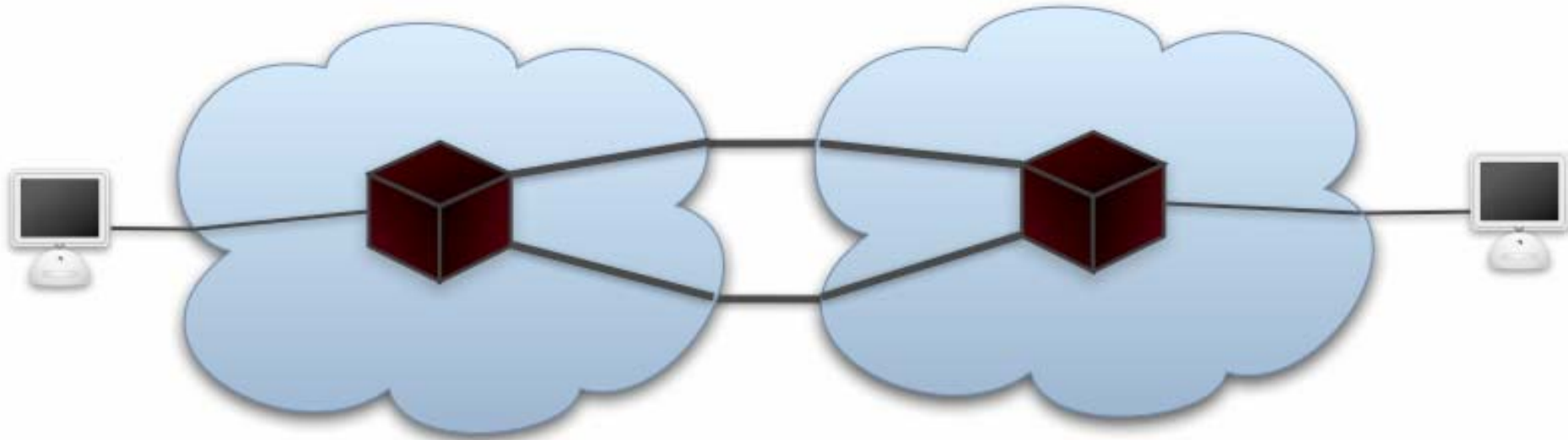
# Current Provisioning Process



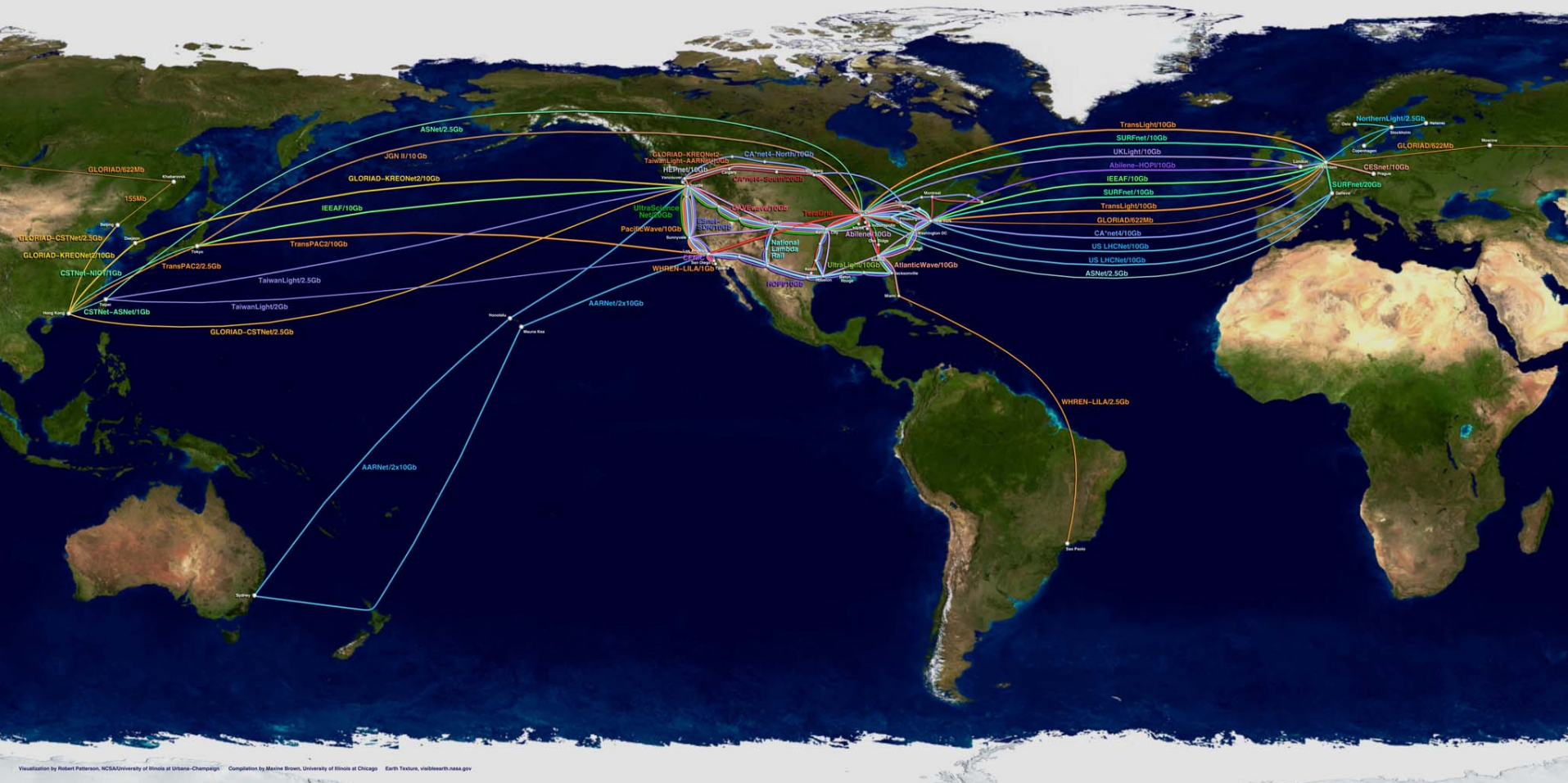
# Current Provisioning Process



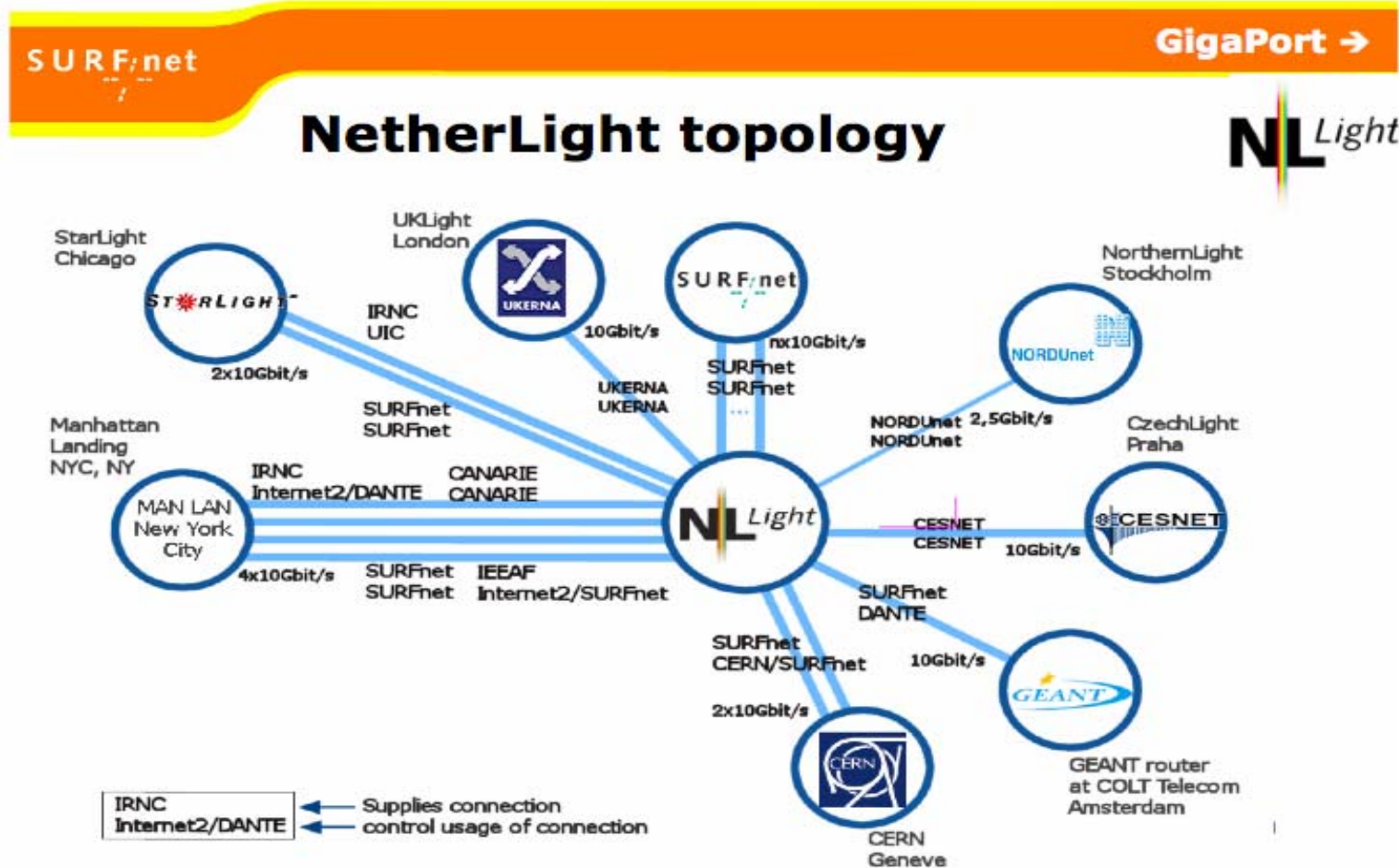
# Ultimate Goal of GLIF



# Network Descriptions - GLIF

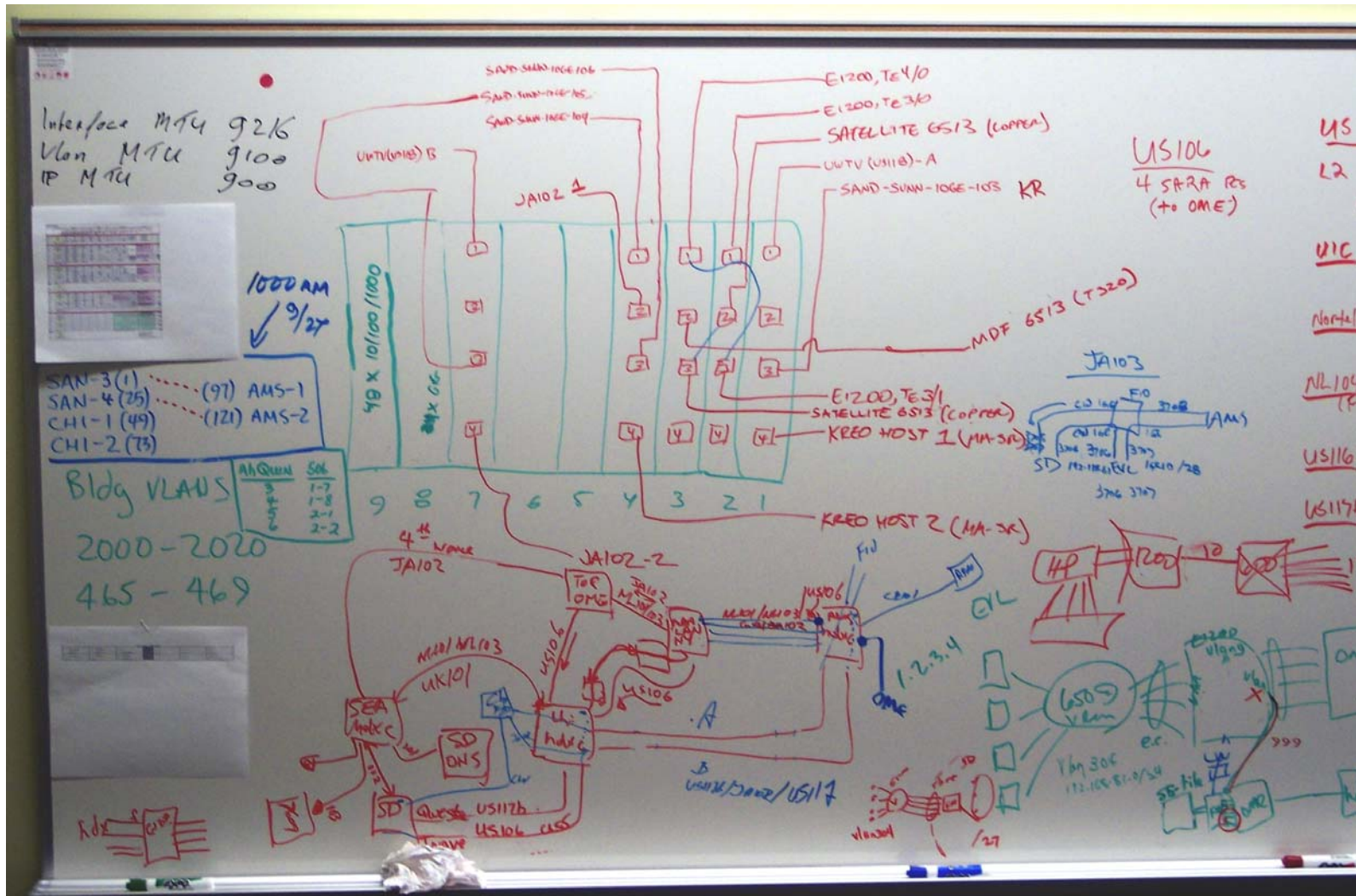


# Network Descriptions - GOLE

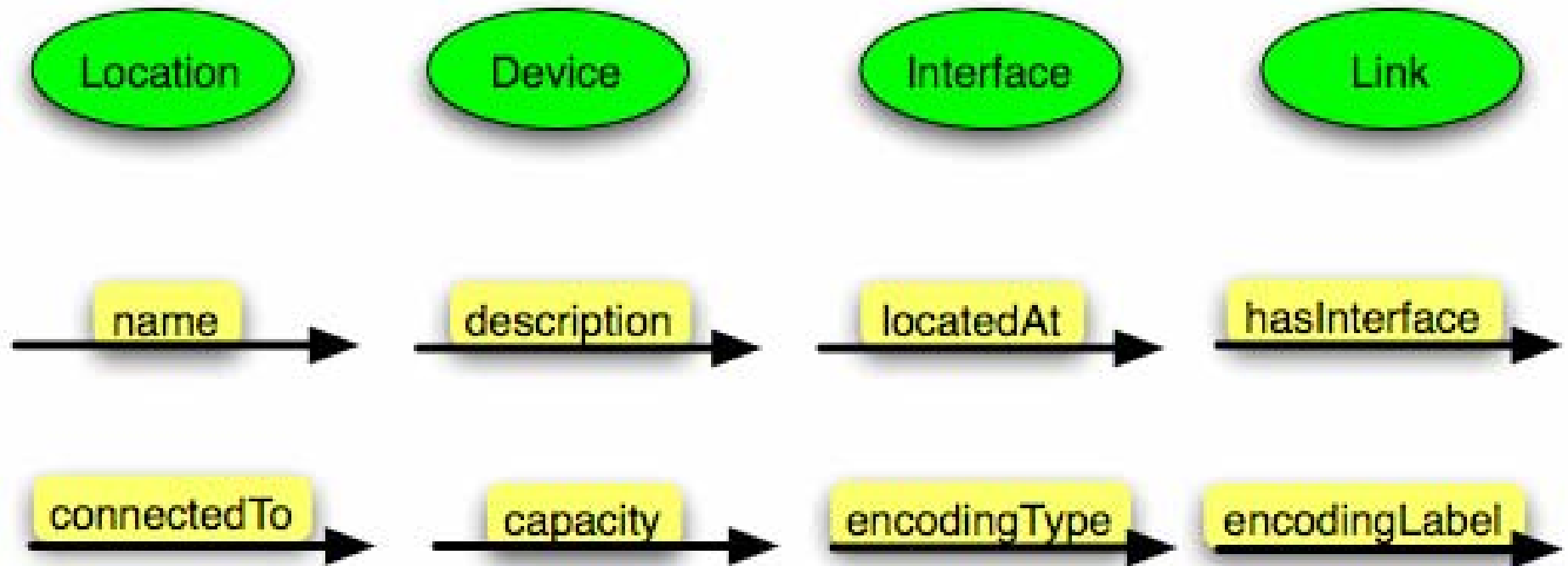




# Network Descriptions - iGrid



# Network Description Language



# NDL Example



```
<ndl:Device rdf:about="#Rembrandt3">
  <ndl:name>Rembrandt3</ndl:name>
  <ndl:locatedAt rdf:resource="#Lighthouse"/>
  <ndl:hasInterface rdf:resource="#Rembrandt3:eth0"/>
</ndl:Device>
<ndl:Interface rdf:about="#Rembrandt3:eth0">
  <ndl:name>Rembrandt3:eth0</ndl:name>
  <ndl:connectedTo rdf:resource="#Speculaas:port3"/>
</ndl:Interface>
```

# NDL Generator

## Step 1 - Location

Indicate the name and a short description of the network that is going to be described in NDL.

Name  Description

Provide also the latitude and the longitude of this location: this will aid the visualization programs.

Both latitude and longitude should use **floating point** notation.

Latitude  Longitude

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## Step 2 - Devices

Indicate the name of all the devices present in the network. If you need to describe more than 3 devices just "Add a Device"

Device

Device

Device

# NDL Generator (ctd.)

Generate interfaces for devices

Device **Rembrandt3** Interface Rembrandt3:  ConnectedTo

Add interface for Rembrandt3

Device **Speculaas** Interface Speculaas:  ConnectedTo

Device **Speculaas** Interface Speculaas:  ConnectedTo

Add interface for Speculaas

<http://trafficlight.uva.netherlight.nl/NDL-Demo/>

# NDL Generator Result

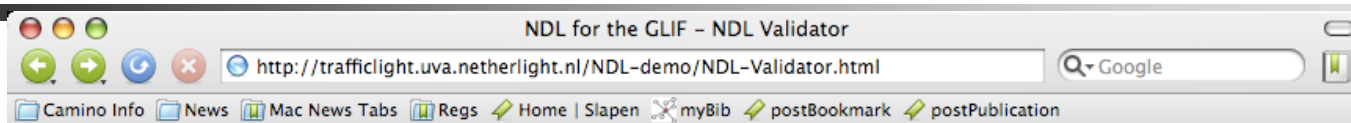
```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
xmlns:ndl="http://www.science.uva.nl/research/sne/ndl#"
xmlns:geo="http://www.w3.org/2003/01/geo/wgs84_pos#">

  <!-- Description of Lighthouse-->
  <ndl:Location rdf:about="#Lighthouse">
    <ndl:name>SNE Lab</ndl:name>
    <geo:lat>52.3651</geo:lat>
    <geo:long>4.9527</geo:long>
  </ndl:Location>

  <!-- Rembrandt3-->
  <ndl:Device rdf:about="#Rembrandt3">
    <ndl:name>Rembrandt3</ndl:name>
    <ndl:locatedAt rdf:resource="#Lighthouse"/>
    <ndl:hasInterface rdf:resource="#Rembrandt3:eth0"/>
  </ndl:Device>

  <!-- Speculaas-->
  <ndl:Device rdf:about="#Speculaas">
    <ndl:name>Speculaas</ndl:name>
```

# NDL Validator



## NDL for the GLIF - NDL Validator

NDL - Network Description Language - is an ontology for description of (hybrid) networks, aimed at facilitating the inter and intra domain lightpath provisioning. The GLIF collaboration makes use of NDL to describe each individual domain, allowing for example the generation of global GLIF network maps.

This page will provide you with tools to validate an NDL file. We provide here two types of validation:

- Syntax validation
- Content validation

### Syntax validation

We can validate that the NDL file you generated is written following the latest NDL schema. You just need to cut and paste it in the space below and you will get back feedback on its validity.

Please paste your NDL file below:

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
xmlns:ndl="http://www.science.uva.nl/research/sne/ndl#"
xmlns:geo="http://www.w3.org/2003/01/geo/wgs84_pos#">

<!-- Description of foo-->
<ndl:Location rdf:about="#foo">
<ndl:name>bar</ndl:name>
<geo:lat>0</geo:lat>
<geo:long>0</geo:long>
</ndl:Location>

<!--Rem2-->
<ndl:Device rdf:about="#Rem2">
<ndl:name>Rem2</ndl:name>
<ndl:locatedAt rdf:resource="#foo"/>
<ndl:hasInterface rdf:resource="#Rem2:eth0"/>
</ndl:Device>

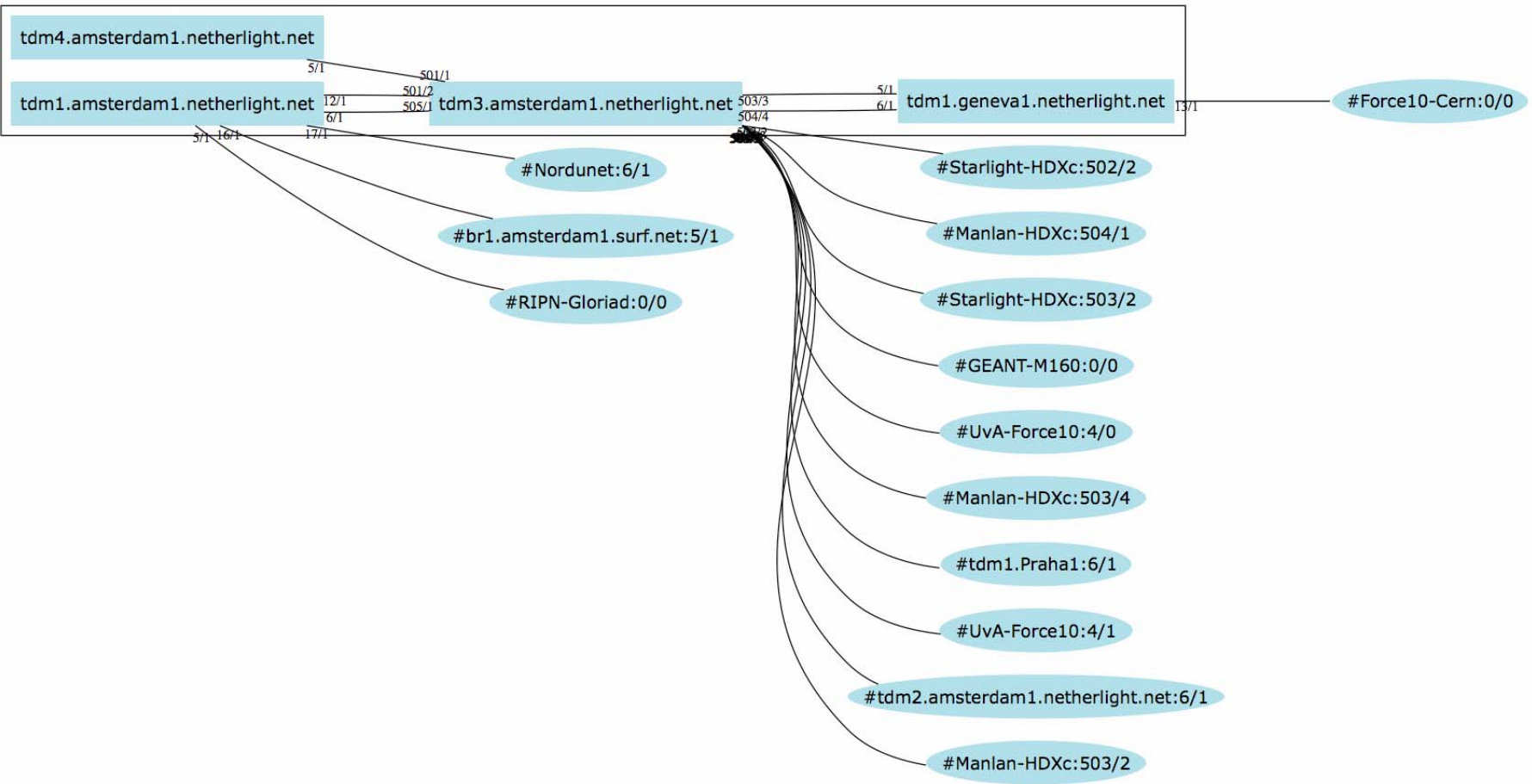
<!--Glif-->
<ndl:Device rdf:about="#Glif">
```

Submit

### Content validation

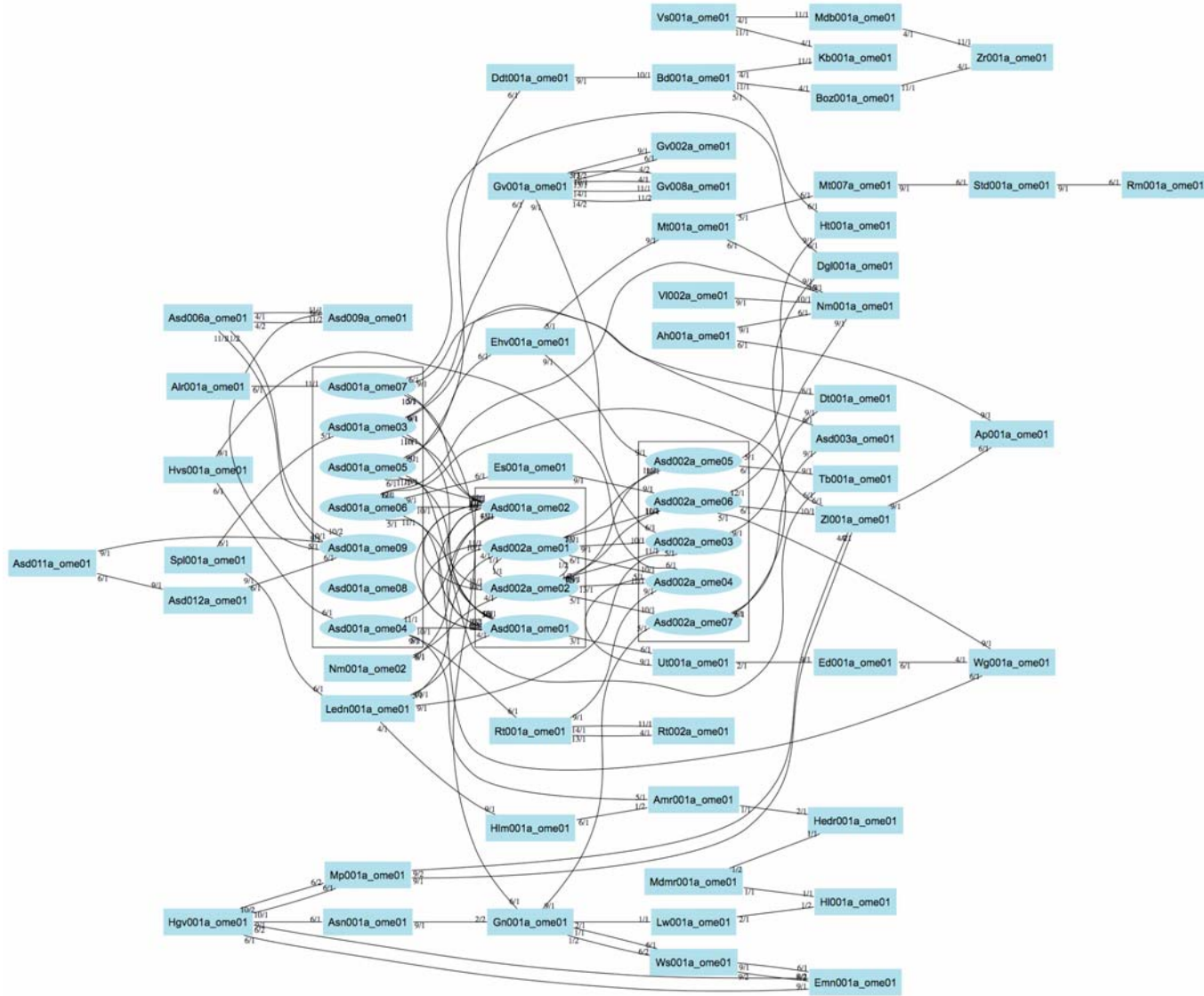
Often NDL files reference information contained in other files managed by others. Such as for example when an interface on a local device connects to an interface to a remote device. The content validator performs a few basic checks to see that the information contained in cross-referencing NDL files is consistent.

# NDL Visualisation

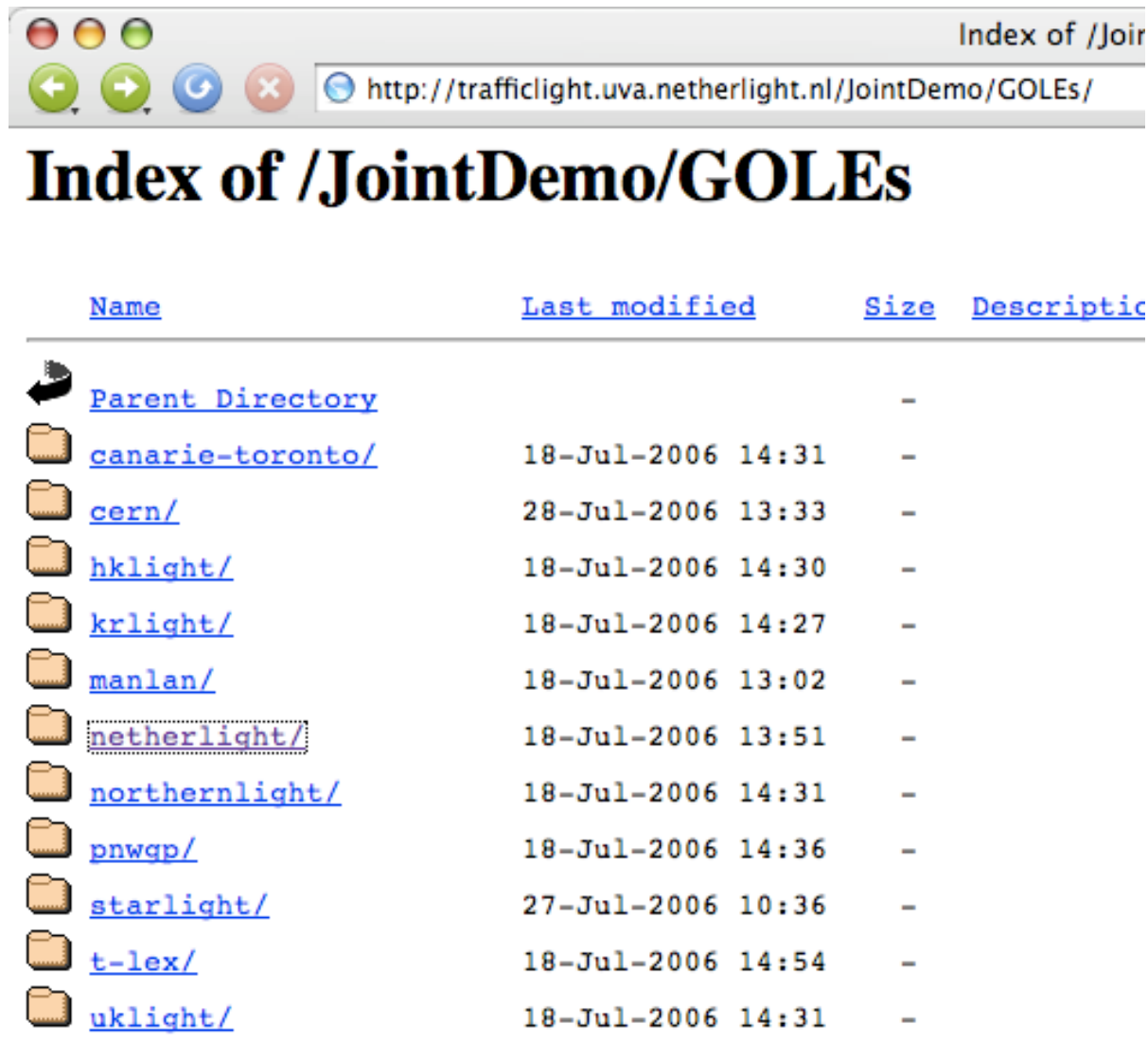




# NDL Visualisation (ctd.)















# GOLE Descriptions



Index of /Joir

http://trafficlight.uva.netherlight.nl/JointDemo/GOLEs/

## Index of /JointDemo/GOLEs

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Descriptio</u>
 <a href="#">Parent Directory</a>		-	
 <a href="#">canarie-toronto/</a>	18-Jul-2006 14:31	-	
 <a href="#">cern/</a>	28-Jul-2006 13:33	-	
 <a href="#">hklight/</a>	18-Jul-2006 14:30	-	
 <a href="#">krlight/</a>	18-Jul-2006 14:27	-	
 <a href="#">manlan/</a>	18-Jul-2006 13:02	-	
 <a href="#">netherlight/</a>	18-Jul-2006 13:51	-	
 <a href="#">northernlight/</a>	18-Jul-2006 14:31	-	
 <a href="#">pnwgp/</a>	18-Jul-2006 14:36	-	
 <a href="#">starlight/</a>	27-Jul-2006 10:36	-	
 <a href="#">t-lex/</a>	18-Jul-2006 14:54	-	
 <a href="#">uklight/</a>	18-Jul-2006 14:31	-	

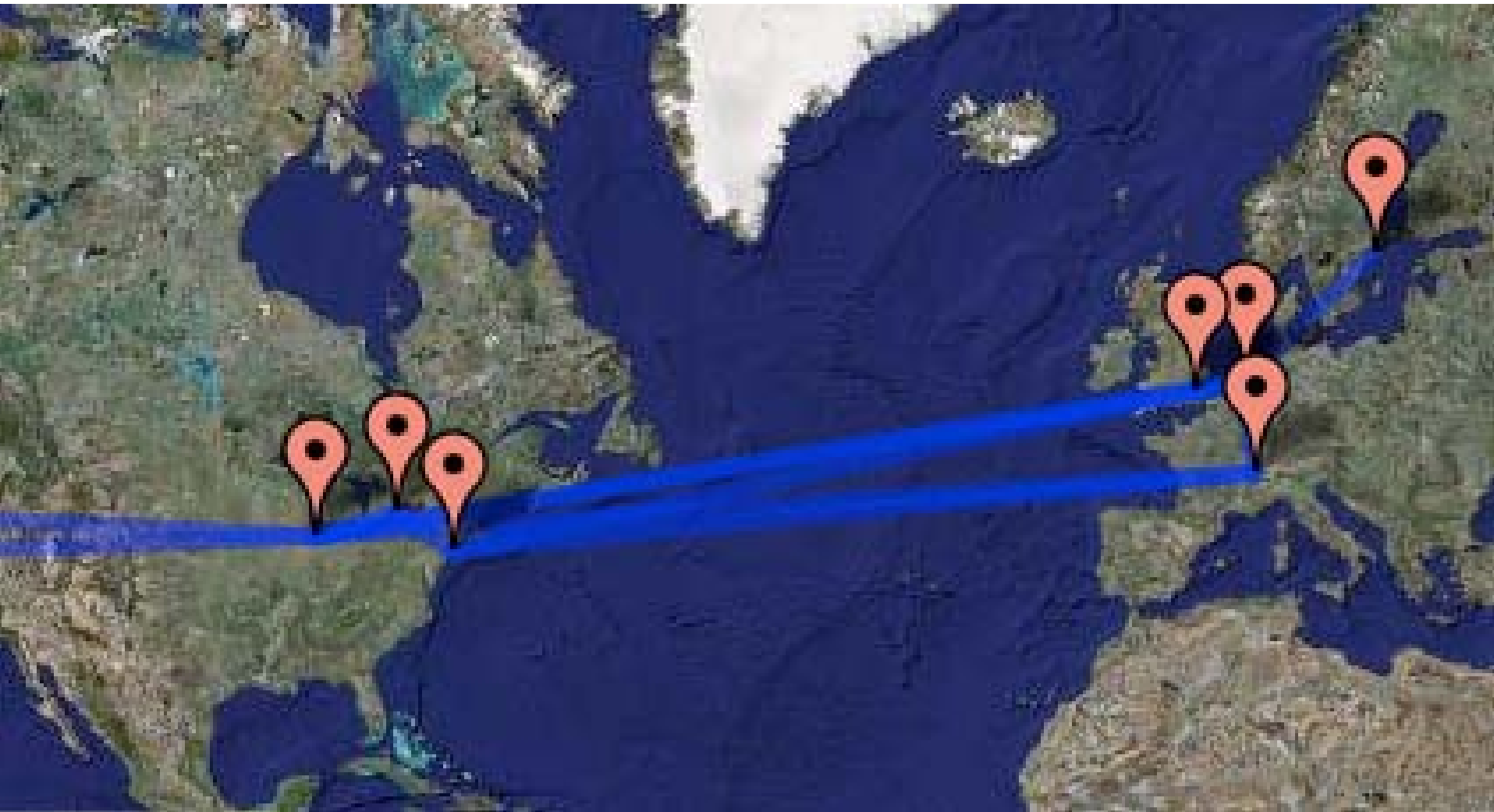
# GOLE Descriptions (ctd.)

```
<ndl:Interface rdf:about="#netherlight:if5">
  <ndl:name>netherlight:if5</ndl:name>
  <ndl:connectedTo
rdf:resource="http://trafficlight.uva.netherlight.nl/JointDemo/GOLEs/starlight
/starlight.rdf#starlight:if3"/>
</ndl:Interface>

<!--http://trafficlight.uva.netherlight.nl/JointDemo/GOLEs/starlight/starlight
.rdf#starlight:if3-->
<ndl:Interface
rdf:about="http://trafficlight.uva.netherlight.nl/JointDemo/GOLEs/starlight/st
arlight.rdf#starlight:if3">
  <rdfs:seeAlso
rdf:resource="http://trafficlight.uva.netherlight.nl/JointDemo/GOLEs/starlight
/starlight.rdf"/>
</ndl:Interface>

<!--netherlight:if6-->
<ndl:Interface rdf:about="#netherlight:if6">
  <ndl:name>netherlight:if6</ndl:name>
  <ndl:connectedTo
rdf:resource="http://trafficlight.uva.netherlight.nl/JointDemo/GOLEs/starlight
/starlight.rdf#starlight:if4"/>
</ndl:Interface>
```

# Enhanced Visualisation



# Six easy steps to NDL GLIF

1. Generate description of the exchange point
2. Publish description on a webserver
3. Send URL of description to [Kevin](#)
4. URL is posted on GLIF Resources site
5. For each external connection:
  - Once relevant description is available, update your description to link to theirs
  - Contact them to do the same

# Future Research

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- Path finding in GLIF
- Network Abstractions
- Multi-Layer Network Descriptions
- Implementation
  - DRAGON
  - Phosphorous
  - ...

# References

- <http://www.science.uva.nl/research/sne/ndl/>
- <http://trafficlight.uva.netherlight.nl/NDL-demo/>
- <http://staff.science.uva.nl/~vdham/NDL/googlemap.html>  
1