# PHOSPHORUS - WP1 domains interface developement

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Reservation Handling in Phosphorus

GRID APLICATIONS & MIDDLEWARE

RESV WS IF

Resv. WSDL

Network Service Plane

RESV WS CLIENT (PROXY)

Resv. WSDL

RESV WS IF — **Adapter**

RESV WS IF — **Adapter**

RESV WS IF — **Adapter**

ARGON

DRAC

UCLPv2

Network Resource Provisioning Systems

NRPS Specific Interfaces (WS, JMS, others)

GMPLS

Transport Network

Transport Network

CreateReservation(...)
+ JobID
+ ServiceDataType<List>:
  - ServiceID
  - TypeOfReservation
  - Connection<List>:
    · ConnectionID
    · MinBW, MaxBW
    · MaxDelay
    · DataAmount
    · Source, Target
    · Directionality
  - Constraints<List>:
    · Start-time
    · Duration
    · Deadline

CreateReservationUCLP(...)
  - ServiceID
  - TypeOfReservation ('fixed' by default)
  - Connection<List>:
    · ConnectionID
    · MinBW, MaxBW
    · MaxDelay
    · Source, Target
  - Constraints<List>:
    · Start-time
    · End-time

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Reservation WSDL (1)

```xml
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions
    name="Reservation-WS" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
    xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/"
    xmlns:http="http://schemas.xmlsoap.org/wsdl/http/"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:soapenc="http://schemas.xmlsoap.org/soap/encoding/"
    xmlns:mime="http://schemas.xmlsoap.org/wsdl/mime/"
    xmlns:wsa="http://www.w3.org/2005/08/addressing"
    xmlns:reservation="http://ist_phosphorus.eu/nsp/webservice/reservation"
    xmlns:ns="http://ist_phosphorus.eu/NSPCommon"
    xmlns:ns1="http://ist_phosphorus.eu/nsp"
    targetNamespace="http://ist_phosphorus.eu/nsp/webservice/reservation">
<wsdl:types><xs:schema>
    <xs:import namespace="http://ist_phosphorus.eu/nsp/webservice/reservation" schemaLocation="Reservation-Types.xsd"/>
</xs:schema></wsdl:types>
[…] fault definitons
<wsdl:message name="getFeatures">
    <wsdl:part name="getFeatures" element="reservation:getFeatures"/>
</wsdl:message>
<wsdl:message name="getFeaturesResponse">
    <wsdl:part name="getFeaturesResponse" element="reservation:getFeaturesResponse"/>
</wsdl:message>
[…] cont'd
```

Reservation WSDL (2)

```
<wsdl:message name="createReservation">
      <wsdl:part name="createReservation" element="reservation:createReservation"/>
</wsdl:message>
<wsdl:message name="cancelReservation">
<wsdl:part name="cancelReservation" element="reservation:cancelReservation"/>
</wsdl:message>
<wsdl:message name="cancelReservationResponse">
<wsdl:part name="cancelReservationResponse" element="reservation:cancelReservationResponse"/>
[…] others
<wsdl:portType name="networkReservationPortType">
      <wsdl:operation name="getFeatures">
              <wsdl:input message="reservation:getFeatures"
      wsa:Action="http://ist_phosphorus.eu/nsp/webservice/reservation/getFeatures"/>
              <wsdl:output message="reservation:getFeaturesResponse"
      wsa:Action="http://ist_phosphorus.eu/nsp/webservice/reservation/getFeaturesResponse"/>
              […] faults
      </wsdl:operation>
      <wsdl:operation name="createReservation">
              <wsdl:input message="reservation:createReservation"
      wsa:Action="http://ist_phosphorus.eu/nsp/webservice/reservation/createReservation"/>
              <wsdl:output message="reservation:createReservationResponse"
      wsa:Action="http://ist_phosphorus.eu/nsp/webservice/reservation/createReservationResponse"/>
               […] faults
      </wsdl:operation>
  […] cont'd
```

Reservation WSDL (3)

Resv. Data Types (must-have for interoperability)

The following parameters are considered for establishing Connections:

```xml
<xs:complexType name="ConnectionType">
    <xs:sequence>
            <xs:element name="ConnectionID" type="nsp:ConnectionIdentifierType"></xs:element>
            <xs:element name="Source" type="nspc:EndpointType"></xs:element>
            <xs:element name="Target" type="nspc:EndpointType" maxOccurs="unbounded"></xs:element>
            <xs:element name="Directionality" type="xs:int"></xs:element>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="ConnectionConstraintType"><xs:complexContent><xs:extension base="nsp:ConnectionType">
    <xs:sequence>
            <xs:element name="MinBW" type="xs:long"></xs:element>
            <xs:element name="MaxBW" type="xs:long"></xs:element>
            <xs:element name="MaxDelay" type="xs:int" minOccurs="0"></xs:element>
            <xs:element name="DataAmount" type="xs:long" minOccurs="0"></xs:element>
    </xs:sequence>
</xs:extension></xs:complexContent></xs:complexType>
```

The following parameters are considered for {Fixed,Deferrable,Malleable} Reservations:

```xml
<xs:element name="StartTime" type="xs:dateTime"></xs:element>
<xs:element name="Duration" type="xs:int" ></xs:element>
<xs:element name="Deadline" type="xs:dateTime"></xs:element>
```
(only for Malleable and Deferrable Resvs.)

Topology Data Types (must-have for interop.)

The following parameters are considered for establishing Connections:

```
<xs:complexType name="DomainInformationType"><xs:sequence>
    <xs:element name="DomainId" type="ns1:DomainIdentifierType"></xs:element>
    <xs:element name="Description" type="xs:string" minOccurs="0"></xs:element>
    <xs:element name="ReservationEPR" type="xs:anyURI"></xs:element>
    <xs:element name="TopologyEPR" type="xs:anyURI"></xs:element>
            <xs:element name="TNAPrefixList" type="ns1:TNAPrefixType" minOccurs="0"
    MaxOccurs="unbounded"></xs:element>
</xs:sequence></xs:complexType>
<xs:complexType name="EndpointType"><xs:sequence>
    <xs:element name="EndpointId" type="ns1:EndpointIdentifierType"></xs:element>
    <xs:element name="Name" type="xs:string" minOccurs="0"></xs:element>
    <xs:element name="Description" type="xs:string" minOccurs="0"></xs:element>
    <xs:element name="Interface" type="ns1:EndpointInterfaceType" minOccurs="0"></xs:element>
    <xs:element name="DomainId" type="ns1:DomainIdentifierType" minOccurs="0« ></xs:element>
    <xs:element name="Bandwidth" type="xs:int" minOccurs="0"></xs:element>
</xs:sequence></xs:complexType>
<xs:complexType name="Link"><xs:complexContent><xs:extension base="y:LinkIdentifierType"><xs:sequence>
    <xs:element name="Name" type="xs:string" minOccurs="0"></xs:element>
    <xs:element name="Description" type="xs:string" minOccurs="0"></xs:element>
    <xs:element name="Delay" type="xs:integer" minOccurs="0"></xs:element>
</xs:sequence></xs:extension></xs:complexContent></xs:complexType>
<xs:complexType name="LinkIdentifierType"><xs:sequence>
    <xs:element name="SourceEndpoint" type="nspc:EndpointIdentifierType"></xs:element>
    <xs:element name="DestinationEndpoint" type="nspc:EndpointIdentifierType« ></xs:element>
</xs:sequence></xs:complexType>
```

WP1 developments Phase 1 M0-M18

Middleware (WP3)

Network Service Plane (NSP)

NRPS Adapter | NRPS Adapter | NRPS Adapter | NRPS Adapter

ARGON (NRPS) | DRAC (NRPS) | UCLP (NRPS) | THIN NRPS for GMPLS
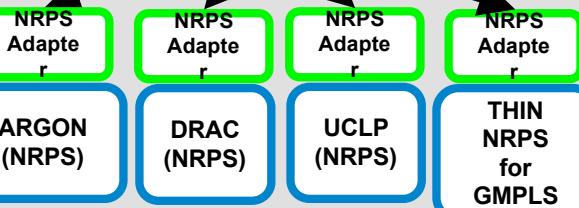
☐ Provided by the partners

☐ Implemented in WP1

• The NRPS Adapter is a generic open source module with a specific interface towards the NRPS

• After M18 the NSP will be enhanced to implement a distributed system architecture

'zoom'

G²MPLS

EnLIGHTened

G-Lambda

GÉANT2 (JRA3)
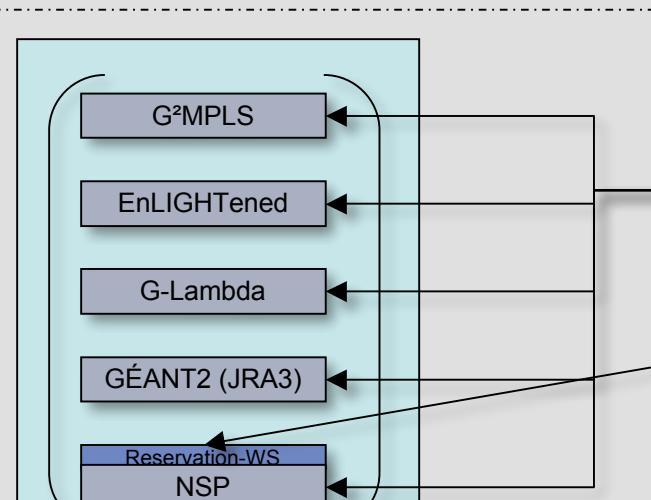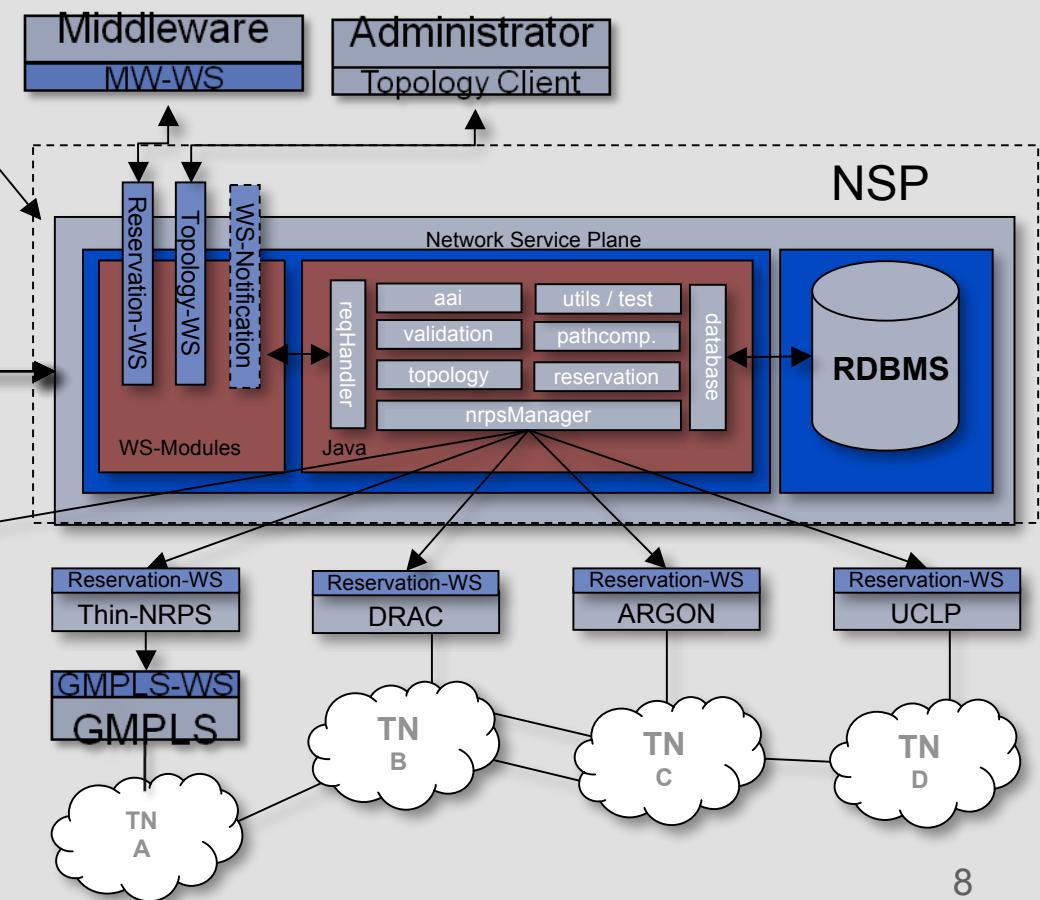
Reservation-WS
NSP

To be integrated after M18 (Phase 2)

Middleware
MW-WS

Administrator
Topology Client

NSP

Network Service Plane

Reservation-WS | Topology-WS | WS-Notification

reqHandler

aai | utils / test
validation | pathcomp.
topology | reservation
nrpsManager

database

RDBMS

WS-Modules | Java

Reservation-WS
Thin-NRPS

Reservation-WS
DRAC

Reservation-WS
ARGON

Reservation-WS
UCLP

GMPLS-WS
GMPLS

TN B

TN C

TN D

TN A

i2cat FUNDACIO

Management architecture. Logical view
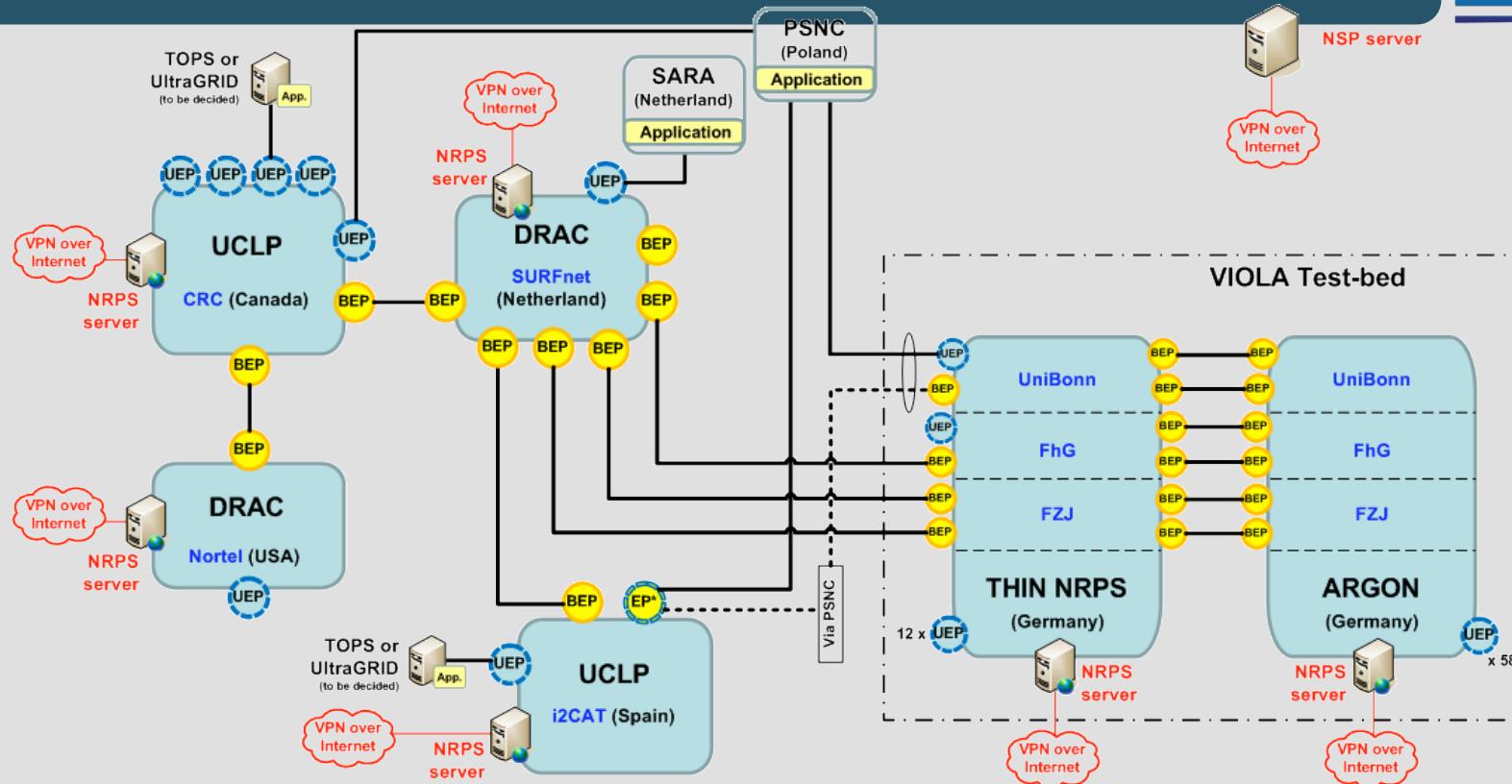
Step1 by December 2007

- Add topology information to the system (domain, link, endpoint)
- Create an immediate/advance reservation E2E across different domains/NRPS, with a selected BW and specific duration.
- 1 PHY port corresponds to 1 EndPoint
- No inter-domain BW management
- Use a THIN NRPS to control a GMPLS domain
- The NSP provides also a Path Computation algorithm

Step2 by March 2008

- Finish implementation of all advance reservation features to be able to create an advanced reservation end-to-end connection across domains
- Use embedded AAI in corporation with WP3
- Implement BW management that considers underlying technology
- Integrate the MW-WS