

*AGNIS<sup>SM</sup> – A Growable Network Information System<sup>SM</sup>*

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# AGNIS Service

Technical Description

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# Table of Contents

<b>AGNIS Service.....</b>	<b>1</b>
Overview.....	1
AGNIS Data Flows.....	1
Development AGNIS Server.....	1
Firewall Settings.....	2
Grid Credentials.....	2
Grid Service Operations.....	3
acknowledgeRetrieval.....	3
acknowledgeSingleRetrievedFormRevision.....	3
getNewlyCompletedFormRevisionQuantity.....	3
ping.....	3
publishCompletedFormRevision.....	3
requestSiteCertificate.....	4
retrieveNewlyCompletedFormRevisions.....	4
retrieveSingleCompletedFormRevision.....	4
submitFormRevision.....	4
Class Diagram.....	5
XML Schema.....	6
Sample Output.....	9
Test Client.....	9

# AGNIS Service

## Overview

This document describes the AGNIS grid service currently running on the `yew.nmdp.org` AGNIS development server.

A number of teams are currently in the process of adding AGNIS connectivity to their software. The service running on `yew.nmdp.org` serves as a testing ground for systems being built to connect with AGNIS.

## AGNIS Data Flows

For the initial AGNIS release, two slightly different types of data will pass through the AGNIS service: completed forms, and new or updated forms.

The NMDP's FormsNet system transmits completed forms to the AGNIS server, which stores them in an AGNIS forms data repository (database). AGNIS subscribers, such as CIBMTR and transplant centers, are then able to periodically retrieve their newly completed forms from the AGNIS repository.

Additionally, a transplant center is able to submit a new or updated form to the AGNIS server; AGNIS immediately passes the submitted form to FormsNet and returns the FormsNet response back to the center.

(TBD: diagrams illustrating these data flows)

## Development AGNIS Server

The URL for the AGNIS "FormHandler" grid service on `yew.nmdp.org` is:

```
https://yew.nmdp.org:8443/wsrf/services/agnis/FormHandler
```

The above URL is not intended to be viewed using a web browser. Instead, AGNIS client programs use this URL to communicate with AGNIS services via web based protocols.

The following URL displays Web Service Definition Language (WSDL) for the AGNIS FormHandler service. For those with access to `yew.nmdp.org`, this URL can be viewed using a regular web browser.

```
https://yew.nmdp.org:8443/wsrf/services/agnis/FormHandler?wsdl
```

WSDL is a standard XML notation for describing web services.

AGNIS is being build using software infrastructure provided by caGrid ([www.cagrid.org](http://www.cagrid.org)) and Globus ([www.globus.org](http://www.globus.org)), which is built upon web service standards.

## AGNIS Service

### Firewall Settings

The `yew.nmdp.org` machine resides in a secure network segment in the NMDP data center, and is protected by NMDP firewalls. The `yew.nmdp.org` machine is not openly accessible from anywhere on the internet, so those wishing to connect to this machine will need to contact the NMDP requesting a modification to the NMDP firewall settings (please specify the IP address from which you will be connecting to `yew.nmdp.org`).

### Grid Credentials

In addition to the NMDP firewall, AGNIS services are also protected by the Globus Security Infrastructure (GSI), which uses client side X.509 certificates to authenticate web service users. Those wishing to connect directly with AGNIS services on `yew.nmdp.org` should contact the NMDP for help generating an AGNIS compatible user certificate, and to have the certificate signed by the `yew.nmdp.org` certificate authority.

Plans call for eventual addition of credential management tools and features to AGNIS, to simplify the process of managing AGNIS user credentials and permissions. However, at this point, although the basic security infrastructure is in place, we still need to manage the user certificates by hand.

## Grid Service Operations

### acknowledgeRetrieval

```
long acknowledgeRetrieval(  
    String subscriberUniqueName,  
    long retrievalSequenceNumber)
```

Usage: AGNIS subscriber (TC or CIBMTR) acknowledges successful processing of all forms associated with a previously received `Retrieval` (see also: `retrieveNewlyCompletedFormRevisions`).

### acknowledgeSingleRetrievedFormRevision

```
long acknowledgeSingleRetrievedFormRevision(  
    String subscriberUniqueName,  
    String publisherUniqueName,  
    String formInstanceId,  
    Integer formRevisionSequenceNumber)
```

Usage: AGNIS subscriber (TC or CIBMTR) acknowledges successful processing of a single form. This would generally be used only in cases where not all forms associated with a specific `Retrieval` could be successfully processed.

### getNewlyCompletedFormRevisionQuantity

```
int getNewlyCompletedFormRevisionQuantity(  
    String subscriberUniqueName)
```

Usage: AGNIS subscriber (TC or CIBMTR) discovers how many newly completed forms are available for the specified `subscriberUniqueName`.

### ping

```
void ping()
```

Usage: Facilitates monitoring of AGNIS service health by administrators.

### publishCompletedFormRevision

```
int publishCompletedFormRevision(  
    FormRevision formRevision)
```

Usage: AGNIS publisher (FormsNet) transmits a completed form to the AGNIS repository.

## AGNIS Service

### **requestSiteCertificate**

```
void requestSiteCertificate(  
    String siteDescription,  
    String publicKey)
```

Usage: New AGNIS site requests signature of public key (certificate) by AGNIS certificate authority.

### **retrieveNewlyCompletedFormRevisions**

```
Retrieval retrieveNewlyCompletedFormRevisions(  
    String subscriberUniqueName,  
    int maximumFormQuantityRetrieved)
```

Usage: AGNIS subscriber (TC or CIBMTR) retrieves a set of newly completed forms from the AGNIS repository.

### **retrieveSingleCompletedFormRevision**

```
Retrieval retrieveSingleCompletedFormRevision(  
    String subscriberUniqueName,  
    String publisherUniqueName,  
    String formInstanceId)
```

Usage: AGNIS subscriber (TC or CIBMTR) retrieves a single form from the AGNIS repository.

### **submitFormRevision**

```
FormRevision submitFormRevision(  
    FormRevision formRevision)
```

Usage: AGNIS subscriber (TC) submits a new or updated form to FormsNet via AGNIS.



## AGNIS Service

### XML Schema

The XML schema which defines XML notation for the AGNIS XML message data structures can be found at the following URL.

<https://yew.nmdp.org:8443/wsrf/share/schema/FormHandler/net.agnis.forms.xsd>

For those without access to `yew.nmdp.org`, here is a copy of the AGNIS XML schema.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns="gme://forms.AGNIS/1.0/net.agnis.forms"
  targetNamespace="gme://forms.AGNIS/1.0/net.agnis.forms"
  elementFormDefault="qualified"
  version="1.1">
  <xs:element name="Question" type="Question" />
  <xs:complexType name="Question">
    <xs:sequence>
      <xs:element name="errorCollection" type="FormElementError"
        minOccurs="0" maxOccurs="unbounded" />
      <xs:element name="value" type="xs:string"
        minOccurs="0" maxOccurs="1" />
      <xs:element name="alternateValue" type="xs:string"
        minOccurs="0" maxOccurs="1" />
    </xs:sequence>
    <xs:attribute name="id" type="xs:long" />
    <xs:attribute name="formRevisionId" type="xs:long" />
    <xs:attribute name="dataElementPublicId" type="xs:long" />
    <xs:attribute name="dataElementVersion" type="xs:decimal" />
    <xs:attribute name="alternateMetadataType" type="xs:string" />
    <xs:attribute name="alternateMetadataId" type="xs:string" />
    <xs:attribute name="repeatSequenceNumber" type="xs:integer" />
    <xs:attribute name="errorException" type="xs:string" />
    <xs:attribute name="modificationTime" type="xs:dateTime" />
    <xs:attribute name="modificationUserId" type="xs:string" />
  </xs:complexType>
  <xs:element name="Institution" type="Institution" />
  <xs:complexType name="Institution">
    <xs:sequence />
    <xs:attribute name="id" type="xs:long" />
    <xs:attribute name="uniqueName" type="xs:string" />
    <xs:attribute name="currentRetrievalSequenceNumber" type="xs:long" />
    <xs:attribute name="modificationTime" type="xs:dateTime" />
    <xs:attribute name="modificationUserId" type="xs:string" />
  </xs:complexType>
  <xs:element name="FormRevision" type="FormRevision" />
  <xs:complexType name="FormRevision">
    <xs:sequence>
      <xs:element name="form" type="Form"
        minOccurs="0" maxOccurs="1" />
      <xs:element name="errorCollection" type="FormElementError"
        minOccurs="0" maxOccurs="unbounded" />
      <xs:element name="questionCollection" type="Question"
        minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
    <xs:attribute name="id" type="xs:long" />
    <xs:attribute name="formId" type="xs:long" />
  </xs:complexType>
</xs:schema>
```

## AGNIS Service

```
<xs:attribute name="sequenceNumber" type="xs:integer" />
<xs:attribute name="receivedTime" type="xs:dateTime" />
<xs:attribute name="status" type="xs:string" />
<xs:attribute name="modificationTime" type="xs:dateTime" />
<xs:attribute name="modificationUserId" type="xs:string" />
</xs:complexType>
<xs:element name="Retrieval" type="Retrieval" />
<xs:complexType name="Retrieval">
  <xs:sequence>
    <xs:element name="subscriber" type="Institution"
      minOccurs="0" maxOccurs="1" />
    <xs:element name="formRevisionCollection" type="FormRevision"
      minOccurs="0" maxOccurs="unbounded" />
  </xs:sequence>
  <xs:attribute name="id" type="xs:long" />
  <xs:attribute name="subscriberInstitutionId" type="xs:long" />
  <xs:attribute name="sequenceNumber" type="xs:long" />
  <xs:attribute name="transmittedTime" type="xs:dateTime" />
  <xs:attribute name="acknowledgedStatus" type="xs:string" />
  <xs:attribute name="acknowledgedTime" type="xs:dateTime" />
  <xs:attribute name="modificationTime" type="xs:dateTime" />
  <xs:attribute name="modificationUserId" type="xs:string" />
</xs:complexType>
<xs:element name="TestQuestion" type="TestQuestion" />
<xs:complexType name="TestQuestion">
  <xs:sequence />
  <xs:attribute name="id" type="xs:long" />
  <xs:attribute name="formElementErrorId" type="xs:long" />
  <xs:attribute name="dataElementPublicId" type="xs:long" />
  <xs:attribute name="dataElementVersion" type="xs:decimal" />
  <xs:attribute name="alternateMetadataType" type="xs:string" />
  <xs:attribute name="alternateMetadataId" type="xs:string" />
  <xs:attribute name="repeatSequenceNumber" type="xs:integer" />
  <xs:attribute name="modificationTime" type="xs:dateTime" />
  <xs:attribute name="modificationUserId" type="xs:string" />
</xs:complexType>
<xs:element name="InformationProcess" type="InformationProcess" />
<xs:complexType name="InformationProcess">
  <xs:sequence />
  <xs:attribute name="id" type="xs:long" />
  <xs:attribute name="uniqueName" type="xs:string" />
  <xs:attribute name="description" type="xs:string" />
  <xs:attribute name="modificationTime" type="xs:dateTime" />
  <xs:attribute name="modificationUserId" type="xs:string" />
</xs:complexType>
<xs:element name="Form" type="Form" />
<xs:complexType name="Form">
  <xs:sequence>
    <xs:element name="publisher" type="Institution"
      minOccurs="0" maxOccurs="1" />
    <xs:element name="originator" type="Institution"
      minOccurs="0" maxOccurs="1" />
  </xs:sequence>
  <xs:attribute name="id" type="xs:long" />
  <xs:attribute name="originatorInstitutionId" type="xs:long" />
  <xs:attribute name="publisherInstitutionId" type="xs:long" />
  <xs:attribute name="instanceId" type="xs:string" />
  <xs:attribute name="publicId" type="xs:long" />
  <xs:attribute name="version" type="xs:decimal" />
</xs:complexType>
```

## AGNIS Service

```
<xs:attribute name="alternateMetadataType" type="xs:string" />
<xs:attribute name="alternateMetadataId" type="xs:string" />
<xs:attribute name="currentFormRevisionSequenceNumber"
  type="xs:integer" />
<xs:attribute name="modificationTime" type="xs:dateTime" />
<xs:attribute name="modificationUserId" type="xs:string" />
</xs:complexType>
<xs:element name="ProcessingStatus" type="ProcessingStatus" />
<xs:complexType name="ProcessingStatus">
  <xs:sequence>
    <xs:element name="informationProcess" type="InformationProcess"
      minOccurs="0" maxOccurs="1" />
    <xs:element name="formRevision" type="FormRevision"
      minOccurs="0" maxOccurs="1" />
  </xs:sequence>
  <xs:attribute name="id" type="xs:long" />
  <xs:attribute name="informationProcessId" type="xs:long" />
  <xs:attribute name="formRevisionId" type="xs:long" />
  <xs:attribute name="value" type="xs:string" />
  <xs:attribute name="startTime" type="xs:dateTime" />
  <xs:attribute name="endTime" type="xs:dateTime" />
  <xs:attribute name="note" type="xs:string" />
  <xs:attribute name="modificationTime" type="xs:dateTime" />
  <xs:attribute name="modificationUserId" type="xs:string" />
</xs:complexType>
<xs:element name="FormElementError" type="FormElementError" />
<xs:complexType name="FormElementError">
  <xs:sequence>
    <xs:element name="testQuestionCollection" type="TestQuestion"
      minOccurs="0" maxOccurs="unbounded" />
    <xs:element name="rawData" type="xs:string"
      minOccurs="0" maxOccurs="1" />
  </xs:sequence>
  <xs:attribute name="id" type="xs:long" />
  <xs:attribute name="formRevisionId" type="xs:long" />
  <xs:attribute name="questionId" type="xs:long" />
  <xs:attribute name="type" type="xs:string" />
  <xs:attribute name="message" type="xs:string" />
  <xs:attribute name="modificationTime" type="xs:dateTime" />
  <xs:attribute name="modificationUserId" type="xs:string" />
</xs:complexType>
</xs:schema>
```

## AGNIS Service

# Sample Output

## Test Client

Output from an AGNIS client program which exercises the existing grid service operations.

```
C:\AGNIS_FormHandler> ant runClient
Buildfile: build.xml

setGlobus:

checkGlobus:
    [echo] Globus: C:\ws-core-4.0.5

defineClasspaths:

defineExtendedClasspaths:

runClient:
    [echo] Connecting to service:
    [echo] https://yew.nmdp.org:8443/wsrf/services/agnis/FormHandler
    [java] JVM args ignored when same JVM is used.
    [java] Running the Grid Service Client

    [java] Operation:  requestSiteCertificate

    [java] Operation:  acknowledgeRetrieval
    [java] Operation successful.
    [java] Now triggering RemoteException.
    [java] RemoteException received.

    [java] Operation:  acknowledgeSingleRetrievedFormRevision
    [java] Operation successful.
    [java] Now triggering RemoteException.
    [java] RemoteException received.

    [java] Operation:  getNewlyCompletedFormRevisionQuantity
    [java] Return value: 0
    [java] Operation successful.
    [java] Now triggering RemoteException.
    [java] RemoteException received.

    [java] Operation:  publishCompletedFormRevision
    [java] Operation successful.
    [java] Return value: 1
    [java] Now triggering RemoteException.
    [java] RemoteException received.

    [java] Operation:  retrieveNewlyCompletedFormRevisions
    [java] Writing serialized object to output file: Retrieval.xml
    [java] Operation successful.
    [java] Now triggering RemoteException.
    [java] RemoteException received.
```

## AGNIS Service

```
[java] Operation: retrieveSingleCompletedFormRevision  
[java] Writing serialized object to output file: FormRevision.xml  
[java] Operation successful.  
[java] Now triggering RemoteException.  
[java] RemoteException received.
```

```
[java] Operation: submitFormRevision  
[java] Writing serialized object to output file: SubmitFormRevision.xml  
[java] Operation successful.  
[java] Now triggering RemoteException.  
[java] RemoteException received.
```

BUILD SUCCESSFUL

Total time: 51 seconds