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IHE Services - Project HEALTHLAB

User Manual

Demographic Data Server - 3.x

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■ KEREVAL Approval

Name	Function	Date	Visa
Eric POISEAU	Project leader	7/04/2016	OK
Florent VAUTION	Quality Manager	7/04/2016	OK

■ Diffusion

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■ Document history

Version	Date	Author	Modifications
V0.01	06/04/2016	Anne-Gaëlle BERGE	Creation: extract content from Drupal
V1.01	06/04/2016	Anne-Gaëlle BERGE	Ready for review
V1.02	07/04/2016	Florent Vaution	QA Checks

■ Table of content

1   Introduction

The demographic Data Server is a tool that generates random demographic informations, and make them available for tools to use for testing purpose.

1.1   Gazelle DDS use cases

The Demographic Data Server tries to respond to the following use cases :

■ Generate realistic data set to fill out a database with data for testing purpose.

■ Request data on the demand through web services

■ Transfert data through HL7 V2 or HL7 V3 messages (using multibyte character encoding when necessary)

■ Support for different kind of character encoding.

■ Support for many languages and countries

Usage through web interface (for humans) or web services (for machines)

1.2   Overview of the Demographic Data Server (DDS) project

When running a test we often need to inject demographic data. The aim of the tool is to generate the necessary data. Generated data are fictive (not real) but looks like real data. Demographic characteristics consist of

■ First name, last name, mother maiden name ...

■ date of birth,

■ sex,

■ religion,

■ race,

■ address

The address consists of the street, town, state, zip code and country. Addresses are randomly generated. We use the geonames database and googlemaps geocoding webservices in order to generate random addresses or more specific research. Generated addresses contain zip code information, matching the city name. Currently generated demographic information can be generated for the United-States, France, Germany and Japan. We are working on including data for more countries. Demographic Dataserver is taking into account information about the frequency of firstname, lastname, race and religion. The Demographic Data Server provides a Web User interface as well as a Web Service interface.

The GUI offers the possibility to generate patient data, see all generated patient data and shre this patient data with other systems in HL7 v2 or v3.

2   DDS - User Manual for user interface

2.1   How to create a new patient data?

To create a new patient, go to the [Create Patient] menu. In the create patient page, user will have the choice between two tabs : "Patient's generation" and "Advances Patient's generation".

In the first tab, "Patient's generation", the user will be allow to create patient information by selecting the country [Country Please Select... / Generate Demographic Data]. Once the country has been selected, hit the "Generate Demographic Data" button. The generated patient will have basic information (last name, first name, other firstname, mother maiden name, gender, data of birth, patient identifier in DDS, National Patient Identifier and one address). It is possible that some of this information are missing. At the bottom of the Patient Information panel, the [icon] button can be used to send patient (with HL7 v2 or v3 messages) to the user system. Go to the next part below to send a patient with DDS. See below, one example of a generated patient :

Patient Information	
FirstName	Lisette
Other FirstName	Humbert, Narcisse,
LastName	Lacombe
Mother Maiden Name	Chanut
Gender	Female
Date Of Birth	1945-11-17
Patient Identifier	DDS-8615^^^DDS&1.3.6.1.4.1.12559.11.1.4.1.2&ISO
National Patient Identifier	08908068822639283608 57^^^FR&UNKNOWN&ISO

Patient Address Details				
Street	**City**	**State**	**Postal Code**	**Country**
Rue Morand	Pontarlier		25300	FRANCE

In the second tab, "Advances Patient's generation", the user will be allow to create advanced patient information by using a lot of criteria. Criteria are all in the "Generation Options" panel. Once the user has set option, just hit the [Generate Demographic Data] button to generate patient information. DDS offers to the user to Preset the generation option according to the selected patient preset(s). For that, select the preset in the left panel, and hit the [▸ Copy] button. Once you have selected all desire presets (selected preset are in the right panel), hit the [Preset Option] button to preset the option according to the selected preset(s). Then, hit the [Generate Demographic Data] button. (You can select more than one preset at the same time). For example, if user choose the "Dead Patient" preset, the "Dead Patient" option will be set to "Yes". This functionnality allows the user to quickly set the generation option. See below the result of a generated patient information.

Choice of the patient generation preset

Please select one or more patient preset for generation.

Married Woman		Alias And Display Name
	▸▸ Copy all	Dead Patient
	▸ Copy	New Born
	◂ Remove	
	◂◂ Remove All	

Preset Option

Generation Options

Country	France ▾
FirstName	Is Like ▾	berna
LastName	Random ▾
Mother Maiden Name	Random ▾
Gender	Male ▾
New Born	Yes ▾
Marriage Status	Unknown ▾
Maiden Name	Empty ▾
Religion	Empty ▾
Race	Empty ▾
Alias Name	Random ▾
Display Name	Random ▾
Date Of Birth	Random ▾
Dead Patient	No ▾
Address	Random ▾

Reset Options   Generate Demographic Data

Patient Personal Information

FirstName	Bernard
Other FirstName	Gervaise,
LastName	Guittard
Mother Maiden Name	Fleury
Gender	Male
Date Of Birth	2012-02-19
Patient Identifier	DDS-8626^^^DDS&1.3.6.1.4.1.12559.11.1.4.1.2&ISO
National Patient Identifier	09891635140544820615 61^^^FR&UNKNOWN&ISO

Futher Information

Alias Name

FirstName	Irenee
LastName	Gay

Display Name

FirstName	Olivier
LastName	Jung

Information about the New Born Mother.

FirstName	Ariane
LastName	Guittard
Mother Maiden Name	Masset
Marital Satus	Married
Gender	Female
Date Of Birth	1968-08-12
Patient Identifier	DDS-8625^^^DDS&1.3.6.1.4.1.12559.11.1.4.1.2&ISO
National Patient Identifier	06471719498465990101 15^^^FR&UNKNOWN&ISO
Maiden Name	
FirstName	Ariane
LastName	Fleury

Patient Address Details

Street : Rue Jean Catelas

City : Bonneuil-sur-Marne

State :

Postal Code : 94380

Country : FRANCE

2.2 How to consult existing patient data ?

To see all patient data generated by DDS, go to the **Consult Existing Patients** menu. This page show to the use, in a table, all patient data generated by DDS. User can use the FirstName and the LastName filters to search a specific patient. It is also possible to sort the patient data by Id (Id in DDS), FirstName, LastName, Gender, Race, Religion ... by hiting the button.

Id	FirstName	LastName	Gender	Race	Religion	Country	Creation date	Action
8741	Francis	Allen	Male	White	Christian: Protestant	United States	2012-03-12 16:53:46.47	
8740	翼	裕美	Male		Shintoist	Japan	2012-03-12 16:10:29.969	
8739	Ludovica	Marini	Female			Italy	2012-03-12 15:58:38.263	
8738	Clothilde	Petitjean	Female			France	2012-03-02 11:55:53.856	
8737	Josephine	Madelaine	Female			France	2012-03-02 11:54:17.58	
8736	Hugo	Devos	Male			Belgium	2012-03-02 11:51:34.577	
8735	Christiane	Schwarz	Female			Germany	2012-03-01 10:43:30.114	
8734	toto	titi	Male			Slovakia	2012-03-01 10:37:21.394	
8733	toto	titi	Male			Greece	2012-03-01 10:37:15.055	
8732	Αλεξανδροσ	Παπαδοπουλοσ	Male			Greece	2012-03-01 10:37:01.984	
8731	test	Lefeuvre	Female			France	2012-03-01 10:21:06.787	
8730	test	Collin	Male			France	2012-03-01 10:20:54.335	
8729	Penelope	Coulon	Female			France	2012-03-01 10:20:44.501	
8728	Celestine	Ferreira	Female			France	2012-03-01 10:05:49.153	
8727	Josee	Roger	Female		Christian: Roman Catholic	France	2012-03-01 09:57:10.669	
8726	Leonne	Lapierre	Female		Christian: Roman Catholic	France	2012-03-01 09:57:07.27	
8725	Apollinaire	Varin	Male		Christian: Roman Catholic	France	2012-03-01 09:56:58.783	
8724	Colette	Metzger	Female		Christian: Roman Catholic	France	2012-02-23 15:44:03.968	
8723	Lucien	Martineau	Male		Christian: Roman Catholic	France	2012-02-23 15:43:46.864	
8722	Gisele	Corbin	Female		Jewish	France	2012-02-23 15:10:48.941	

In the action column :

The ![info] button allows user to see the patient data in a pop-up.

The ![add] button allows user to add the selected patient in the selected patient list. This list can be used to share patient. User can add to this list many patients as he wants.

Finally, just below the patient data table, the user could find all patients of the selected patient list :

The ![share] button can be used to share all patient data of the selected patient list.

The ![reset] button can be used to reset the selected patient list.

The **Refresh patients list below** button (over the patient table) can be used to refresh the patients list of the patient data table.

2.3   How to share patient data ?

The GUI allows the user to send the selected patients through an HL7 V2 or V3 messages. Once user has selected the patients to send to his system (see the section over), it is necessary to configure the sending option :

User must select the HL7 message type and version. Four options are available, see the screenshot

○ **ADT^A01^ADT_A01 (v2.3.1)**

○ **ADT^A04^ADT_A01 (v2.3.1)**

○ **ADT^A28^ADT_A05 (v2.5)**

below. ○ **PRPA_IN201301UV02 (v3)**

Once the message typas has been seleted, the user must choose the character set encoding to use (only available for the HL7 version 2). The list of character set encoding depends on the country of the

ISO-8859-1
ISO-8859-1
UTF-8

patients to send.

Then, the user must fill the Targets Selected fields. This information are relative to the user system which will receive the patient data. It is possible to send the patient data to several system at the same time. See the example below, for HL7 v2. Hit the Add button to add the configuration to the list of configuration. Be careful, your target must have a port open on the internet. Before sending messages to your system, ensure that your firewall options give to DDS the access to your system.

Targets Selected	
System Name*	Gazelle
IPAddress*	127.0.0.1
Port*	5555
Receiving Application*	System
Receiving Facility*	IHE

* Required Fields

[Add]

List of configurations

System Name ▲	IPAddress	Port	Receiving Application	Receiving Facility	Action
Gazelle	127.0.0.1	5555	System	IHE	✖

[Send Message] [Empty List]

Finally, hit the **Send Message** button to send all selected patient data to the configuration(s). A summury of exchanges will appear just below the configuration panel. For each message, you can hit the **more** button to see the full sent message content or the full acknowlegdment message content. See the example below.

Summary of exchanges

Result(s) for the configuration : Gazelle

System Name	Sent Message	Received ?	Ack Code	Ack
Gazelle	MSH|^~\&|Gazelle|IHE|System|IHE|20120221145103||ADT^A28^ADT_A05|20120221145103|P|2.5|1||||FRA|UTF-8... more	Yes	AA	MSH|^~\&|System|IHE|Gazelle|IHE|20120221145104||ACK|20120221145103|P|2.5|||||UTF-8 MSA|AA|20120221... more
Gazelle	MSH|^~\&|Gazelle|IHE|System|IHE|20120221145104||ADT^A28^ADT_A05|20120221145104|P|2.5|1||||FRA|UTF-8... more	Yes	AA	MSH|^~\&|System|IHE|Gazelle|IHE|20120221145104||ACK|20120221145104|P|2.5|||||UTF-8 MSA|AA|20120221... more
Gazelle	MSH|^~\&|Gazelle|IHE|System|IHE|20120221145104||ADT^A28^ADT_A05|20120221145104|P|2.5|1||||FRA|UTF-8... more	Yes	AA	MSH|^~\&|System|IHE|Gazelle|IHE|20120221145104||ACK|20120221145104|P|2.5|||||UTF-8 MSA|AA|20120221... more

[Print]

3 Web Services Interface

The WSDL file describing the web service is here. You can also download an example of a project soapUI that use these methods from here.

3.1 Functionalities

Functionalities of DDS can be used by web services methods. In fact, DDS implement 7 methods on web service :

- *returnAddress :* generate random address from the country code

- *returnAddressByCoordinates :* generate a specific address from country code and coordinates

- *returnAddressBtTown :* generate a specific address from a town

- *returnHL7Message :* generate HL7 message on format XML from a country code

- *returnPatient :* generate a patient from a country code. We can restrict generation on same persons by specifying attributes like the gender, or on specifying a nearby name or a part of the name

- *returnPatientWithAllOptions* : generate a patient from a country code. All options to generate a patient are available here.

- *returnPerson :* generate a person without address, using the same attributes of generation of a patient

- *sendHL7Message :* generate and send a HL7 message to a target host and port.

3.2 Web Services Limitation

We do not have limited ressources to offer for this service. Thus the access to the webservice is limited to a "reasonnable" number of request per days/minute. We'd like to avoid DoS on the gazelle tools because someone is requesting fake patients every second.

Thus our limitation are :

- No more than 30 requests per IP address per minute

- No more than 3000 requests per period of 24 hours per IP address

If you'd like to generate large random data, please get in contact with Eric Poiseau and we will try to help you and generate data to fill your needs.

4   DDS - User Manual for Web Services

4.1   Web Services Interface

The WSDL file describing the web service is here. You can also download an example of a project soapUI that use these methods from here.

4.2   Functionalities

Functionalities of DDS can be used by web services methods. In fact, DDS implement 12 methods on web service. See the table below to have further information:

Method Name	Description	Parameter Name	Possible Values
getListCountryCode	Return all available country code.	No parameter.	
returnAddress	Generate a specific address from country code.	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country. Use the getListCountryCode method.)
returnAddressByCoordinates	Generate a specific address from country code and coordinates.	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country. Use the getListCountryCode method.)
		lat : The lattitude of the place from which we extract the address.	For example : 53.5459481506
		lng : the longitude of the place from which we extract the address.	For example : 10.204494639
returnAddressByTown	Generate a specific address from a Town.	**townName** : The name of the town.	For example : Paris, London, Toronto, Roma, ...
returnPerson	Return a Person from some parameters.	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country. Use the getListCountryCode method.)
		lastNameOption : Specify if you want to generate the last name or not.	true or false
		firstNameOption : Specify if you	true or false

		want to generate the first name or not.	
		motherMaidenNameOption : Specify if you want to generate the mother maiden name or not.	true or false
		religionOption : Specify if you want to generate the religion of the person or not.	true or false
		raceOption : Specify if you want to generate the race of the person or not.	true or false
		birthDayOption : Specify if you want to generate the birth day of the person or not.	true or false
		genderDescription : Specify the gender of the person.	Male, Female, male, female, m, M, f, F or Random. For other value, the gender will be generate randomly.
		firstNameLike : Specify it if you want to get a first name approaching the specified first name.(Attention, you have to choose between the firstNameLike and the firstNameIs.)	For example : Nico, Dav, ...
		lastNameLike : Specify it if you want to get a last name approaching the specified last name. (Attention, you have to choose between the lastNameLike and the lastNameIs.)	For example : Jam, lef, ...
		firstNameIs : Specify it if you want to get a person with this exact first name. (Attention, you have to choose between the firstNameLike and the firstNameIs.)	For example : Nicolas
		lastNameIs : Specify it if you want to get a person with this exact first name. (Attention, you have to choose between the lastNameLike and the lastNameIs.)	For example : James
returnSimplePatient	Return a simpl patient from a specific country.	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country. Use the getListCountryCode method.)
returnPatient	Return a Patient from some parameters.	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each

			country. Use the getListCountryCode method.)
		lastNameOption : Specify if you want to generate the last name or not.	true or false
		firstNameOption : Specify if you want to generate the first name or not.	true or false
		motherMaidenNameOption : Specify if you want to generate the mother maiden name or not.	true or false
		religionOption : Specify if you want to generate the religion of the person or not.	true or false
		raceOption : Specify if you want to generate the race of the person or not.	true or false
		birthDayOption : Specify if you want to generate the birth day of the person or not.	true or false
		genderDescription : Specify the gender of the person.	Male, Female, male, female, m, M, f, F or Random. For other value, the gender will be generate randomly.
		firstNameLike : Specify it if you want to get a first name approaching the specified first name.(Attention, you have to choose between the firstNameLike and the firstNameIs.)	For example : Nico, Dav, ...
		lastNameLike : Specify it if you want to get a last name approaching the specified last name. (Attention, you have to choose between the lastNameLike and the lastNameIs.)	For example : Jam, lef, ...
		firstNameIs : Specify it if you want to get a person with this exact first name. (Attention, you have to choose between the firstNameLike and the firstNameIs.)	For example : Nicolas
		lastNameIs : Specify it if you want to get a person with this exact first name. (Attention, you have to choose between the lastNameLike and the lastNameIs.)	For example : James
returnPatientWithAllOptions	The most complete method to return	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the

	a patient. A lot of parameters are available.		ISO code of each country. Use the getListCountryCode method.)
		lastNameOption : Specify if you want to generate the last name or not.	true or false
		firstNameOption : Specify if you want to generate the first name or not.	true or false
		motherMaidenNameOption : Specify if you want to generate the mother maiden name or not.	true or false
		religionOption : Specify if you want to generate the religion of the person or not.	true or false
		raceOption : Specify if you want to generate the race of the person or not.	true or false
		birthDayOption : Specify if you want to generate the birth day of the person or not.	true or false
		addressOption : Specify if you want to generate the address of the patient or not.	true or false
		genderDescription : Specify the gender of the person.	Male, Female, male, female, m, M, f, F or Random. For other value, the gender will be generate randomly.
		firstNameLike : Specify it if you want to get a first name approaching the specified first name.(Attention, you have to choose between the firstNameLike and the firstNameIs.)	For example : Nico, Dav, ...
		lastNameLike : Specify it if you want to get a last name approaching the specified last name. (Attention, you have to choose between the lastNameLike and the lastNameIs.)	For example : Jam, lef, ...
		firstNameIs : Specify it if you want to get a person with this exact first name. (Attention, you have to choose between the firstNameLike and the firstNameIs.)	For example : Nicolas
		lastNameIs : Specify it if you want to get a person with this exact first name. (Attention, you have to choose between the lastNameLike	For example : James

		and the lastNameIs.)	
		maritalSatusOption : Specify the marital status of the patient.	Possible values are : Married or M, Single or S, Divorced or D, Unknown or U, Random or R.
		deadPatientOption : Specify if you want to generate a dead patient or not. If yes, the date of patient death will be randomly find.	true or false
		maidenNameOption : Specify if you want to generate a maiden name for the patient or not. Attention, the maiden name can't be generate if the patient gender is not female.	true or false
		aliasNameOption : Specify if you want to generate an alias name for the patient or not.	true or false
		displayNameOption : Specify if you want to generate a display name for the patient or not.	true or false
		newBornOption : Specify if you want to generate a new born patient or not. If yes, the patient will have a mother and the patient's age will be between 1 and 2 days. If the new born option is true, the marital status must be set to 'Unknown' or 'U', because a new born can't be married or divorced.	true or false
returnHl7Message	Return HL7 v2 Message containing description of a patient from a specific country.	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country. Use the getListCountryCode method.)
		receivingApplication : The Application of your system. (MSH-5)	See the IHE Technical Framework for more information about this field.
		receivingFacility : The Facility of your system. (MSH-6)	See the IHE Technical Framework for more information about this field.
		characterSet : The character set encoding of the HL7 message. (MSH-18)	Possible values : It depends of each country. For example, for France, all available characters set are : UTF-8 and ISO-8859-1. If you ask for a

			character set which is not supported by DDS, DDS will return a SOAPException with a message to show you all possible characters set.
		hl7Version : The HL7 version of the message. (MSH-12)	Possible values : 2.3.1 or 2.5
		messageType : The message type of the HL7 message. (MSH-9)	Possible values : ADT^A01^ADT_A01, ADT^A04^ADT_A01 or ADT^A28^ADT_A05. The ADT^A28^ADT_A05 is only available with the HL7 v2.5 version and the ADT^A01^ADT_A01 and ADT^A04^ADT_A01 with the HL7 v2.3.1 version.
sendHl7Message	Send HL7 v2 Message containing description of a patient from a specific country to a target host and port. This method return the message response.	**countryCode** : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country get with the getListCountryCode method.)
		targetHost : The IP Address of your system, which will receive the HL7 message.	Example : 137.114.220.XXX
		targetPort : The port on which your system will receive the HL7 message.	Example : 1030
		receivingApplication : The Application of your system. (MSH-5)	See the IHE Technical Framework for more information about this field.
		receivingFacility : The Facility of your system. (MSH-6)	See the IHE Technical Framework for more information about this field.
		characterSet : The character set encoding of the HL7 message. (MSH-18)	Possible values : It depends of each country. For example, for France, all available characters set are : UTF-8 and ISO-8859-1. If you ask for a character set which is not supported by DDS, DDS will return a SOAPException with a message to show you all possible characters set.

		hl7Version : The HL7 version of the message. (MSH-12)	Possible values : 2.3.1 or 2.5
		messageType : The message type of the HL7 message. (MSH-9)	Possible values : ADT^A01^ADT_A01, ADT^A04^ADT_A01 or ADT^A28^ADT_A05. The ADT^A28^ADT_A05 is only available with the HL7 v2.5 version and the ADT^A01^ADT_A01 and ADT^A04^ADT_A01 with the HL7 v2.3.1 version.
returnHl7v3Message	Return HL7 v3 Message containing description of a patient from a specific country.	countryCode1 : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country. Use the getListCountryCode method.)
sendHl7v3Message	Send HL7 v3 Message containing description of a patient from a specific country to URL.	countryCode : The code of the country used to generate the Patient.	For example : JP, FR, DE, US, ... (To know all possible values, see the ISO code of each country. Use the getListCountryCode method.)
		systemName : The name of your system.	The name of your system.
		url : The URL of your system.	The URL of your system.
		receivingApplication : The Application of your system.	See the IHE Technical Framework for more information about this field.
		receivingFacility : The Facility of your system.	See the IHE Technical Framework for more information about this field.

4.3   Static WS Client for DDS

We have implemented a Static WSClient for DDS. This related jar is easy to use. You have only to add the jar file to the project, and use it. The jar file is downloadable here (on the Gazelle Maven repository).

4.4   Web Services Limitation

We do not have limited ressources to offer for this service. Thus the access to the webservice is limited to a "reasonnable" number of request per days/minute. We'd like to avoid DoS on the gazelle tools because someone is requesting fake patients every second.

Thus our limitation are :

- No more than 30 requests per IP address per minute

■ No more than 3000 requests per period of 24 hours per IP address

If you'd like to generate large random data, please get in contact with Eric Poiseau and we will try to help you and generate data to fill your needs.

The administrator of the tool can allow specific IPs to given them unlimited access to the service.

To do this you need to update database with this kind of request :

```
UPDATE dds_user_request_historic SET unlimited=true WHERE
ip_address='62.212.122.29';
```