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Towards a Meta-model of E-orientation platforms

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Abstract: *Choosing a suitable career may be difficult for students because they have to consider many if they want to be on the best path. Today, E-orientation systems are designed to help students to find the best way for their academic and professional lives. In this context the research center within the University Hassan II Mohammedia AinChock announced the appearance of MMSyOrientation project. This project focuses on the orientation of Moroccan. Our aim here is to have creatable meta-model of E-orientation platforms to make it easy for student to get oriented. In order to obtain the goal mentioned above, a comparative study of the existing platforms proves to be essential with regard to the particularity and the characteristics of the existing platforms. In this paper, we present a new approach to comparing E-orientation platforms based on the Web Services Description Language (WSDL). The work is divided into two parts: The first is a description of the existing E-orientation platforms using the WSDL and the second is how to process WSDL files using XSLT technology.*
Keywords: *E-Orientation, MMSyOrientation, Platform, WSDL, XSLT.*

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I. Introduction

This orientation system will play a vital role in the process of distributing students in different ways of education, pathways and options and help them to choose their academic and professional future. Make it automatically accessible for everyone. The Internet is a reliable means and allows access to any information, it could also be the means of providing guidance and orientation around the world, and this may be possible if we create a platform, which will combine between the three elements which are schools, the world of work and the user profile.

To obtain the goal mentioned above, problems have been encountered among them: that there are several platforms, this is why it is obvious to make a comparison between these platforms To get what we can call a meta-model that satisfies the student's need, we pick to use the Model Driven Architecture (MDA) [1] presented by the Object Management Group (OMG) [2], a Meta -model enriched by the characteristics that allow to satisfy the students orientation.

First, we focus on comparing and describing these platforms and generating the WSDL on each platform, using the Extensible Style sheet Language Transformations (XSLT) technology in order to get by the end one Descriptive file of an e-orientation platform According to a deep study we have chosen three platforms to optimize working time [3].

This article will be organized to describe the functionality of each platform in WSDL form in Chapter 2, transformations of WSDL files using XSLT technology will be represented in Chapter 3, a conclusion and perspective will be discussed in Chapter 4.

II. Description Of The E-Orientation Platforms

After the baccalaureate, the priority of the young students is mainly their university orientation. Several platforms provide information to help them make the right decision, but since each of them has advantages and disadvantages, we wanted to compare them, first to collect information that is common and propose for each functionality its WSDL.

1. The three platforms chosen are :

- Onisep.com [4]

L'Onisep (Office national d'information sur les enseignements et les professions) is a public institution under the Ministry of National Education, Higher Education and Research. As a public publisher, the Onisep produces and publish information on training and trades. It also offers services to students, parents and educational teams.

This glossary describes and attributes of the features of this platform. As shown in Table 1.

Table 1: functionality_Onisep

Functionality	Description	Attributes
Collèges	Presentation of the studies at the college concerning the organization, or the classes, Internships, Diploma....	Classes, Stage, Diplôme, Orientation.
Lycée	Presentation of high school studies: General, technological and professional.	Admission, Lycée : Général, Technologie, Professionnel.
Apres le Bac	Advice and strategies on post-baccalaureate studies.	Apres Bac, Etudes Courte, Classe Prépa, Ecole Spécialisée, Domaine.
Equipes éducatives	This feature offers articles on educational courses and events.	Actualités, Ressources Pédagogiques, Folio, Evènement, Décrochage, Inclusion Scolaire.
Parents	Explanations of schools to parents, answers to their questions.	Collège, Lycée, Question, Réponse, Ecole.
Handicap	Information on the studies of disabled people in France.	Type, Zone géographique, Région.
Métiers	Job Information Possible in France.	Nature du travail, Lieu d'exercices et Statut, Salaire, Témoignage, ressources utiles, Accès au Métier, Secteur, niveau d'études, Statut.
Emploi	Discovery of the professional world concerning internships in companies, alternations, my job search.	Stages, Alternance, Monde Professionnel, Emploi.
Formation	Formation List.	Nom, Niveau d'étude, Région, Domaine, Type, Durée de formation, Débouchés.
Etablissements	List of college schools just after the baccalauréat in France.	Zone géographique, Département, Type, Statut de l'établissement.
Lieu D'information	List of college schools just after Baccalaureate in France.	Nom, Type d'organisme, Zone géographique, Adresse.

- Orientation.com [5]

A yearbook of diplomas, studies and trades well distributed according to the level of studies, the site offers sections specific to the alternation, to the outlets, and proposes numerous practical sheets.

Table 2: Functionality_Orientation

Functionality	Description	Attributs
Diplômes	The most detailed Diploma Directory in France.	Nom, En Bref, Admissions, Programme, Examen, Débouchés, Ville
Formations	The directory of Formations.	Nom, Niveaux d'études, Filières, Critères
Concours	The most detailed Competition directory for access to Large schools.	Nom, En Bref, Admission, Date, Inscription, Epreuves, Ecoles.
Métiers	Information on possible jobs.	Nom, En Bref, Fonctions, Qualités, Formations, Salaire.
Etablissements	Description of all universities, and schools.	Nom, En Bref, Site Internet, Téléphone, Adresse, Type d'établissement.
JPO	Open Days.	Nom, En Bref, Date, Adresse.
International	The complete Country Study Guide.	Pays, Bourses, logements.
Question	Question and Answer on crafts And Studies.	Nom, Catégorie, Question, Réponse.
Orientation	Orientation, Education News in France.	Nom, Introduction, Date, Auteur, contenue.

- 9rayti.com [6]

9rayti .com is the leading platform for orientation and education in Morocco, followed by more than 3 million users per year. And it is edited by Education Media Company.

Table 3: Functionality_9rayti

Functionality	Description	Attributes
Etablissements	Description of all universities, and Moroccan schools.	Nom, Ville, Site, Tel, Secteur d'activité, Type d'établissement.
Etudes Supérieures à l'étranger	Information about schools and universities in some foreign countries.	Pays, Système LMD, Condition et Inscription, Visa, Bourse, Adresse et lien.
Concours	The conditions to be met to take part in the competition for access to the Large schools.	Concours.
Guide des métiers	Information on possible jobs.	Nom, Présentation, Capacité&Formation.

Formations	Description of formations in Morocco.	Nom, Introduction, Objectifs, Débouchée.
Actualités&Evénement	Education News and Events in Morocco.	Nom, Date, Introduction, Description
Collège	Information about the college studies in Morocco.	À-propos, Cours et Exercices, Niveau d'étude, Matière, Documents.
Lycée	Information about the high schoolsstudies in Morocco.	À-propos, Cours et Exercices, Niveau d'étude, Matière, Documents.

2. Web Service Definition Language

Much efforts have been made to describe each functionality of the E-orientation platforms with the WSDL language. WSDL [7] is an XML format [8] used to describe network services as a set of end nodes running on messages that contain document-oriented or procedural-oriented information. WSDL is often used in combination with SOAP [9] and an XML schema [10] to provide Web services over the Internet. [11]
Fig. 1 shows the relationship between the different sections of a WSDL file.

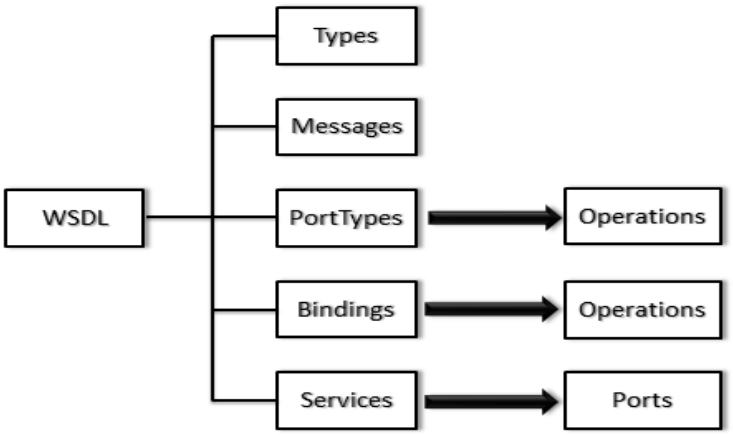

Figure 1: Wsdl Shema

The contents of the WSDL documents are named as:
Types: Describes language and machine-independent data containers for message exchange. In short, the types of data used by a web service are the Types element.

Messages: Indicates the data transmitted between consumers and providers of a web service. There are two types of messages supported by a service, input and output messages.
Web service parameters are described by input messages, and the data returned by the web service is described by output messages. Each message consists of zero or more part elements. Each part element refers to the input /output parameters of a web service operation.

Port Types: A web service can have multiple ports. Ports refer to web services, endpoints and links define the transport protocol for these ports. A port-based element contains a set of operations supported by the web service. Each operation contains input and output parameters.

Bindings: Linking components provide details about the data format and provide transport protocols for a port Type operation. It is possible to use several transport protocols such as HTTP GET, HTTP POST or SOAP for linking. Multiple bindings can be specified for a single port Type.
Services: Describes the service name and groups multiple service ports.

3. Generation of WSDL files on E-orientation platforms

We chose Eclipse [13] as a tool that automates the generation of WSDL files (it takes a Java class and creates the corresponding WSDL).
So we developed all the functionalities of the three E-guidance platforms mentioned above in the Java class containing attributes and functions, and thanks to Eclipse the WSDL files of the functionalities are generated automatically.
By way of illustration here is the example of a WSDL file generating setup functionality for the three platforms chosen.

FIG. 2 shows an extract of the WSDL file of the 9rayti platform.

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions name="Etablissement" targetNamespace="http://entites_9rayti"
xmlns:apachesoap="http://xml.apache.org/xml-soap" xmlns:impl="http://entites_9rayti"
xmlns:intf="http://entites_9rayti" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
<!--WSDL created by Apache Axis version: 1.4
Built on Apr 22, 2006 (06:55:48 PDT)-->
<?xml-stylesheet href="fichier.xsl" type="text/xsl" ?>
 <wsdl:types>
  <schema elementFormDefault="qualified" targetNamespace="http://entites_9rayti" xmlns="http://www.w3.org/2001/XMLSchema">
 <complexType name="Ecole">
    <sequence>
     <element name="adresse" nillable="true" type="xsd:string"/>
     <element name="article" nillable="true" type="impl:Article"/>
     <element name="concour" nillable="true" type="xsd:string"/>
     <element name="description" nillable="true" type="xsd:string"/>
     <element name="diplome" nillable="true" type="xsd:string"/>
     <element name="durre_Etude" nillable="true" type="xsd:string"/>
     <element name="formation" nillable="true" type="impl:Formation"/>
     <element name="id" type="xsd:int"/>
     <element name="nom" nillable="true" type="xsd:string"/>
     <element name="secteur" nillable="true" type="impl:Secteur"/>
     <element name="siteWeb" nillable="true" type="xsd:string"/>
     <element name="statut" nillable="true" type="xsd:string"/>
     <element name="tel" type="xsd:int"/>
     <element name="type_e" nillable="true" type="impl:Type_E"/>
     <element name="ville" nillable="true" type="impl:Ville"/>
    </sequence>
   </complexType>
   <complexType name="Secteur">
    <sequence>
     <element name="description" nillable="true" type="xsd:string"/>
     <element name="ecole" nillable="true" type="impl:Ecole"/>
     <element name="id" type="xsd:int"/>
     <element name="nom" nillable="true" type="xsd:string"/>
    </sequence>
   </complexType>
   <element name="setType_e">
    <complexType>
     <sequence>
      <element name="type_e" type="impl:Type_E"/>
     </sequence>
    </complexType>
   </element>
   .....
   .....
   .....
   .....
```

Figure 2: WSDL-9rayti

Finally, we obtained all the WSDL files of the chosen E-orientations platforms, in the next chapter we will process these files using the XSLT technology.

III. Processing WSDL files

1. Functionality Dictionary

We have chosen to establish a dictionary to unite the names of the functionalities and attributes in order to avoid all the synonyms.

Table 4: Dictionary_Glossary

Former Functionality	New Functionality	New Attribute
Groupe des Etablissements au Maroc, Etablissements	Etablissements	Type_Ecole, Site_web, Statut, Description.
Guide des Métiers, Métiers	Métiers	Formation, Présentation.
International, Etudes Supérieures à l'étranger	International	-
Actualités&Evénement, Orientation	Actualités	-
Formations	Formations	Secteur

2. Technology XSLT

XSLT (Extensible Style sheet Language Transformations) [14], a declarative language based on Path expressions. XSLT is used to transform XML documents into other XML documents. The transformation process is presented to the basic idea of this processor is to take in input WSDL documents (XML format) of the same functionality that belongs to the e-orientation platforms with an XSLT document (contains the transform rules), after processing a new WSDL document (XML format) is output.

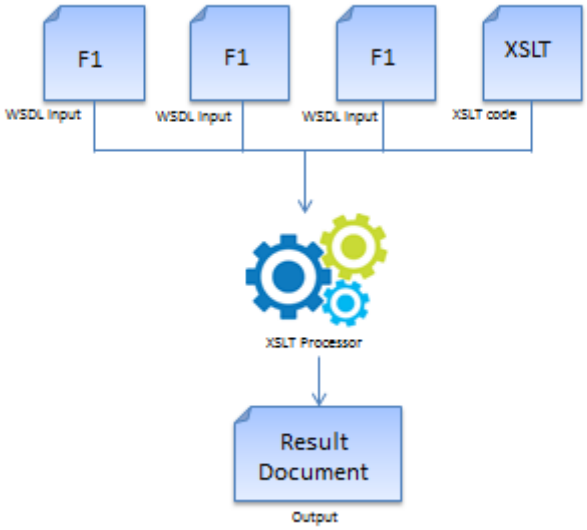

Figure 2: Operation of the XSLT Processor

- Operation

First, we use the WSDL (XML content) files of the same functionality and we run with an XSLT file, the latter contains the transformation rules mentioned below. After processing, a single WSDL file is output for this functionality. The same operation is performed for the rest of the functionality of the E-orientation platforms, and at the end all the WSDL files that correspond to them are obtained. Finally, another XSLT file is executed with the last files obtained to have a single WSDL output file Containers all features that represents a standard e-orientation platform.

Table 5: Management Rules

Rule	Name	Description
R1	GEC	We keep the common elements between the functionalities of the platforms.
R2	AEC	We add elements that are not common (which belongs at least in a platform).
R3	AVE	The same value is assigned to elements that have the same meaning.
R4	GF	We keep all the functionality of the platforms.

Here is an excerpt from the XSLT file using the rules R2 and R3 on the WSDL file of the 9rayti platform.

```
<?xml version="1.0" encoding="UTF-8"?>
<xsl:stylesheet version="1.0" xmlns:xsl="http://www.w3.org/1999/XSL/Transform"  >
<xsl:output method="xml"  encoding="UTF-8"  indent="yes"/>
  <xsl:template match="/">
    <xsl:apply-templates select="//9rayti"/>
  </xsl:template>
<xsl:template match="9rayti">
 <xsl:choose>
  <xsl:when test="element = 'type_e'">
    translate(element,type_e,type_ecole)
   </xsl:when>
  <xsl:when test="element = 'journee_porte_ouverte'">
  translate(element,journee_porte_ouverte,JPO)
   </xsl:when>
  <xsl:when test="element = 'site'">
    translate(element,site,siteWeb)
   </xsl:when>
 </xsl:choose>
  <xsl:apply-templates select="document(etablissement1.wsdl)/">
</xsl:template>
</xsl:stylesheet>

.....
.....
.....
.....
```

Figure 4: XSLT

After running the XSLT file, the following is an excerpt from the Types section of the resulting new WSDL file.

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions name="Etablissement" targetNamespace="http://entites_result"
xmlns:apachesoap="http://xml.apache.org/xml-soap" xmlns:impl="http://entites_result">
xmlns:intf="http://entites_result" xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
<!--WSDL created by Apache Axis version: 1.4
Built on Apr 22, 2006 (06:55:48 PDT)-->
 <wsdl:types>
  <schema elementFormDefault="qualified" targetNamespace="http://entites_result" xmlns="http://www.w3.org/2001/XMLSchema">
 <complexType name="Etablissement">
    <sequence>
     <element name="adresse" nillable="true" type="xsd:string"/>
     <element name="article" nillable="true" type="impl:Article"/>
     <element name="concour" nillable="true" type="xsd:string"/>
     <element name="description" nillable="true" type="xsd:string"/>
     <element name="diplome" nillable="true" type="xsd:string"/>
     <element name="durre_Etude" nillable="true" type="xsd:string"/>
     <element name="formation" nillable="true" type="impl:Formation"/>
     <element name="nom" nillable="true" type="xsd:string"/>
     <element name="secteur" nillable="true" type="impl:Secteur"/>
     <element name="siteWeb" nillable="true" type="xsd:string"/>
     <element name="statut" nillable="true" type="xsd:string"/>
     <element name="tel" type="xsd:int"/>
     <element name="type_ecole" nillable="true" type="impl:Type_E"/>
     <element name="ville" nillable="true" type="impl:Ville"/>
     <element name="jpo" nillable="true" type="impl:JPO"/>
     <element name="region" nillable="true" type="impl:Region"/>
     <element name="département" nillable="true" type="xsd:string"/>
     <element name="fax" nillable="true" type="xsd:string"/>
     .....
     .....
     .....
     .....
```

Figure 5: WSDL-result

IV. Conclusion

In this paper we described and compared the E-orientation platforms. Then we generate or each functionality a corresponding WSDL file using the Eclipse tool. We have defined a dictionary for unified names, also management rules that will be applied to these files using XSLT technology.
Finally, we were able to develop a descriptive file (WSDL) enriched by features and attributes that will be used for our meta-model. In this paper we described and compared the E-orientation platforms. Then we generate for each functionality a corresponding WSDL file using the Eclipse tool. We have defined a dictionary for unified names, also management rules that will be applied to these files using XSLT technology. Finally, we were able to develop a descriptive file (WSDL) enriched by features and attributes that will be used for our meta-model.

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