The Mobility Project

WEB-SERVICES FOR EXCHANGE OF DATA ON COOPERATION AND MOBILITY BETWEEN HIGHER EDUCATION INSTITUTIONS

RS³G workshop, Uppsala, November 16th 2009

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affiliations:

MUCI, Poland, consortium of Polish universities, owner of USOS (University Study-Oriented System), project leader

University of Warsaw, Faculty of Mathematics, Computer Science and Mechanics, Assistant Professor (operating systems, parallel programming, system programming, software engineering, …)

Agenda

- Real life scenarios and needs
- WSDL – format of exchanged data (ver. 2)
- Mobility web node (ver. 2)
  - architecture
  - testbed
- Problems to solve

Real life scenario

International Relations Office at the University of Warsaw

Faculty of Mathematics, Computer Science and Mechanics

University Study-Oriented System (USOS)

USOS – module for IRO

IRO – International cooperation Agreements

IRO – Agreement → Conditions of cooperation

Faculty – Offers available for students

Faculty – Student's application

This application has been accepted.

Priority	Institutions to which the student wants to go. ℹ️ (max 3)
1	**Université Paris Nord (Paris XIII)** (*Mathematics*)
2	**Vrije Universiteit Brussel** (*Mathematics*)
3	**Universitat Autónoma de Barcelona** (*Mathematics*)

RLMTODO	
Language	Level
English	znam język dostatecznie dobrze, by rozumieć wykłady
French	znam język dostatecznie dobrze, by rozumieć wykłady
German	znam język dostatecznie dobrze, by rozumieć wykłady

Courses with marks		(max 3)
1000-135RC1a	Partial differential equations I	4,5
1000-1L00RR	Differential equations in natural sciences	5
1000-135ST1	Statistics I	4,5

Opinion	(min 1)(max 1)	
RLMTODO	Status ℹ️	Options ℹ️
Grzegorz Łukaszewicz	submitted	→ view

Motivation letter in a foreign language

Please consider my candidature to the deans founded scholarship.

Dear Sir or Madam,

I am writing to propose my candidature to the Socrates-Erasmus student exchange program in the academic year 2009/10. I'm a student of the fourth year of mathematics. I am studying mathematics as a primary specialization in a Individual Studies Program in conjunction with physics.
It is a great combination which makes studying more interesting and purposeful. I am a hard-working and solid person. A result of that is the fact that every semester I am exceeding the required ECTS numbers and every subject I take on is passed by me.
Thanks to such approach I have passed more subjects that were necessary, and I have also passed numerous subjects on the faculty of Physics.

I believe that an international scholarship will be a great opportunity for me to widen my horizons(not only mathematical) and to get more knowledge in various fields. I am aware that it may be a difficult challenge, however I am sure I will be able to cope with it and it will be a great benefit to me as well.

As a person who is travelling a lot, and with good knowledge in foreign languages I hope I won't have any problems to acommodate myself in a new environment. After finishing my master degree I am planning to continue my studies to reach the PhD degree.

Best regards

Faculty – Nominations

IRO – Outgoing mobility

IRO – What happens next …

Nominations are:
- typed manually into partner's system (many different systems, many different styles and requirements)
- scanned,
- faxed,
- delivered by phone call
- …

Usually many times (updates are common)

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moveonnet
Higher Education Worldwide

HOME	DIRECTORY	FOR INSTITUTIONS	FOR STUDENTS	EVENTS	ABOUT	MY MOVEONNET

INSTITUTION'S DATA E-NOMINATION E-AGREEMENTS USERS

Back to nomination of outgoing students

G   , Urszula

Status: accepted

Information about student

Nationality	Poland
Sex	Female
Date of birth	26/03/1988
Email	urszula.g @op.pl

Information about institutions

Home institution	Poland - Uniwersytet Warszawski (PLWARSZAW01)
Home Coordinator	Head Sylwia Salamon (sylwia.salamon@adm.uw.edu.pl)
Host institution	Germany - Europa-Universität Viadrina Frankfurt (Oder) (DEFRANKFU08)
Host Coordinator	Bernd Schünow (students-in@euv-frankfurt-o.de)

Information about exchange studies

Exchange programme	Erasmus
Field of study	345 - Management and administration
Study level	F - First cycle
Exchange period	WS09/10 (1 Semester / 6 Months)

[Edit data] [Cancel nomination] [Send message to partner]

Nomination history

	11/08/2009	Accepted - Acceptance received from DEFRANKFU08 "The Letters of Acceptance for your students have been faxed to your office today. The originals are now on the way to you with a letter."
	20/05/2009	Acknowledged - Acknowledgement received from DEFRANKFU08 "Please note that this acknowledgment does not guarantee acceptance. We can only give you a definitive answer after you have correctly completed the application process. You will find further information about the application process for the European University Viadrina, accommodation and courses of study on our website at the following link: http://www.euv-frankfurt-o.de/en/internationales/internationals/bewerbung /index.html (in English) or http://www.euv-frankfurt-o.de/de/internationales/internationals/bewerbung /index.html (in German). The deadlines for applications are for our winter semester: July 15th for our summer semester: January 15th Applications have to be done online first, following the link https://euv-frankfurt-o.moveonnet.eu/moveonline/incoming/ After filling in your details here, please print out the form, sign it and send it - signed and stamped by your home university - to the following address: Europa-Universität Viadrina Department of International Affairs incoming students Große Scharrnstraße 59 15230 Frankfurt (Oder) "
	20/05/2009	Nominated - Nomination sent to DEFRANKFU08
	20/05/2009	Student added

IRO – We would prefer to do it with … one click → SEND button…

IRO – partner would send us his students in a similar way → this is the result of the remote invocation of **sendNominatedStudents()**

Other scenarios

- **Signing agreement (organization's information record, cooperation conditions of the agreement)**
- **Sending Learning Agreements (sending token vs sending structured data)**
- **Getting Transcripts of Records (grades)**
- **Sending departure/arrival dates of mobile students (important → scholarships)**
- **Sending course catalog**

Learning Agreement

LEARNING AGREEMENT
Academic year: Winter semester 2009/2010
Field of study: Informatics, Computer Science (code 11.3)

Name of student:
Aleksander G

Sending institution:	Country:
University of Warsaw	**Poland**

DETAILS OF THE PROPOSED STUDY PROGRAM ABROAD/LEARNING AGREEMENT

Receiving institution:	Country:
Université Paris Nord (Paris XIII)	**France**

Current version

Course unit code (if any)	Course unit title (as indicated in the information package):	Number of ECTS credits if applied
	Algorytmique parallele et distribuee	4
	Analyse de Fourrier et theorie du signal	4
	Calcul haute performance	5
	Modelisation mathematique pour le traitement des images	5
	Programmation mathematique approfondie	5
	Systemes distribues	4

Date	Student's signature:
....	....

SENDING INSTITUTION
We confirm that this proposed program of study/learning agreement is approved.

The document has been automatically generated from the electronic system USOS. The study program listed above has been approved by Erasmus Departamental Coordinator.
Date: 2009-11-14

The document has been automatically generated from the electronic system USOS. The study program listed above has been approved by Erasmus Institutional Coordinator.
Date: 2009-11-14

RECEIVING INSTITUTION
We confirm that this proposed program of study/learning agreement is approved.

Departmental coordinator's signature

....
Date: ....

Institutional coordinator's signature

....
Date: ....

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Learning Agreement → Transcript of Records

In reference to

Student:	Piotr S
Study program:	**DM-JSIM** - Double Degree Program in Computer Science and Mathematics
Stage:	**JSIM4I** - Fourth year JSIM 3I+4M
Term:	**2007** - Academic year 2007/08

General information

	Decision number:	75064
	Decision date:	2008-08-17
i	Decision type:	**MODIFICATION**
	Decision state:	**Z** - approved
i	Stage of creation:	Filling in
	Next stage:	(no change)
	Comment:	Porozumienie w sprawie programu zajęć (LA)

External courses

#	Name	Term	Passed	ECTS	Language	i	Coordinator	Status
1.	Agent Based Systems U02497	2007	**YES**	5.00	English	none / none	Michael Rovatsos	**Z** - approved
	CW (8 hours), WYK (20 hours). **Institution:** (in Polish) The University of Edinburgh							
2.	Computer Communications and Networks U03858	2007	**YES**	5.00	English	none / none	Mahesh Marina	**Z** - approved
	WYK (20 hours). **Institution:** The University of Edinburgh							
3.	Computer Security U03025	2007	**YES**	5.00	English	none / none	David Aspinall	**Z** - approved
	WYK (20 hours). **Institution:** (in Polish) The University of Edinburgh							
4.	Enterprise Computing U01902	2007	**YES**	5.00	English	none / none	Stephen Gilmore	**Z** - approved
	CW (8 hours), WYK (20 hours). **Institution:** (in Polish) The University of Edinburgh							
5.	Informatics 2D: Reasoning & Agents U02602	2007	**YES**	10.00	English	none / none	Jacques Fleuriot, Michael Rovatsos	**Z** - approved
	CW (10 hours), LAB (20 hours), WYK (30 hours). **Institution:** (in Polish) The University of Edinburgh							
	max ECTS to achieve:			30.00	i			
	achieved ECTS total:			30.00	i			

Grades from the University of Edinburgh

Diploma supplement

DIPLOMA SUPPLEMENT

Valid with the Diploma no 1000/46331/2009

I. INFORMATION IDENTIFYING THE HOLDER OF THE QUALIFICATION

1. Surname: *S*
2. First name(s): *Piotr Krzysztof*
3. Date of birth (day, month, year): *24.09.1985*
4. Student identification number or code: *219737*

II. INFORMATION IDENTIFYING THE QUALIFICATION

1. Diploma number : 1000/46331/2009
2. Name of qualification and the title conferred [1] *magister*
3. Main field of study and field of specialisation for the qualification : *Computer Science*
4. Name and status of awarding institution[1]

   Uniwersytet Warszawski

   Uniwersytet Warszawski, established in 1816 is a public higher education institution. The university is entitled to confer the degrees of 'doktor', 'doktor habilitowany' and apply for the title of 'profesor'. The university educates students in the spirit of Magna Charta Universitatum and is also a party to the Agreement of Polish Universities on the Quality of Education, as a result of which the University Accreditation Commission was established.

5. Name and status of institution administering studies [2]

   Uniwersytet Warszawski

   Uniwersytet Warszawski, established in 1816 is a public higher education institution. The university is entitled to confer the degrees of 'doktor', 'doktor habilitowany' and apply for the title of 'profesor'. The university educates students in the spirit of Magna Charta Universitatum and is also a party to the Agreement of Polish Universities on the Quality of Education, as a result of which the University Accreditation Commission was established.

   The University of Edinburgh - United Kingdom

6. Language(s) of instruction/examination: *Polish, English*

III. INFORMATION ON THE LEVEL OF QUALIFICATION

1. Level of qualification: *second cycle programme*
2. Official length of programme: *5-year studies (3+2)*
3. Access requirements: *maturity certificate or entrance examination*

Academic year 2007/08			
Computer Security	wyk 20	5	5
Computer Communications and Networks	wyk 20	5	5
Enterprise Computing	wyk 20/cw 8	4	5
Agent Based Systems	wyk 20/cw 8	4,5	5
Decision support systems	sem 60	4,5	12
Distributed Systems	sem-mgr 60	ZAL	6
Informatics 2D: Reasoning & Agents	wyk 30/cw 10/lab 20	4,5	10

IRO – Scholarships
(final amount depends on dates of arrival/departures)

				Program	<wszystkie>	Etap	<wszystkie>	Cykl dydaktyczny		<wszystkie>	Miejsce	<wszystkie>		Filtruj po etapach

Wyjazdy

Nazwisko	Imię	PESEL	Jednostka osoby	Cykl dyd. wyjazdu	Numer teczki	Jednostka wyjazdu		
	Magdalena		33210000	2007	BWZ981EUC07-S0003	33210000		Filtr
								Osoba
								Szukaj po indeksie

Email

Obywatelstwo: polskie

Grupa stypendiów: Pierwsza stawka stypendialna (wyższa)

Wypłaty

Kod funduszu	Waluta	Licz. mies.	VIII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII*	IX*	
ERASMUS	EUR	4,50			340,00	340,00	340,00	340,00	170,00								Wypełnij autom.
UW EURO	EUR	4,50			17,00	17,00	17,00	17,00	8,50								

		VIII	IX	X	XI	XII	I	II								
Waluta wypłaty				EUR	EUR	EUR	EUR	EUR								
Stan wypłaty				Z	Z	Z	Z	Z								
Data wydruku raportu				03.10.2007	03.10.2007	14.11.2007	14.11.2007	14.11.2007								
Data zlecenia przelewu				04.10.2007	04.10.2007	15.11.2007	15.11.2007	15.11.2007								

Zmień walutę i stan

Opis funduszu
ERASMUS studia

GOAL

STOP SENDING PAPER,

EXCHANGE ELECTRONICALLY

STRUCTURED DATA

BY CALLING WEB-SERVICES

Establishing format for data exchange

- Standardisation committees and on-going projects
  - CEN (European Commission for Standardization)
    - Metadata for Learning Opportunities (MLO) – e.g. programme of study, course catalog
    - European Learner Mobility (ELM) – e.g. Europass portfolio (Diploma Supplement, Certificate Supplement, Curriculum Vitae, Mobility, Language Passport)
  - R3SG (Rome Student System and Standard Group)
  - National initiatives
    - OODI Finland
    - German universities, sending eToRs using OSCI protocol
  - Vendor initiatives
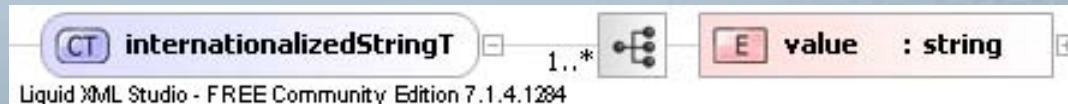   - unisolution – web services for moveon users
  - and many others …

WSDL for the Mobility project

- Such diversity of standards does not make things easier ☹

- Mobility project has specific objectives and specific needs
    - Data should be well structured
    - Pieces of data should be uniquely identifiable (on a database level)
    - Each party may want to use own identifiers
    - Each party may want to use own language

    Some possible solutions are presented on the following slides …

WSDL – some details 1

List of strings in various languages

CT internationalizedStringT ... 1..* ... E value : string
Liquid XML Studio - FREE Community Edition 7.1.4.1234

ISO-based types

| WSDL type	Description	ISO standard	Example value(s)
countryCodeT	Country	ISO 3166-1 alpha-2	"PL", "IT", "GB"
languageCodeT	Language	ISO 639-1	"pl", "en", "de"
genderT	Gender	ISO/IEC 5218:2004	"1", "2"

Identifiers (global)
- an organization – domain name, e.g. uw.edu.pl (inspired by SCHAC)
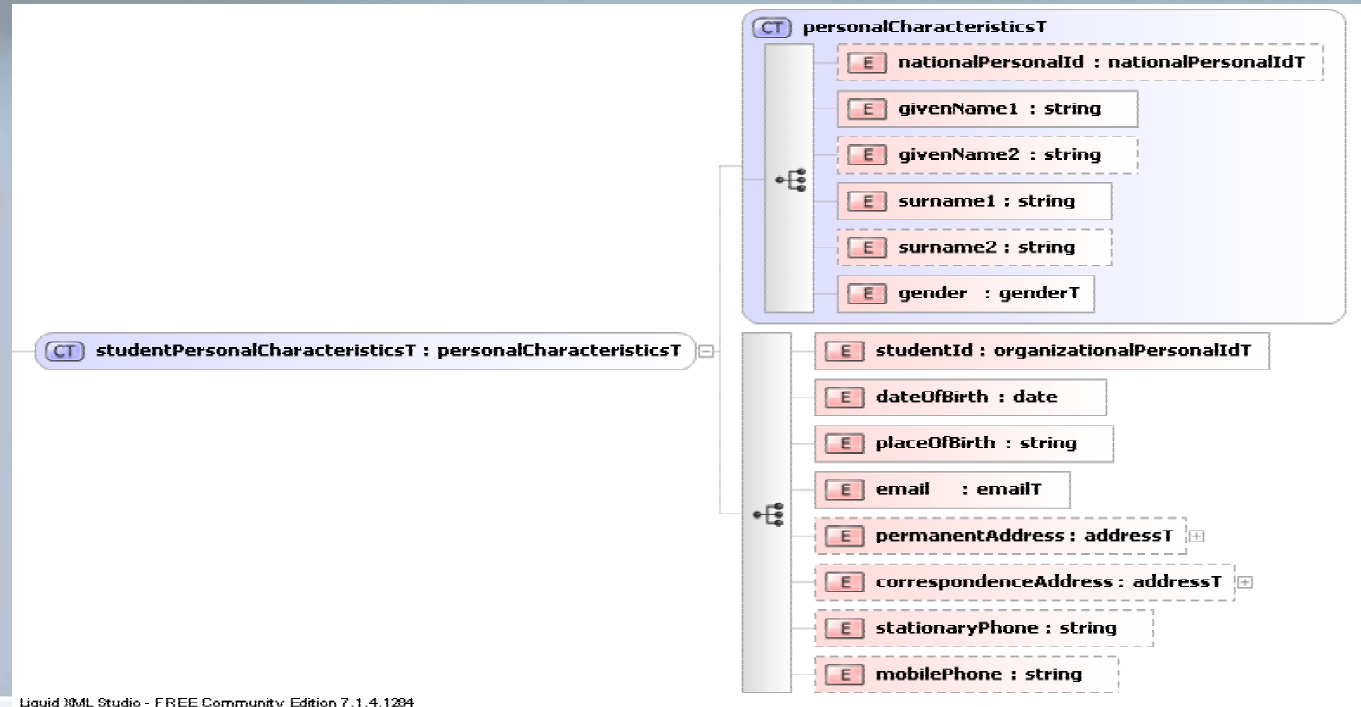- a person – national identifier

Type of national id	Example value
Finnish FIC	fi:260667-123F
Spanish NIF	es:31241312L
Swedish NIN	se:12345678
Polish PESEL	pl:77121201230

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WSDL – some details 2

Agreement (local identifiers)
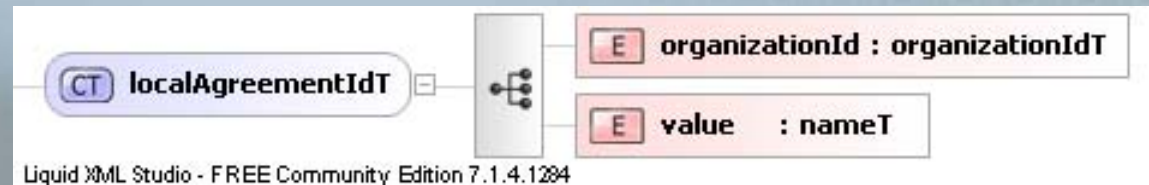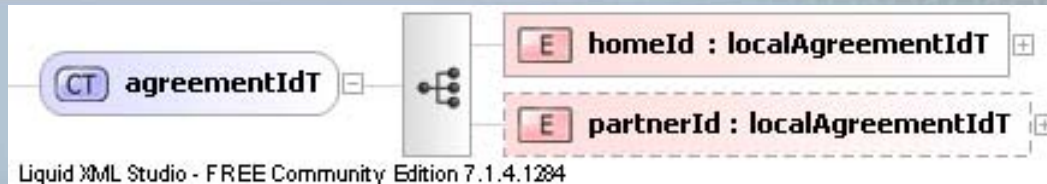
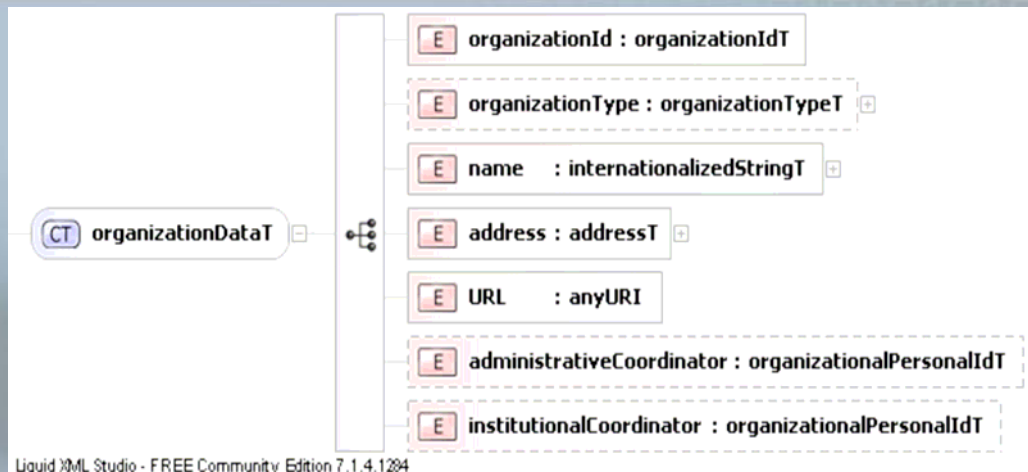Student (local identifiers)

WSDL – some details 3

Organization data

Example


```
<tns:organizationId>uw.edu.pl</tns:organizationId>
<tns:name>
        <tns:value language="en">University of Warsaw</tns:value>
        <tns:value language="pl">Uniwersytet Warszawski</tns:value>
</tns:name>
<tns:address>
        <tns:street>Krakowskie Przedmiescie</tns:street>
        <tns:houseNumber>26/28</tns:houseNumber>
        <tns:postalCode>00−927</tns:postalCode>
        <tns:city>Warsaw</tns:city>
        <tns:country>PL</tns:country>
</tns:address>
<tns:URL>www.uw.edu.pl</tns:URL>
<tns:administrativeCoordinator>uw.edu.pl:45065</tns:administrativeCoordinator>
<tns:institutionalCoordinator>uw.edu.pl:112233</tns:institutionalCoordinator>
```

WSDL – some details 4

Course
data
example

```
<tns:code>1000−234aMRJ</tns:code>
<tns:name>
        <tns:value language="en">Compiler construction</tns:value>
        <tns:value language="pl">Metody realizacji jezykow programowania</tns:value>
</tns:name>
<tns:description>
        <tns:value language="en">Structure of a compiler. Phases of compilation: analysis (
            lexical analysis, syntax analysis, contex vel semantic analysis), synthesis (code
            generation, optimization, loading). Data structures of a compiler (symbol table
            et al.).</tns:value>
        <tns:value language="pl">Struktura kompilatora. Fazy kompilacji: analiza
            leksykalna, skladniowa, kontekstowa, generowanie kodu, optymalizacja, skladanie
            kodu. Struktury danych kompilatora (tablica nazw, tablica symboli).</tns:value
            >
</tns:description>
<tns:language>pl</tns:language>
<tns:courseURL>https://usosweb.mimuw.edu.pl/kontroler.php?_action=actionx%3Akatalog2
    %2Fprzedmioty%2FpokazPrzedmiot(prz_kod%3A1000−234aMRJ)&amp;lang=2</
    tns:courseURL>
```

WSDL – some details 5

Course instance

```
<tns:code>1000−2M03DM</tns:code>
<tns:studyCredits>
        <tns:value unit="ects">5</tns:value>
</tns:studyCredits>
<tns:contactHours>30</tns:contactHours>
<tns:period>
        <tns:academicYear>2008</tns:academicYear>
        <tns:academicPeriod>S1</tns:academicPeriod>
        <tns:duration>1</tns:duration>
</tns:period>
<tns:lecturerId>uw.edu.pl:1111</tns:lecturerId>
```

Grade(s)

```
<tns:value gradingScheme="local">5</tns:value>
<tns:value gradingScheme="ects">A</tns:value>
```

Subject area code

subjectAreaCodeT – code of the study subject area within specific classification; classifications supported are: EU, ISCED97 (case insensitive); EU denotes Socrate/Erasmus coding while ISCED97 – UNESCO ISCED 97 standard [ISCED]; examples: "11.3" corresponds to Computer Science, "15.1" to Journalism), ISCED97 – UNESCO ISCED 97 standard (examples: "48" – Computing, "32" – Journalism and information);

CT subjectAreaCodeT   1..*   E value : string   A classification : nameT
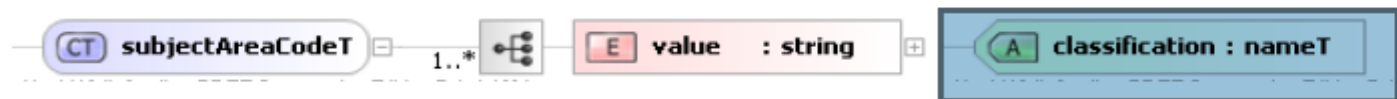
WSDL – methods (web services)

sendOrganizationData()
getOrganizationData()
sendAgreementData(), getAgreementData()
sendNominatedStudents()
getNominatedStudents()
sendArrivalDate(), getArrivalDate()
sendDepartureDate(), getDepartureDate()
sendLearningAgreement()
getLearningAgreement()
sendTranscriptOfRecords()
getTranscriptOfRecords()
getCourseData()
validateNationalPersonalID()

Architecture of the prototype (ver. 2)
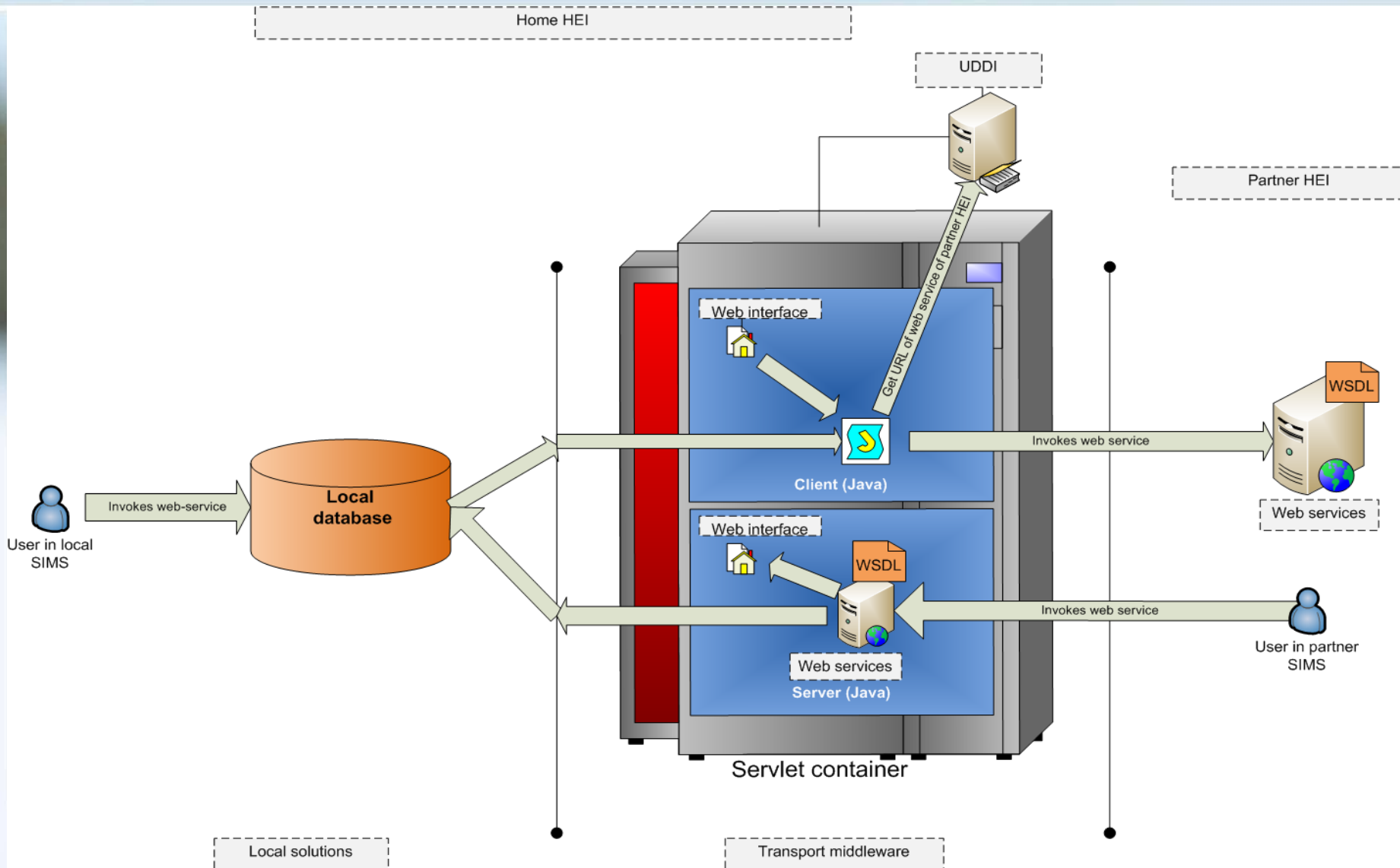
Testbed for the project (ver. 2)
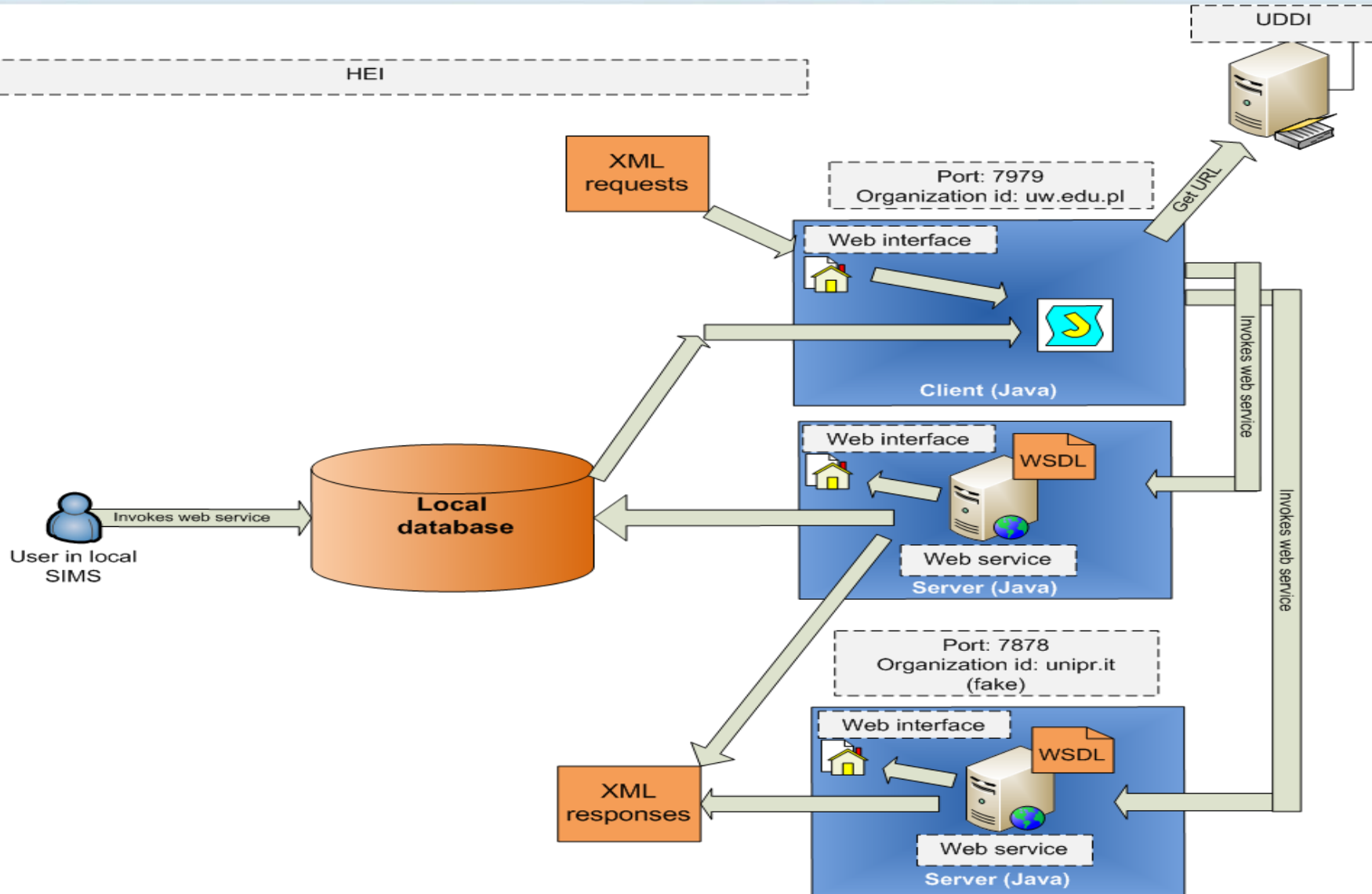
UDDI – Universal Description, Discovery and Integration (registry of Mobility nodes)

Mobility Client

Information
- Introduction

Web Service Methods

OrganizationData
- sendOrganizationData
- getOrganizationData

AgreementData
- sendAgreementData
- getAgreementData

NominatedStudents
- sendNominatedStudents
- getNominatedStudents

ArrivalDate
- sendArrivalDate
- getArrivalDate

DepartureDate
- sendDepartureDate
- getDepartureDate

CourseData
- getCourseData

LearningAgreement
- sendLearningAgreement
- getLearningAgreement

TranscriptOfRecords
- sendTranscriptOfRecords
- getTranscriptOfRecords

Other
- validateNationalPersonalId

UDDI Registry
- **Edit**

Help
- WSDL

UDDI Registry

Add   Delete   Refresh

	Id	Name	WSDL URL
○	unipr.it	it:Universita degli Studi di Parma	http://usosphp:7878/mobility-server-transport/webservices/mobility-service?wsdl
◉	uw.edu.pl	pl:Uniwersytet Warszawski	http://usosphp:7979/mobility-server-transport/webservices/mobility-service?wsdl

Edit

Details

ⓘ Id *   uw.edu.pl   246 left / 255

ⓘ Name *

pl:Uniwersytet Warszawski

Delete

ⓘ Language

ⓘ Localized Name

Add

ⓘ WSDL URL *   http://usosphp:7979/mobility-server-transport/webservices/mobility-service?wsdl

ⓘ Contact Person Name

ⓘ Phone Number

ⓘ Service Name

ⓘ Service Description

Save   Cancel

*- required

2

Web client (client= WARSAW, server= PARMA)
http://usosphp.mimuw.edu.pl:7979/mobility-client-web/index.jsp

Web server (server=PARMA)
http://usosphp.mimuw.edu.pl:7878/mobility-server-web/

Mobility Server

|◄ ◄◄ ◄ 1 2 3 **4** ► ►► ►| Items:Page 15 ▼ Count 51 Id unipr.it

2009-11-13 14:28   getOrganizationDataRequest

2009-11-13 14:29   getOrganizationDataRequest

2009-11-13 14:31   getOrganizationDataRequest

2009-11-13 14:32   getOrganizationDataRequest

2009-11-13 17:04   sendAgreementDataRequest

2009-11-14 21:05   sendNominatedStudentsRequest

```
<tns:sendNominatedStudentsRequest xmlns:tns="http://mobility.usos.edu.pl" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://mobility.usos.edu.pl MobilitySchema.xsd">
  <tns:agreementId>
   <tns:homeId>
    <tns:organizationId>uw.edu.pl</tns:organizationId>
    <tns:value>982/E/II08</tns:value>
   </tns:homeId>
   <tns:partnerId>
    <tns:organizationId>unipr.it</tns:organizationId>
    <tns:value>1207/E/XI08</tns:value>
   </tns:partnerId>
  </tns:agreementId>
  <tns:academicYear>2008</tns:academicYear>
  <tns:nominatedStudentsWithPersonalData>
   <tns:uniquePersonalData>
    <tns:student>
     <tns:nationalPersonalId>PL:85          </tns:nationalPersonalId>
```

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Web client (client= PARMA, server= WARSAW)
http://usosphp.mimuw.edu.pl:7979/mobility-client-web/index.jsp

Web server (server=WARSAW)
http://usosphp.mimuw.edu.pl:7979/mobility-server-web/

Mobility Server

|◁ ◁◁ ◁ 1 2 **3** ▷ ▷▷ ▷| Items/Page 10 ▾ Count 22 Id uw.edu.pl

2009-11-13 19:33   sendOrganizationDataRequest

2009-11-14 22:39   sendOrganizationDataRequest

```
<tns:sendOrganizationDataRequest xmlns:tns="http://mobility.usos.edu.pl" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://mobility.usos.edu.pl MobilitySchema.xsd">
  <tns:organizationDataWithPersonalData>
   <tns:uniquePersonalData>
    <tns:employee>
     <tns:nationalPersonalId>IT:CRDTZN         </tns:nationalPersonalId>
     <tns:givenName1>Tiziana</tns:givenName1>
     <tns:surname1>Cord    </tns:surname1>
     <tns:gender>2</tns:gender>
     <tns:employeeId>unipr.it:2323</tns:employeeId>
    </tns:employee>
    <tns:employee>
     <tns:nationalPersonalId>IT:CCRSL        </tns:nationalPersonalId>
     <tns:givenName1>Silvia</tns:givenName1>
     <tns:surname1>Iacc    </tns:surname1>
     <tns:gender>2</tns:gender>
     <tns:employeeId>unipr.it:2424</tns:employeeId>
```

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Integration with USOS
(Oracle database, Oracle forms)

1. <u>Web service called by the local user</u>

   - send() – gather context data, create **XML message**, enque it into **Advanced Message Queue** for outgoing messages, read the answer from Advanced Message Queue for incoming messages

   - get() – create XML message, enque it into the Advanced Message Queue for outgoing messages, read the answer from Advanced Message Queue for incoming messages, display it in user interface

2. <u>Web service called by the remote user</u>

   - send() – store incoming messages in **XML buffer** inside Oracle database, use database **views** for selecting messages corresponding to specific methods, display them on demand in user interface

   - get() – invoke a **procedure** from Oracle **package**, which selects data from the database and sends to the caller

IRO – result of the remote invocation of **sendOrganizationData()**

Questions and problems

- Mobility project has specific objectives and specific needs concerning exchanged data – how to integrate its WSDL with other standards
- Software for mobility nodes distributed as open-source
- Software for local system developed by local vendors, consortia, …
- UDDI – one or many, who should administer?
- Authorisation and authentication in global scale (federated IDM or bilateral authorisation agreements)
- Security and privacy of data – legal aspects
- Next steps …

Links and readings

- Project home page

  http://usos.edu.pl/Mobility

- Web client

  http://usosphp.mimuw.edu.pl:7979/mobility-client-web/

- Web server

  http://usosphp.mimuw.edu.pl:7979/mobility-server-web/

- Rafał Nagrodzki, *The Mobility Project*, Master Thesis in Computer Science, University of Warsaw