



Open source databases and data migration tools

Simion Pruna



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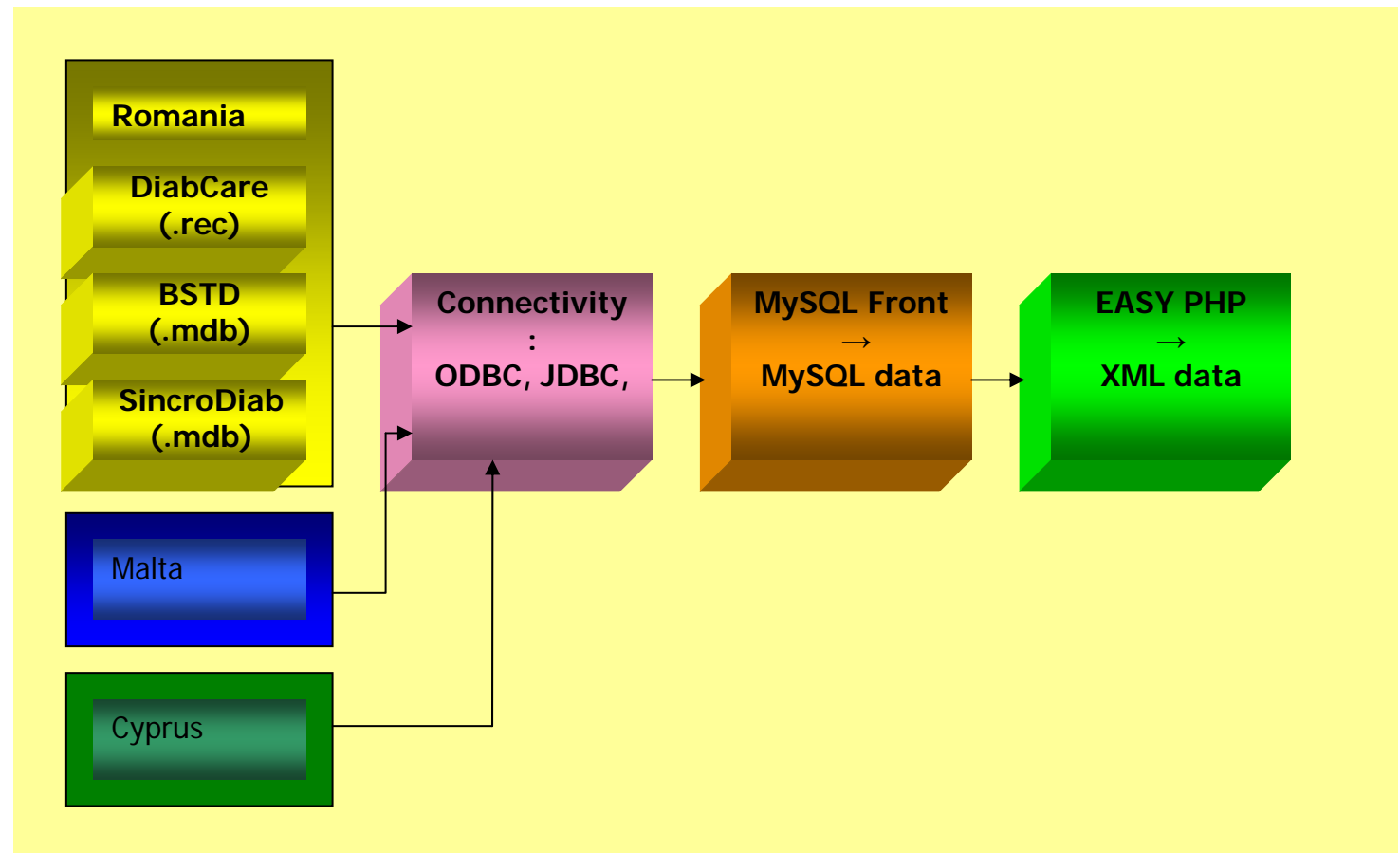
BIRO Continuous Integration

- Romania, Malta and Cyprus involvement in the adaptation, implementation, set-up and use of the BIRO Health Information System through continuous integration of the WPs.



The BIRO XML Data Transfer Architecture

- A common framework for all EHR applications that enables partners to export data in XML format
- Use Easy PHP 1-8 free software





SQL/XML Overview

- Unfortunately, XML and SQL represent information in very different ways, and many developers spend significant effort converting information between the two.
- The following example shows the same information represented in a C++ form, a relational tables and represented in XML



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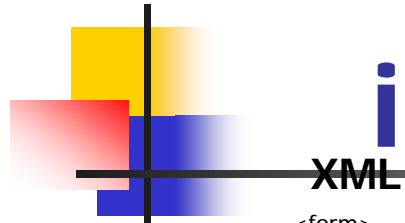
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Identificare pacient

Pacient prezent	Loc înregistrare	Data înregistrare	Data completare		
<input type="radio"/> Da <input checked="" type="radio"/> Nu	Centrul de Diabet Ambulator, Bucuresti	17/01/2005 09:49:57	06/01/2005		
Numar identificare	Medic	<input type="button" value="Selectie"/> <input type="button" value="Copiere"/>			
00000001	CRISTESCU JULIETA				
Numar fisa CAD	Medic responsabil de ingrijirea pacientului	<input type="button" value="Selectie"/>			
122103	CRISTESCU JULIETA				
Cod numeric personal	Nume	Prenume	Data nasterii	Virsta	Sex
1530704520037	FRINCU	VASILE	04/07/1953	51	Masculin
Adresa	Telefon	e mail	Ocupatia		
Giurgiu Str. Talei nr.57	0723648711		SUBINGINER		
	Stara civila	Grup sanguin	Rh	Casa de Asigurari	
	Necompletat	Necompl	Necomp	Bucuresti	
Nota Bene	DIETA 180HC/zi				



Defining form patient in XML format and SQL



```

XML
<form>
  -<patient>
    <ID>1</ID>
    <patient_number>122103</patient_number>
    <surname>FRINCU</surname>
    <forenames>VASILE</forenames>
    <date_of_birth>19530704</date_of_birth>
    <age>51</age>
    <cnp>1530704520037</cnp>
    <gender>1</gender>
    <date_of_death />
    <address>Giurgiu Str.Taliei nr.57</address>
    <phone>0723648711</phone>
    <occupation>SUBINGINER</occupation>
    <civil_status>0</civil_status>
    <sanguine_group>0</sanguine_group>
    <rh>0</rh>
    <lock>False</lock>
    <casa_asig>11</casa_asig>
  </patient>
</form>

```

- HTML is a presentation language, whereas XML is a data-description language
- To describe patient form in XML is very similar to that of HTML form
- The XML format should therefore be very easy to understand to anyone that has knowledge of HTML forms.
- The XML file must always start and end with the <forms> element
- The form described here has 1 input field whose name is "patient".
- Apart from text fields, the XML can also define textareas, password fields, radio buttons, checkboxes, etc.

Relational Tables

ID	patient_number	surname	forenames	date_of_birth	age	cnp	gender	date_of_death	address	phone	en
1	122103	FRINCU	VASILE	19530704	51	1530704520037	1		Giurgiu Str.Taliei nr.57	0723648711	



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EXPORT data and convert in XML

Date Fise / Medicamente/ Consultatii

Pentru intervalul de timp cuprins intre...

...si intre

Tip
 Fisa
 Consultatie

Nume fisier

Selectati Medicul

BACANU ELENA
BOBOC DANIELA CAMELIA
BRATU MARIA DANIELA



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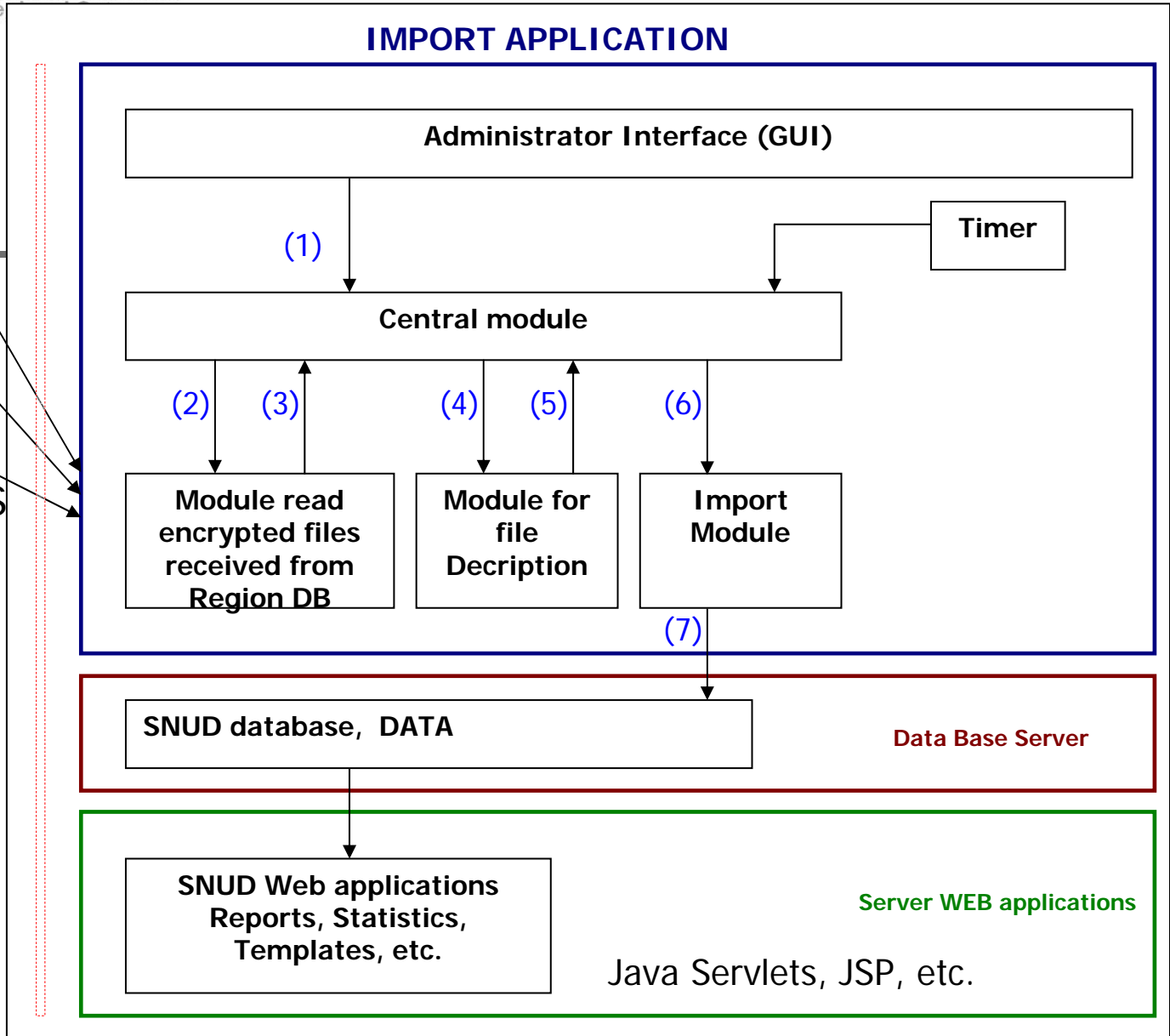
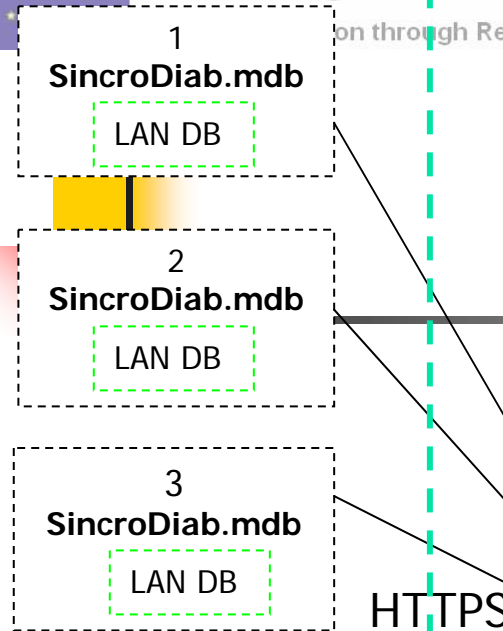
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National System for Diabetes Monitoring (SNUD)

- the need for developing a system which can aggregate data from various sources and provide a mechanism for managing the privacy of patient and healthcare information via a robust rule-based system.



Middleware



Firewall



Encrypting data

- We need to mention about encrypting data when it is transmitted through the internet.
- Data privacy is going to be a major concern in Romania as it deals with sensitive patient information and clinical data.

Preluare date SincroDiab & Transfer pe server

Data: 16-05-2006

Calea de unde se vor prelua tabelele SincroDiab

d: \

- D:\
- BD_reale
- 1_paulescu

Nume server: 10.0.0.110
Username: snud
Parola: *****

Transferul se va face zilnic la ora

16:481

Editeaza configuratia

Salveaza configuratia

Parola bazei de date SincroDiab

Start

Ati fost deconectat ...
19:25 Fisierul 1&SNUD&16-05-2006.FLG a fost transmis pe server in directorul /snud/flag !
19:25 Fisierul 1&HRI_VAL&16-05-2006.xml a fost criptat si transmis pe server in directorul /snud/tabele/tabele1 !
19:25 Fisierul 1&link_pacient_hcp&16-05-2006.xml a fost criptat si transmis pe server in directorul /snud/tabele/tabele1 !
19:25 Fisierul 1&person&16-05-2006.xml a fost criptat si transmis pe server in directorul /snud/tabele/tabele1 !
19:25 Fisierul 1&user&16-05-2006.xml a fost criptat si transmis pe server in directorul /snud/tabele/tabele1 !
19:25 Fisierul 1&pacient&16-05-2006.xml a fost criptat si transmis pe server in directorul /snud/tabele/tabele1 !
19:25 Tabelele HRI si HRI_C au fost convertite in fisier XML !
19:23 Tabela HRI_C a fost prelucrata in tabela de manevra !
19:19 Tabela HRI a fost prelucrata in tabela de manevra !
19:18 Tabela Link_Patient_HCP a fost convertita in fisier XML !
19:17 Tabela Person a fost convertita in fisier XML !
19:17 Tabela User a fost convertita in fisier XML !
19:17 Tabela Pacient a fost convertita in fisier XML !
19:17 Daca nu exista, folderul tabele1 a fost creat pe server in directorul /snud/tabele !
19:17 Incepe transferul tabelelor SincroDiab
Asteptati, se face conectarea ...

Import date SincroDiab in baza SNUD

Calea de unde se vor prelua fisierele criptate

c: \ ftproot
SNUD
tabele

Calea de unde se vor prelua Flaguri

c: \ ftproot
SNUD
flag

Importul se va face zilnic la ora

12:00

Editeaza configuratia

Salveaza configuratia

Start

19:33 Flag-ul 1&SNUD&16-05-2006.FLG a fost sters de pe server
19:33 Fisierul c_1&HRI_VAL&16-05-2006.xml a fost transferat in baza SNUD
19:28 Fisierul c_1&HRI_VAL&16-05-2006.xml a fost preluat de pe server si decriptat
19:27 Fisierul c_1&link_patient_hcp&16-05-2006.xml a fost transferat in baza SNUD
19:27 Fisierul c_1&link_patient_hcp&16-05-2006.xml a fost preluat de pe server si decriptat
19:27 Fisierul c_1&person&16-05-2006.xml a fost transferat in baza SNUD
19:27 Fisierul c_1&person&16-05-2006.xml a fost preluat de pe server si decriptat
19:27 Fisierul c_1&user&16-05-2006.xml a fost transferat in baza SNUD
19:27 Fisierul c_1&user&16-05-2006.xml a fost preluat de pe server si decriptat
19:27 Fisierul c_1&patient&16-05-2006.xml a fost transferat in baza SNUD
19:27 Fisierul c_1&patient&16-05-2006.xml a fost preluat de pe server si decriptat
19:27 Fisierul 1&SNUD&16-05-2006.FLG a fost preluat in directorul D:\Middleware\Import\flag!
Asteptati, se preiau fisierele transmise prin ftp ...



R A P O A R T E

centrul de diabet:

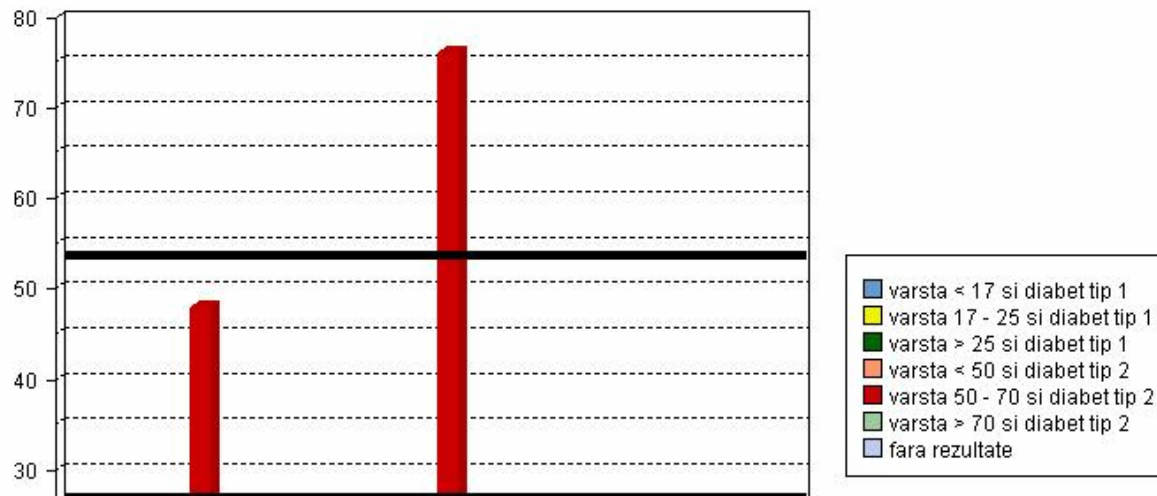
indicator:

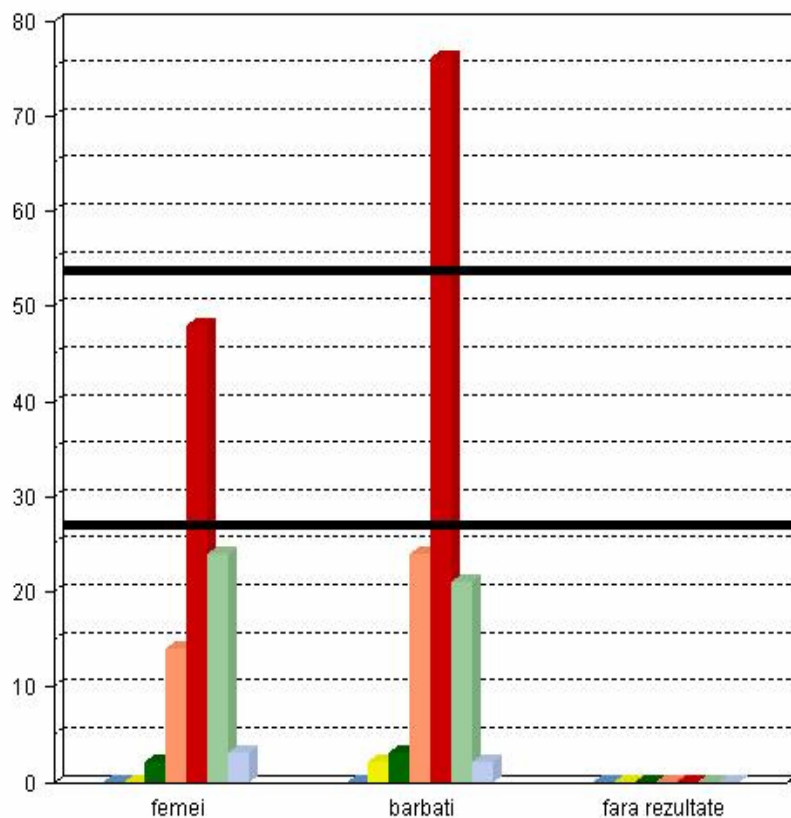
perioada raportului:

selectati modul de afisare:

[Afiseaza grafic](#)

Raport al indicatorului Sex





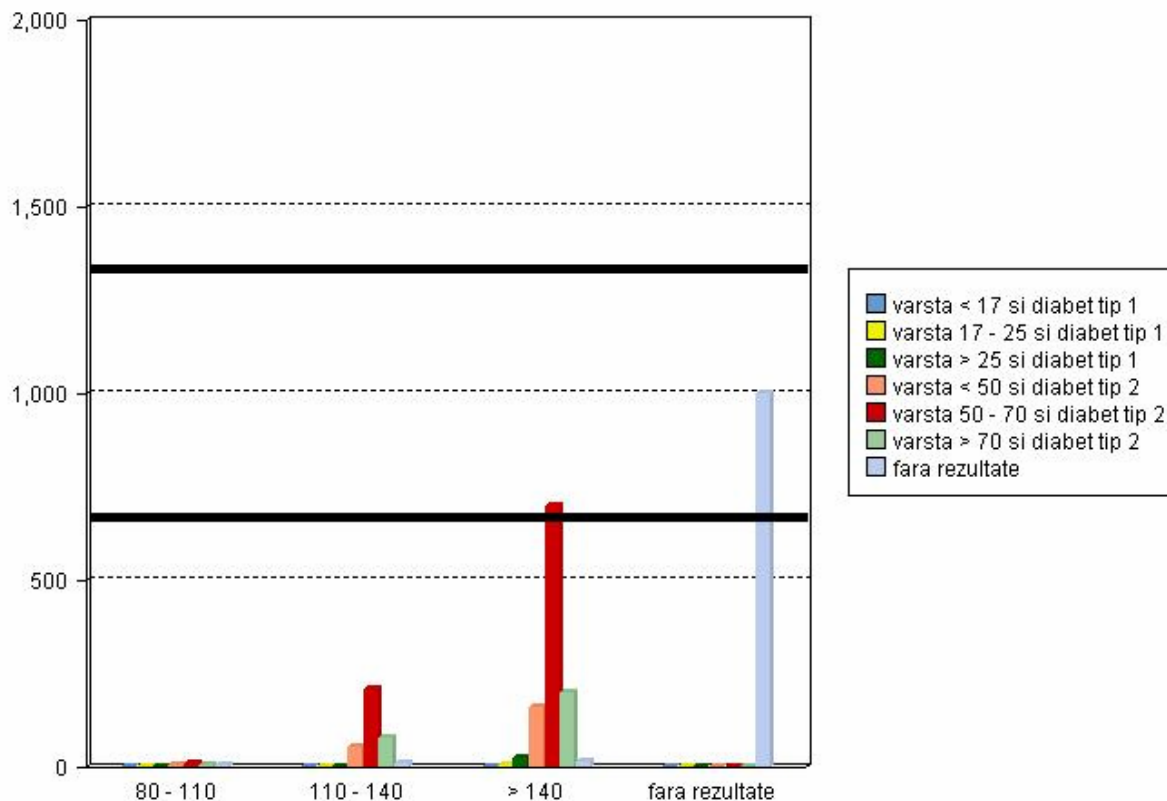
- varsta < 17 si diabet tip 1
- varsta 17 - 25 si diabet tip 1
- varsta > 25 si diabet tip 1
- varsta < 50 si diabet tip 2
- varsta 50 - 70 si diabet tip 2
- varsta > 70 si diabet tip 2
- fara rezultate

Afiseaza valori

Numarul total de pacienti: 219

	femei	barbati	fara rezultate
varsta < 17 si diabet tip 1	0	0	0
varsta 17 - 25 si diabet tip 1	0	2	0

Raport al indicatorului Prima Glicemie



Afiseaza valori

@ copyright 2005. Toate drepturile rezervate.

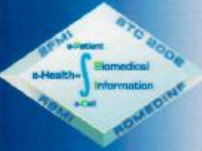


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2006 Prize

European Federation for Medical Informatics and Romanian Society of Medical Informatics
Special Topic Conference 2006 & ROMEDINF
Integrating biomedical information: "From e-Cell to e-Patient"



CRISTINA SIMONA ALECU, CONSTANTIN TONESCU TÂRGOVIȘTE

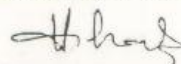
MRS./MR. *GABRIEL MARTIN, EMILIA STANCIU, SIMION PRUNA*


HAS BEEN GRANTED THE





ROMEDINF PRIZE

FOR THE BEST PAPER
CONTRIBUTING TO THE DEVELOPMENT OF
MEDICAL INFORMATICS

TIMISOARA, ROMANIA 8 APRIL 2006

PROF. UNIV. DR.
GHEORGHE. I. MIHALAS


PROF. UNIV. DR.
LACRIMIOARA STOICU-TIVADAR






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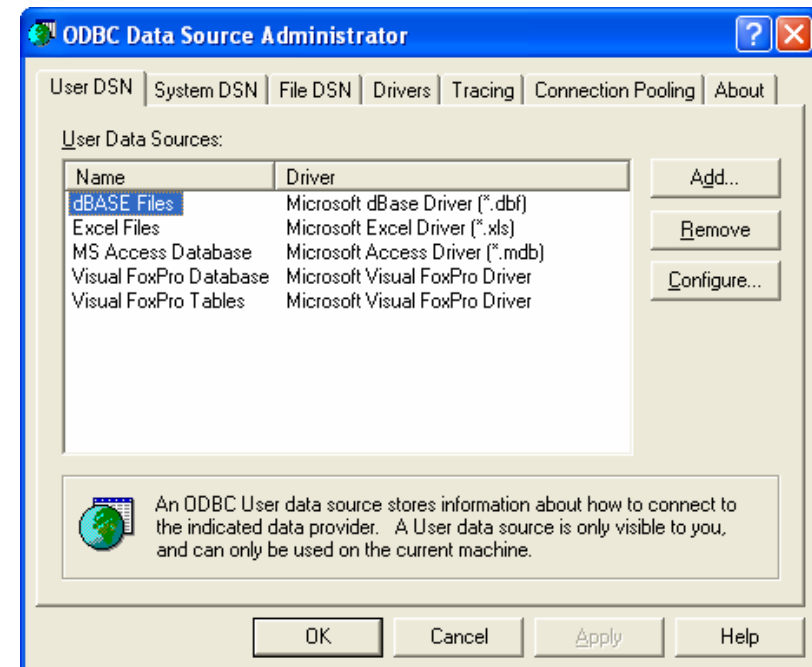
Migration of DB = two-step process

- Executing the migration of the database is a two-step process: first, connect to the database (ODBC) using the supplied credentials. Then, send and execute the command (as Front-MySQL statements) if the connection is successful.



Data Sources Open Database Connectivity (ODBC)

- To open Data Sources (ODBC), click **Start**, and then click **Control Panel**. Double-click **Administrative Tools**, and then double-click **Data Sources (ODBC)**
- It will look very familiar to users of databases tools

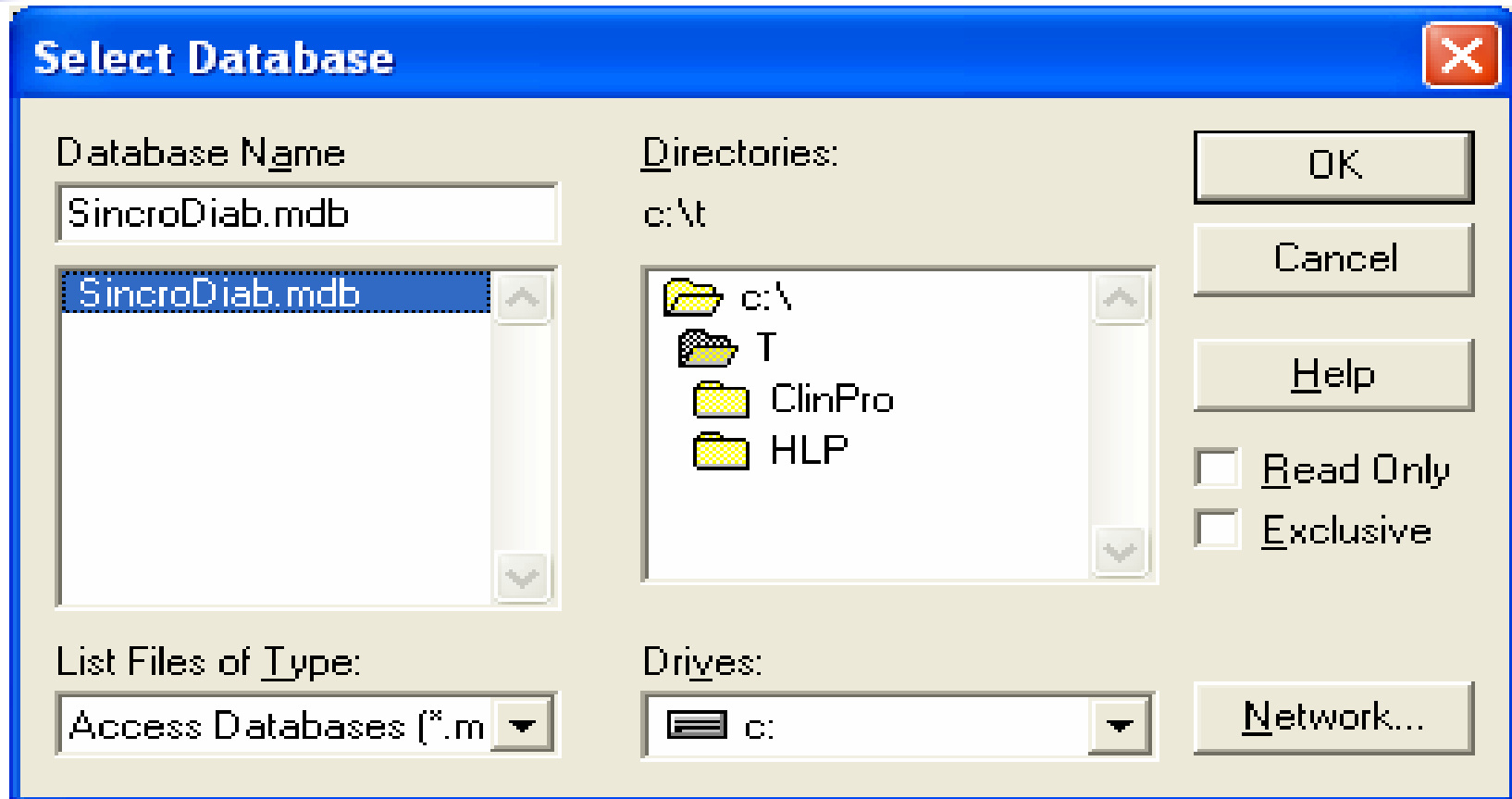




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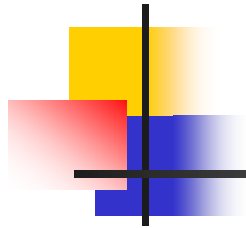
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ODBC Administration





What we need is Front MySQL



- Hostname / IP is the IP address of the database server
- the database login and the password
- it is only possible to connect to TCP ports greater than or equal to 1024

Connection to MySQL-Host...

New Save Delete

Description: localhost

Hostname / IP: localhost

User: root

Password: *****

Port: 3306 Timeout: 30 seconds

Use compressed client/server protocol

Database(s):

separated by semicolon (;)

Connect! Cancel



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Data source, BIRO dataset

- The data will be extracted out of diabetes information systems from a number of diabetes units
- A wide mixture of health care agencies including hospitals, GP practices, health authorities, and eye screening services hold these information systems



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Viewing an XML file in Internet Explorer

127.0.0.1 -> localhost -> b -> term_ref | phpMyAdmin 2.6.1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Search the Web Search Address http://127.0.0.1/mysql/ Go Links

phpMyAdmin

Baza de date: b (90)

- mqty_with_units
- multi_text
- multimedia_data
- net_address
- newmedication
- nota_bene_trans
- paste_errors
- patient
- patient_version
- person
- physical_data
- plain_text
- preturi_si_cantitati
- qhcp
- qty
- qty_range
- qty_ratio
- qty_with_units
- query1
- reg_agency
- registration
- report
- report_trans
- staff_member
- stocuri
- summary_trans
- summary_trans_c
- table1
- term_ref
- termref_qualifier
- termset_desc
- tool
- typed_address
- unit
- unit_system
- units_list
- units_list_setup
- user
- version
- version_c
- versioned_trans

```
<text>TA diastolic clino</text>
<is_plural>False</is_plural>
<termset>1</termset>
</term_ref>
- <term_ref>
  <ID>241</ID>
  <not>False</not>
  <orig_lang>1</orig_lang>
  <concept_code>2F6</concept_code>
  <code_used />
  <text>TA systolic orto</text>
  <is_plural>False</is_plural>
  <termset>1</termset>
</term_ref>
- <term_ref>
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  <concept_code>2F7</concept_code>
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  <is_plural>False</is_plural>
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  <orig_lang>1</orig_lang>
  <concept_code>2F10</concept_code>
  <code_used />
  <text>Frecv. C. - S</text>
```

Local intranet



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Way of connecting BIRO to a database

- An application may be needed to act as an intermediary between BIRO server and the regional databases (Malta, Cyprus and Romania)
- The second method, which this presentation will focus on, is open Data Sources (ODBC) and Front-MYSQL
- This will be a section of the Del_12 and it is under development as a tutorial.



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XML Schema for SincroDiab data

- BIRO – WP3 want to use XML Schema for data constraints
- The first option, converting C++, Java data to XML, is actually fairly simple.
- Our solution will be detailed fully in the next two slides of the presentation, but I'll introduce it now.
- The first thing we want to do is to create an XML document for BIRO WP3 purposes
 - <http://127.0.0.1/mysql/>