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TROST
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Implementation of an Electronic Medical Record System

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- **Electronic Medical Records (EMR) is a digital representation of the traditional medical record.**
- **Numerous advantages over a traditional medical record:**
 - **Dynamic data.**
 - **Accessibility.**
 - **Customizable.**
- **A distributed system built on pre-existing open-source components (OpenEMed).**



- **Give doctors easy access to vital patient information**
- **Keeps doctors aware with dynamic sensor data.**
- **Elderly citizens can enjoy independence at home.**
- **System can help doctors by saving and analyzing sensor readings.**
- **Alerts can be triggered to notify doctor of trouble.**
- **Distributed nature makes it more robust.**



- **Understanding the system we were working with.**
- **Had to explore directories and source files.**
- **Time consuming (many source files).**
- **Necessary for the success of the project.**



- **Project was programmed in Java.**
- **Data readings are stored in an SQL-accessible database (HSQL).**
- **We needed to decide where changes were to be made.**
- **Most of the changes were to be made in PIDS.**
- **Sensor data will be stored on the patient's system where sensor readings will be sorted and can be uploaded to the doctor.**



- **Security.**
- **EMR should contain all relevant patient data.**
- **Doctor should be able to submit queries.**
- **Interfaces should be customizable to some degree.**
- **The system should allow patient/doctor interactions.**
- **System should be scalable.**
- **System should be dependable and accurate.**




- **Personal Identification Service (PIDS) – Interface to store and maintain patient data.**
- **Resource Access Decision Service (RADS) – Interface used to change access permissions for users.**
- **Clinical Observation Access Service (COAS) – Used to run queries based on clinical information.**

Screenshots



OpenEMed Patient Manager

File Help

 **TeleMed Patient Manager**

enter search criteria →

ID	Family Name	Given Name	Middle Name	Suffix	Gender
[Empty Table]					

...servers/pids/pids.ior

 Confidence Level: 0.5

 PID State: PERMANENT, TEMPORARY, DEACTIVATED

A Simple COAS Client

Servers

COAS Server: [] Naming Server: [] Info Connect

Search Parameters

Who: DNS:unm.edu//anonymous When (start): 19711223T154113

What: DNS:telemed.lanl.govTraitCode/Treatment When (stop): 20011226T035112

Max.Obs: 20 Count Query

Status

for large queries it is much more efficient to do a <Count> to see how many records would come back

Select Qualifier

Name: [] Value: []

Predefined Qualified Codes

Treatment History Report Summary Immunology

ImageStudy Contraindic... Attachment free1 free2

get codes []

Policies

use Policy [] True False default

Display

ObsNo: 0 DISPLAY_TYPE_ALL_TEXT Display

Clear Write XML COAS.xml Ok

Client

User Attributes	James Rados	
Resource Name	DNS:lanl.gov//ld.1005/field.BACTERIOLOGY	Access_Allowed
Operation	READ	
RAD Server	AD	Connect



- **Analyzed structure of OpenEMed.**
- **Analyzed the source code of necessary components and determined where and how modification can be carried out.**
- **Created a Design Map to outline important parts and places where modifications can be made.**
- **Added a medical record section to the PIDS component.**

Screenshots



Add Patient

Enter new patient data:

Personal | Contact | Other

ID:

Family Name:

Given Name:

Middle Name:

Suffix:

Gender: Male Female Other Unknown

Date of Birth:

SSN #:

Add Patient

Enter new patient data:

Personal | Contact | **Records** | Other

Medical Record

Condition (5/21/06):
Compound fracture - Tibia.
Operation performed by Dr. Joe Brown, (213) 483 - 0734.
Prescribed Medication Medication:
Vicodin (60 mL)

Condition (7/17/05):
Streptococcal pharyngitis
Prescribed Medication:
Suprax (100 mg/ 5 mL 75 mL)



- **There is a strong need for such a system.**
- **Can be very beneficial all around if implemented correctly.**
- **Incorporate sensor readings into the system so data readings from patients can be queried by the doctor.**
- **Create an interface to integrate the various parts of the system (PIDS, RADS, etc.).**
- **Clients running off of a secure server.**
- **Test the distributed nature of the system.**



Questions/Comments?