CaboLabs

Healthcare Informatics, Standards and Interoperability

Interoperability between
Health Information Systems

an in depth approximation to the use of standards for interoperability in digital health

openEHR

The open standard for future proof health information systems

HL7

The international standard for health information interchange

DICOM
Digital Imaging and Communications in Medicine

The industry standard for clinical imaging storage and communication

Course Objectives

The main goal of this course is to allow students to understand and gain practical experience on using standards to enable interoperability between Health Information Systems. This includes: using different communication protocols and message formats, knowing how to read standard specifications, and use tools that help on implementation and testing.

Why do we need this course?

Health information systems are often designed as isolated silos, clinical patient information is fragmented and inaccessible. Creating an environment with huge limitations for clinical decision support, blocking better quality of care and better clinical management. These systems do not allow an effective use of valuable clinical data, thus, do not enable interoperability.

On the other hand, interoperability as a design principle enables the integration of different clinical data repositories, and real time exchange of clinical information, allowing to access all the information at the right moment, enabling better clinical decision support and clinical management. Standards play an important role in creating such an interoperable environment, enabling the effective use of clinical data to improve health care.

There are many standards, each with a specific scope, from technical standards like communication protocols (TCP, MLLP, HTTP, SOAP, DICOM), information standards (openEHR), formats and messaging (HL7 v2.x, XML, JSON, DICOM), terminologies (SNOMED CT, LOINC) and semantic standards (openEHR Archetypes and Templates). On this course we'll use many of these standards focused on implementation.

Who is this course for?

The main target is for IT professionals and students interested in the eHealth domain, especially software and integration architects, programmers, technical leaders, network managers, among other roles. Programming skills are required to do the assignments, but assignments are optional.

It is recommended to have notions of communications protocols (TCP, HTTP), and formats like XML and JSON. It is required to have programming knowledge. Java will be the reference language, but other languages can be used on the assignments.

Syllabus

Here you can find the course modules and the correspondent list of topics.

Module	Topics
1 Architecture & Communication Protocols	+ Architecture of hospital information systems + Communication protocols and messaging formats + Tools to work with data interchange between different systems
2 HL7 v2.x Messaging	+ HL7 v2.x messaging, structure and specification chapters + Main message types (ADT, ORM, ORU and ACK) + Building messages with HAPI, using ER7 and XML encoding + HL7 use case examples
3 DICOM Architecture and Communications	+ Architecture of imaginology systems (RIS, PACS, Modalities, Workstations) + DICOM information model, DICOM tags + DICOM services (Store, Q/R, WADO, etc.) + Tooling presentation: DCM4CHEE PACS and DCM4CHE Toolkit
4 Semantic Interoperability with openEHR	+ openEHR clinical record structure + openEHR archetypes and templates + openEHR clinical document management in XML (generation, processing, validation, versioning) + Storing and semantic querying of openEHR clinical data

Assignments with grading

- Create HL7 v2.x client and server or HTTP client and server from scratch.
- Using HAPI to create a HL7 server for ADT messages.
- Using DCM4CHEE PACS to manage orders, store DICOM studies and structured reports, and retrieve them using the DCM4CHE Toolkit.
- Create a client to commit and query openEHR data using EHRServer as a backend.

Modalities

This course is offered online and on-site for companies, organizations and events. To request a quote please contact info@cabolabs.com

It is also offered online with live/synchronous sessions. This modality works in established periods, generally once a year. To get notification when the next enrollment period opens, sign to the Waiting List found here: https://www.cabolabs.com/en/education

For the online editions:

- We have a virtual campus with the materials and a forum
- We have a videoconference tool to provide the live online sessions

- All the session are recorded to watch later
- All the materials needed for each module will be available before the correspondent session

Evaluation and Certification

This course has four optional assignments, with a total score of 100. The course is approved with 50 points.

CaboLabs will be delivered two kinds of certificates:

- APPROVAL: for those who got 50 or more points.
- PARTICIPATION: for those who got less than 50 points or didn't deliver the assignments.

Trainer

The course will be delivered by Pablo Pazos Gutiérrez, who designed the course taking into account the HL7, DICOM and openEHR specifications and summarizing years of experiences working with standards communication protocols and clinical repositories.

Bio

Pablo is a Computer Engineer from Uruguay, specialized in the eHealth domain. Director of CaboLabs: Health Information Systems, Standards and Interoperability, and creator of the courses delivered through CaboLabs. With 15+ years of experience in eHealth, 600+ trained professionals from 20 countries.

- Computer Engineer degree, Universidad de la República, Uruguay
- Director at CaboLabs Health Informatics
- openEHR Ambassador for Latin America
- Coordinator at openEHR community in spanish
- Qualified Member of openEHR's Specification Editorial Committee

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