GNU Health Federation

Building large, nationwide public health networks

Dr. Luis Falcon, MD, MSc
President, GNU Solidario
falcon@gnuhealth.org

Jornadas Nacionales Tryton 2019 – Alicante – 27 Nov 2019

About GNU Health

Freedom and Equity in Healthcare

GNU Health is, first and foremost, a Social Project

...with really cool technology

From GNU Solidario

GNU SOLIDARIO

EDUCATION AND HEALTH WITH FREE SOFTWARE

Group pic from **GNUHealthCon 2018** in Canary Islands

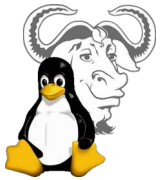
Official GNU Package

Official GNU Package, from the Free Software Foundation

Open Documentation

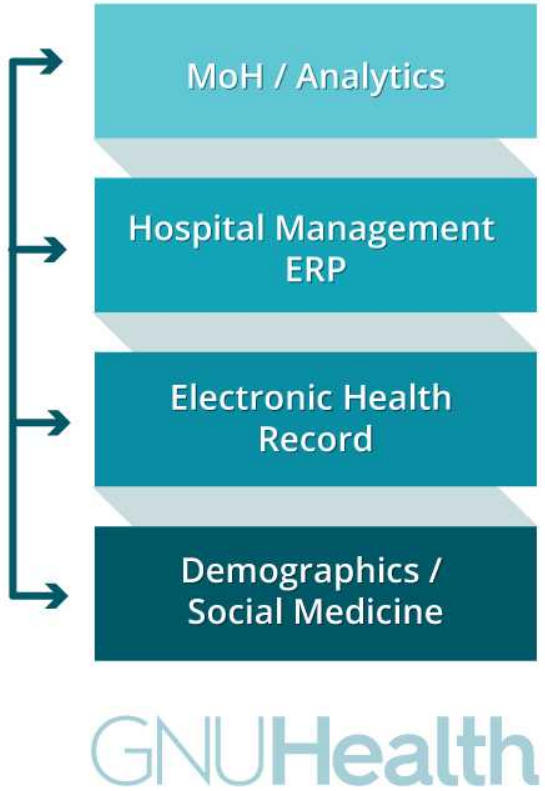
Relies on free technology

Friendly community



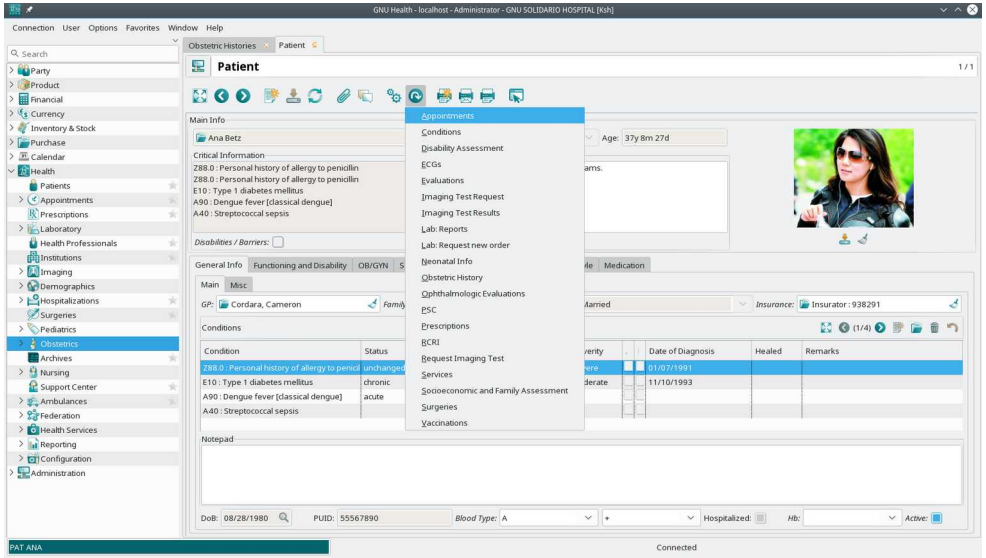
GNU Health Ecosystem

Main areas / functionality



Projects from GNU Health ecosystem

GNU Health snapshots

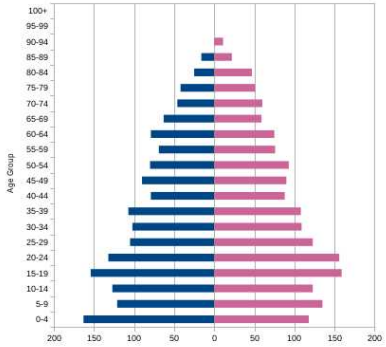


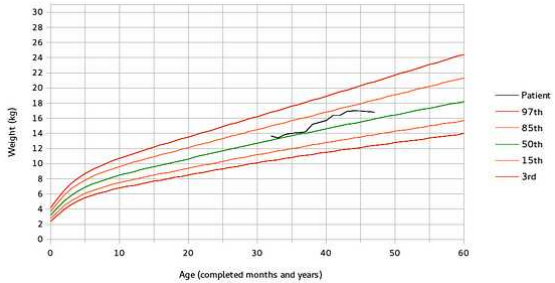
Print Date: 10/11/2014 at 18:57:01

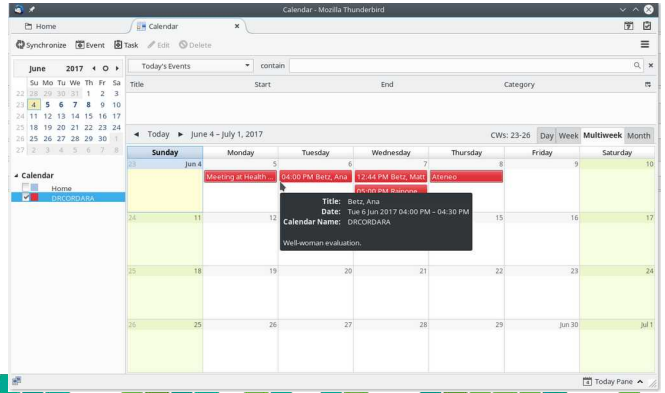
GNU Health Summary Report

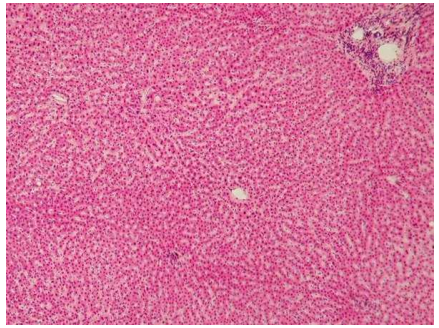
Population Pyramid

	♀	♂	Σ
Population	2131	1998	4129



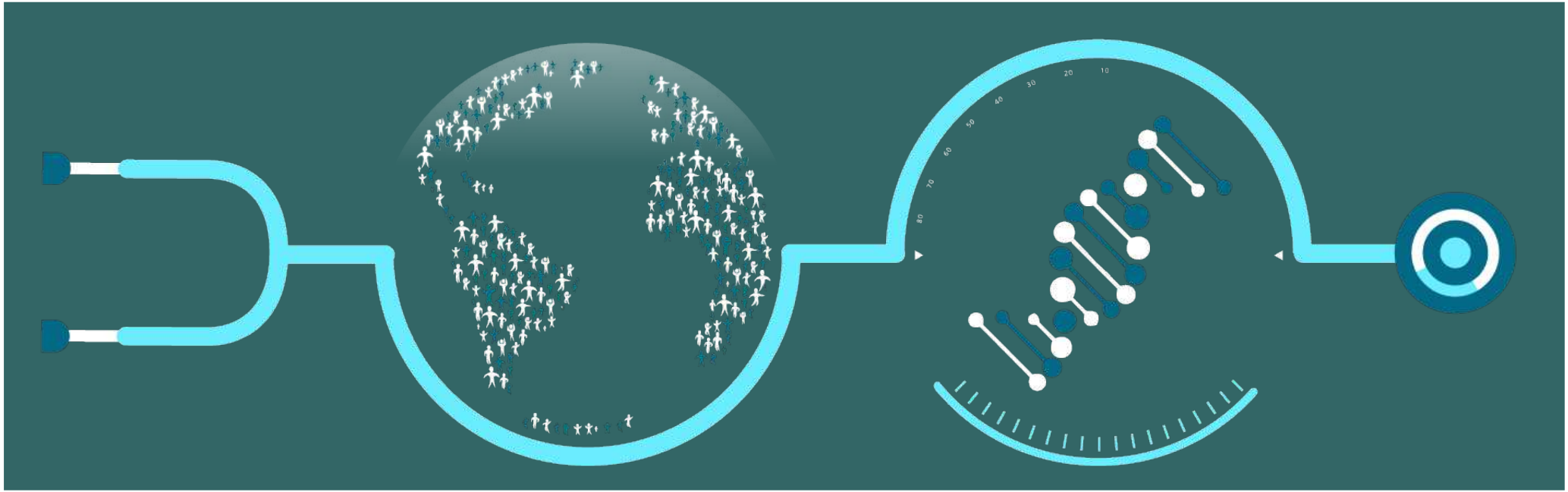






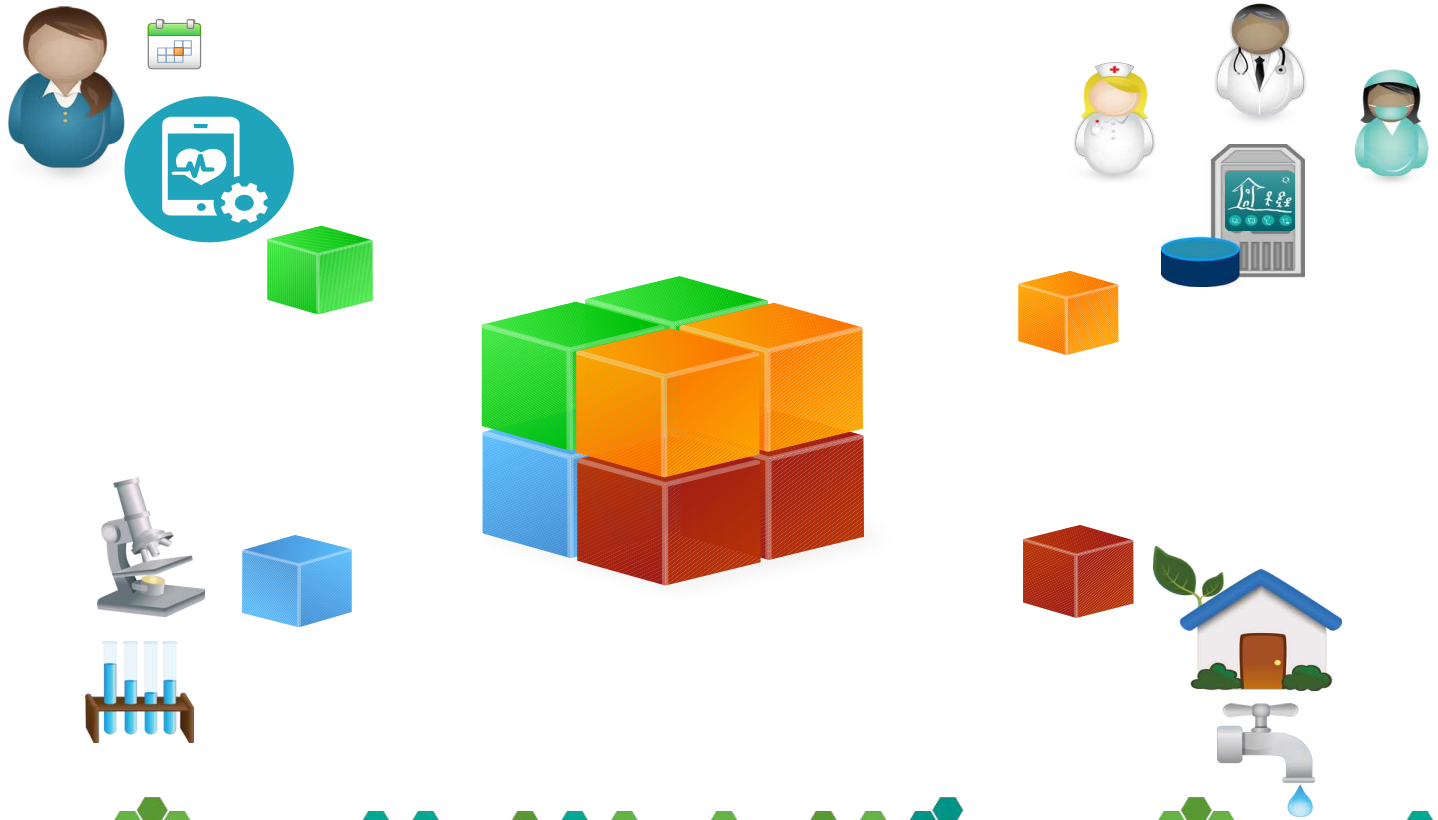
GNU Health Federation

The GNU Health Federation



Network of independent health nodes

Distributed, autonomous, scalable, heterogeneous, secure, accessible



GNU Health Federation components

Nodes

Message Server

Information System

Federation and the GH Book of Life

Pages and Books of Life

Each page represents a relevant event in on a person life

Types of pages: **Demographical, Medical, Biographical and Social**

With their own categories, for instance :

* **Social** : Exclusion, Stress, lifestyle, family, violence, food, ...
* **Medical** : Health condition, encounter, **genetics**, lab, surgery,...

Linked to HMIS processes (evaluations, health conditions, genetics...)

Easy to write and read by health professionals and patients

Easy to process by machines (industry and health coding standards)

Integrates and contextualizes the information

Transdisciplinary approach to health

A GNU Health book of life is made of

Multiple pages and **sources** of information coming from the **person** and

a **transdisciplinary** team on

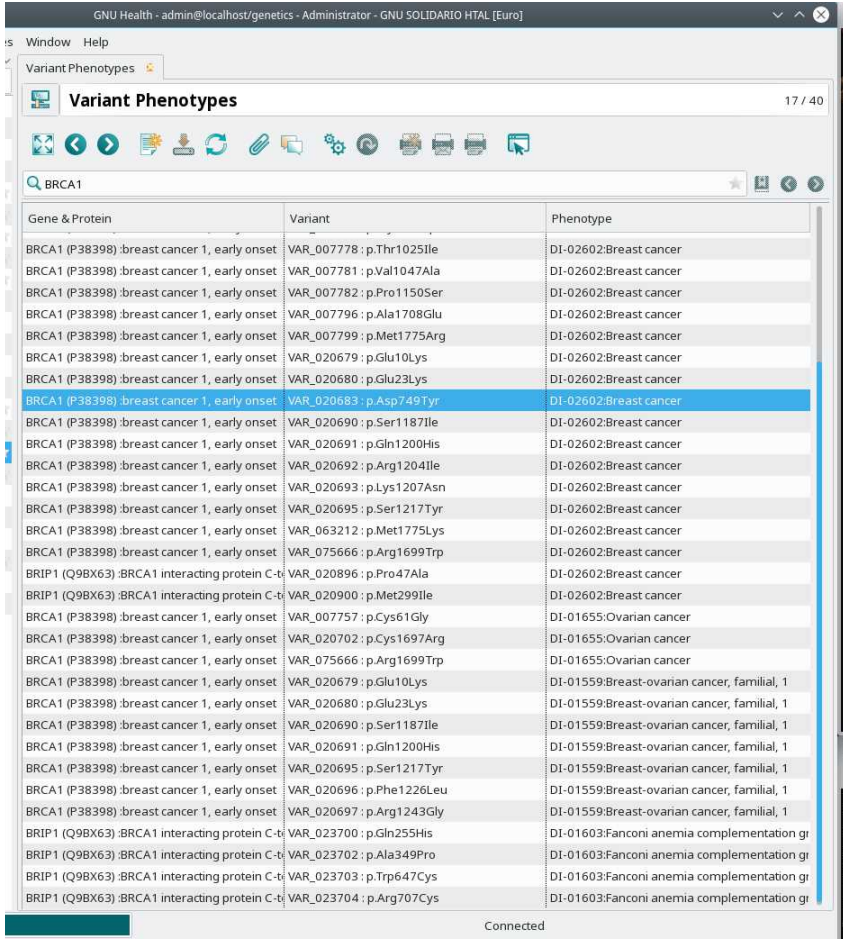
multiple health centers and nodes

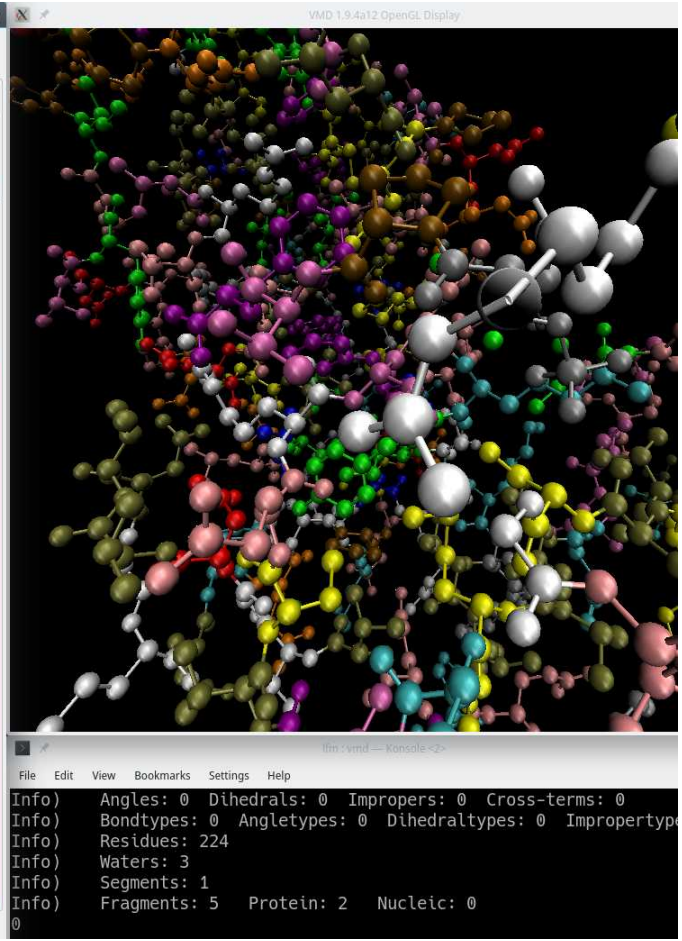
at different times and contexts.

The GH Federation Health Information System aggregates the information to provide a holistic and unique picture of the person and her health history and status

Building Large Public Health Networks

Case: GNU Health in Cancer research



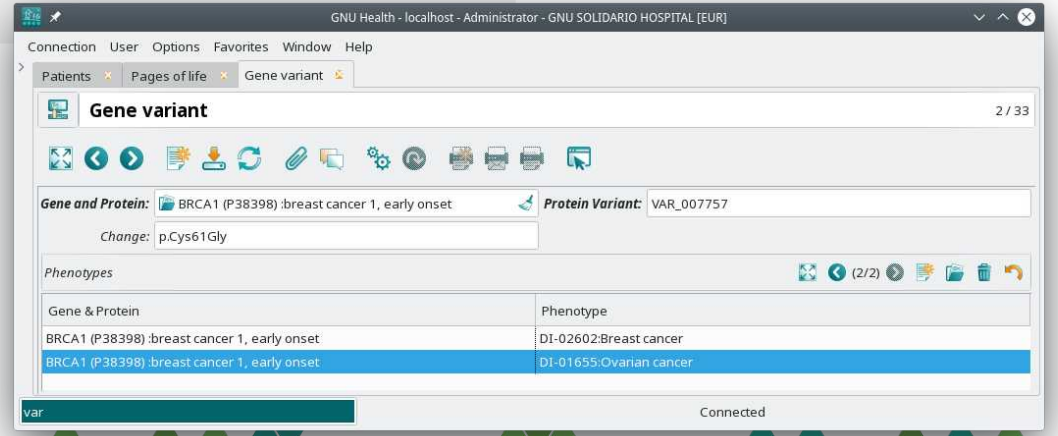


Contextualized patient information

Federation Account : ESPGNU777ORG
Gene : BRCA1 (breast cancer 1, early onset)
Locus : 17q21
Protein code : P38398 . **URI** : https://www.uniprot.org/uniprot/P38398
Natural variant : VAR_007757 // **p.Cys61Gly**
Phenotypes: DI-02602: **Breast Cancer** . MIM Code : 114480
DI-01655: **Ovarian Cancer** . MIM Code: 167000
Onset age : -
Family history: **Mother** : C50.1 Malignant neoplasm central portion of the breast
Grandfather (maternal): Q87.4Marfan Syndrome
Medical History: Type 1 Diabetes (7y) / allergic to β-lactams // appendectomy (13y)
Lifestyle: Ex-smoker //...

Genetics
+
Family history
+
Lifestyle
+
Socioeconomics

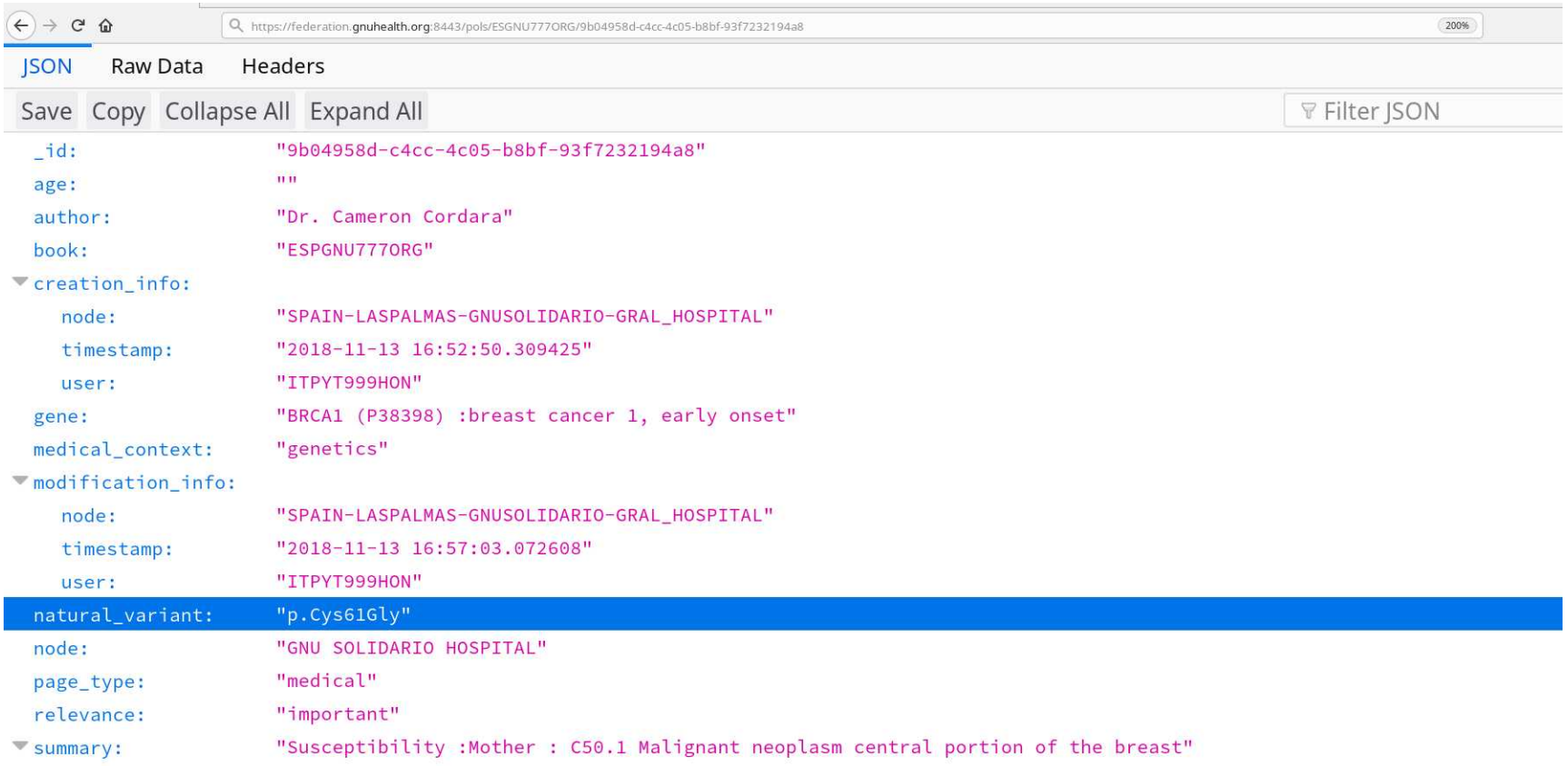
The GNU Health Federation can be the answer to many **genetic natural variants of unknown clinical significance !**



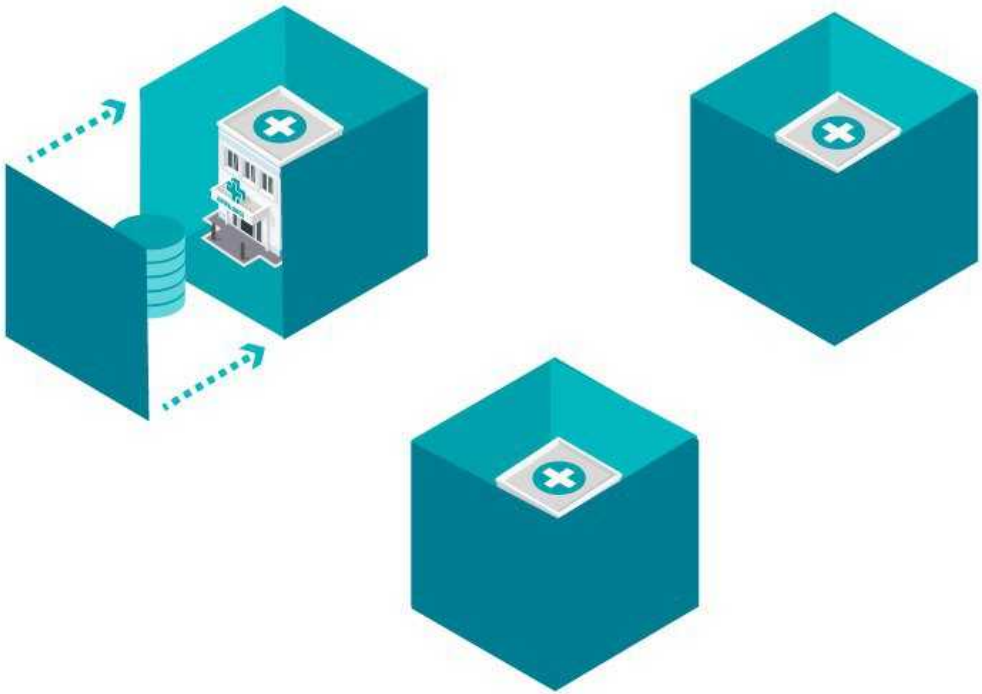
Interaction between nodes / actors

The patient, the doctor, nurse, research institution can enter their domain information, and **access** to the **latest version anytime, anywhere**

Machine readable, Human readable



Challenge: Health Information SILOS



The information is locked

Different health histories at each institution, most of them obsolete / not updated

Health professionals and patients can not share medical information

Opposes team work among health professionals and patients

Takes away precious time from the health professional

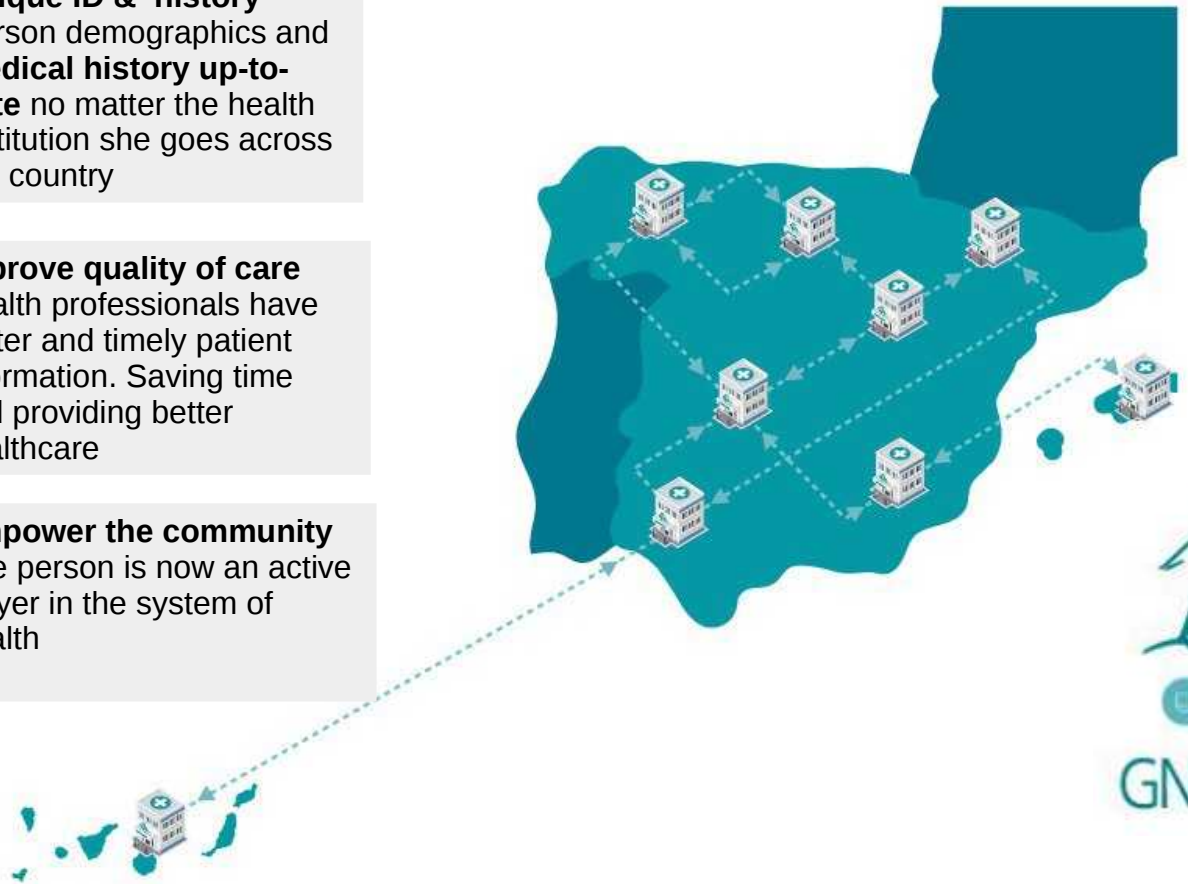
A proposal to our governments

Public Money, Public Code !

Unique ID & history
Person demographics and **medical history up-to-date** no matter the health institution she goes across the country

Improve quality of care
Health professionals have better and timely patient information. Saving time and providing better healthcare

Empower the community
The person is now an active player in the system of health



Libre Software: No hidden code, no blackboxes in healthcare.

The health software will be a **public good.**

Save millions of euros in licenses that can go to improve the public health system.

GNUHealth™

GNU Health + openSUSE

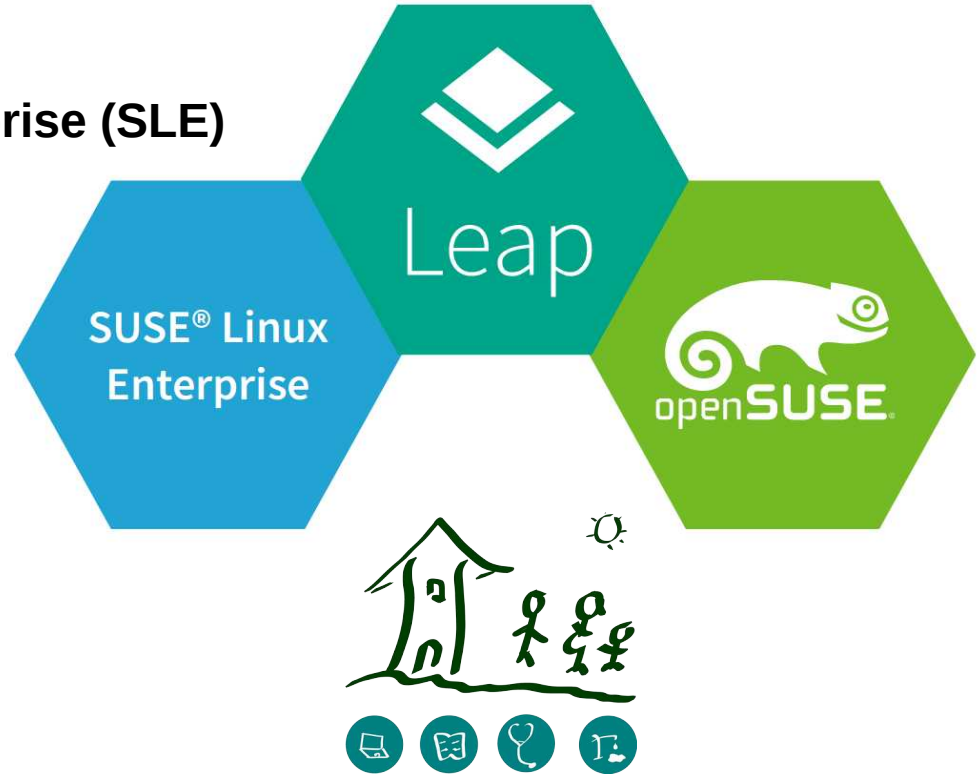
Professional support for GNU Health

Leap can be switched to **SuSE Linux Enterprise (SLE)**

Professional support

Large installations

Mission critical deployments



openSUSE commitment to GNU Health

Sponsor of GNUHealthCon / IWEEE

Provides **Raspberry Pi computers & images** for GNU Health projects **around the world**

GNU Health invited to openSUSE events

GNU Health Federation Community Hub

Community public server in Munich

Demo and test environment

Main Federation components:

* **HMIS node and PgSQL**
* **Thalamus** message server
* Person / Patient Master Index HIS
* **openSUSE** Leap OS

The GNU Health Federation Community Hub allows developers, **health practioners and research institutions** from all over the world to learn, test and develop their nodes & integrate them in the Federated network.

Some projects around the World

From clinics in the African rainforest

GNU Health

Social Medicine at the heart of Africa

http://health.gnu.org

To the largest hospitals in Asia

GNU Health and the World Health Organization - WHO

Malaria, TB and HIV modules

Essential list of medicines

Neglected Tropical Diseases

ICPM

WHO Immunization schedules

ICD-10

Training sessions with WHO Africa regional officers

Pediatric growth charts

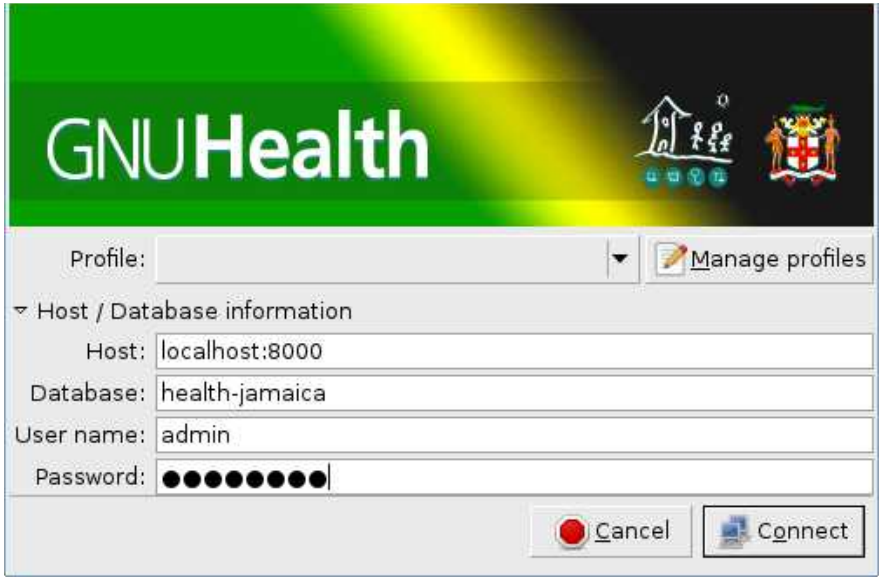
GNU Health implementation at Bafia district Hospital, Cameroon with the World Health Organization

Jamaica Public Health System

Started as a joint project between Government of Jamaica Ministry of Health and GNU Solidario

Local team

Sustainability and independence



Red Cross / Cruz Roja

Cruz Roja Mexicana uses GNU Health
Over 300,000 evaluations / year

GNU Health at Laos public health

Join the GNU Health Alliance !

GNU Health Alliance of Academic and Research Institutions

GNU Health

ALLIANCE

OF ACADEMIC AND RESEARCH INSTITUTIONS

GNU Health and the Academia

United Nations University, Kuala Lumpur,Malasia

University of Entre Rios, Argentina

Harvard / MIT, Boston, United States

Univ. Palermo, Italy

UNIVERSIDAD DE CIENCIAS MÉDICAS
Matanzas

Univ. Matanzas, Cuba

Happy and Healthy Hacking !

Health must remain a non-negotiable human right

GNU Solidario first project :Santiago del Estero, **Argentina, 2006**