

# GHCon2020

V International GNU Health Conference, Nov 20-21 2020



# GNUHealth

## MyGNUHealth PHR: A technical introduction

Luis Falcon, MD



# Agenda

- **About GNU Health**
  - History of the project & community
- **The GH ecosystem components**
  - The GNU Health Federation and its components
- **MyGNUHealth**
  - The GH Personal Health Record
- **MyGNUHealth technical infrastructure**
  - Framework and integration w/ GH Federation
- **Q&A**
  - Questions and answers



## About me

**Luis Falcón**

President, GNU Solidario

Author of GNU Health

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## Education

- Computer Scientist
- Physician
- Genomics & Medical Genetics

## Activism

- Social Medicine
- Animal Rights
- Libre Software

# History of GNUHealth and Community

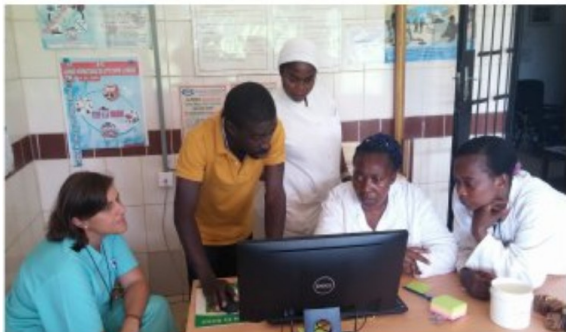




- **GNU Solidario**
  - Is the NGO behind GNUHealth
  - Non-for-profit organization
  - Works globally
  - Focused on Social Medicine
  
- **Official GNU Project**
  - GNU Health is an official GNU project
  - Hosted at GNU Savannah
  - Many mirrors around the World
  - International community



# GNUHealth around the world



MyGNUHealth: A technical introduction  
GHCon2020, Nov 21st, 2020



GNUHealth

The Free / Libre Hospital and Health Information System



# Social Medicine & Health Informatics





# Official GNU Package

Official GNU project

Open Documentation

Relies on free technology

Friendly community



PostgreSQL



**WIKIBOOKS**  
Open books for an open world

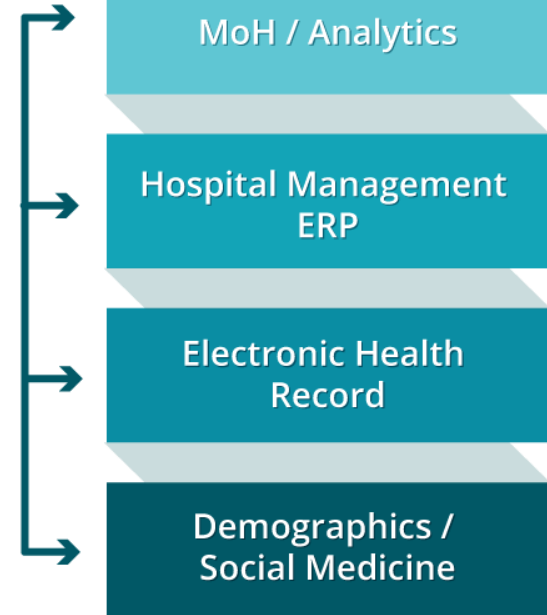
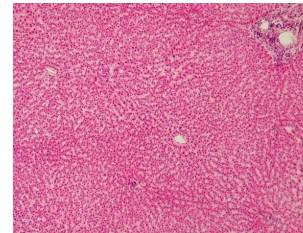
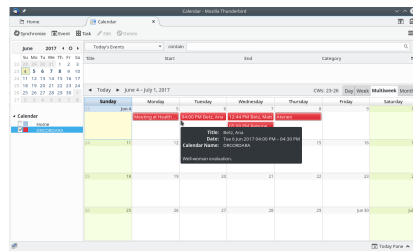
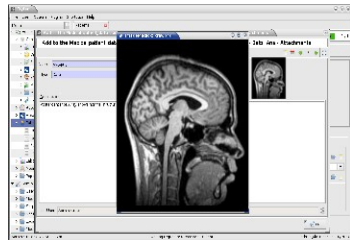
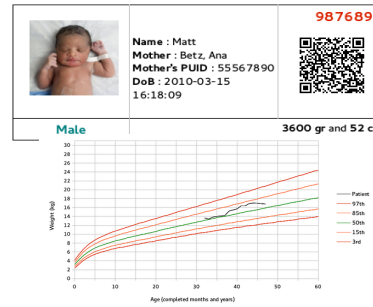
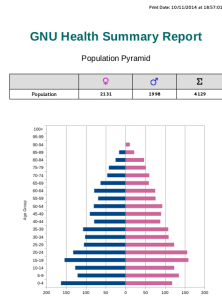
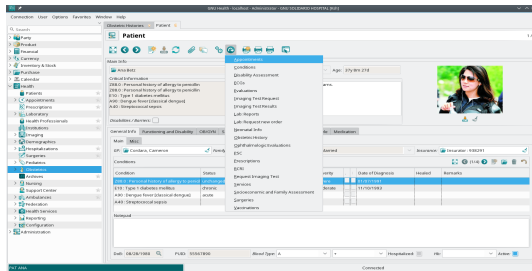




# GNU Health ecosystem components



# GNUHealth HMIS component



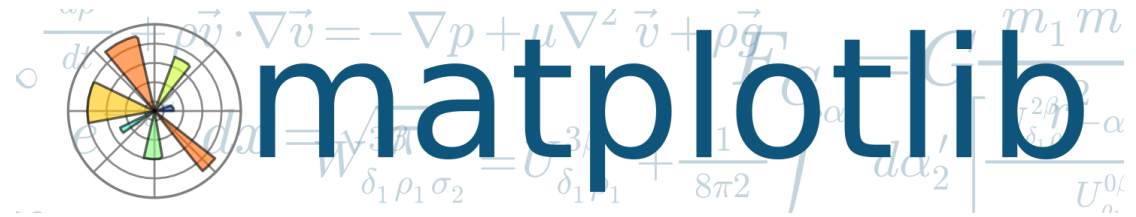
# MyGNUHealth: The Libre Personal Health Record



Empowering the person to be an **active member** in the **System of Health**



# MyGNUHealth: Technology





# Python3 as main language



Python 3 is the main language used in most of GNU Health ecosystem components

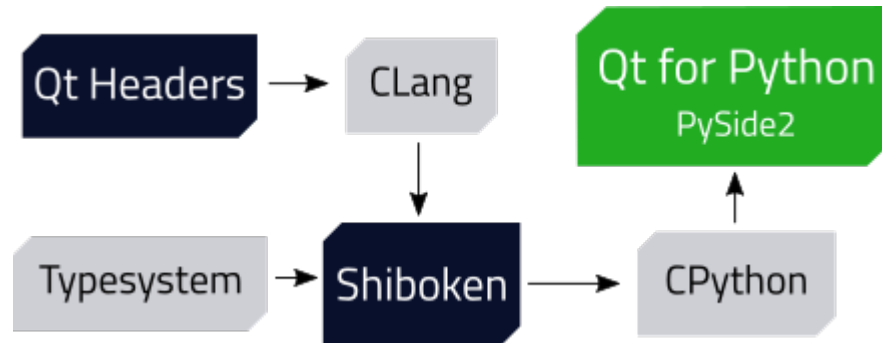
Most packages can be found at the **Python Package Index (PyPi)**



# Qt for Python (PySide2)



MyGNU Health is a Python3 application that uses the Qt framework



Source: <https://doc.qt.io/qtforpython/shiboken2/shibokengenerator.html>



# MyGNUHealth is a convergent application



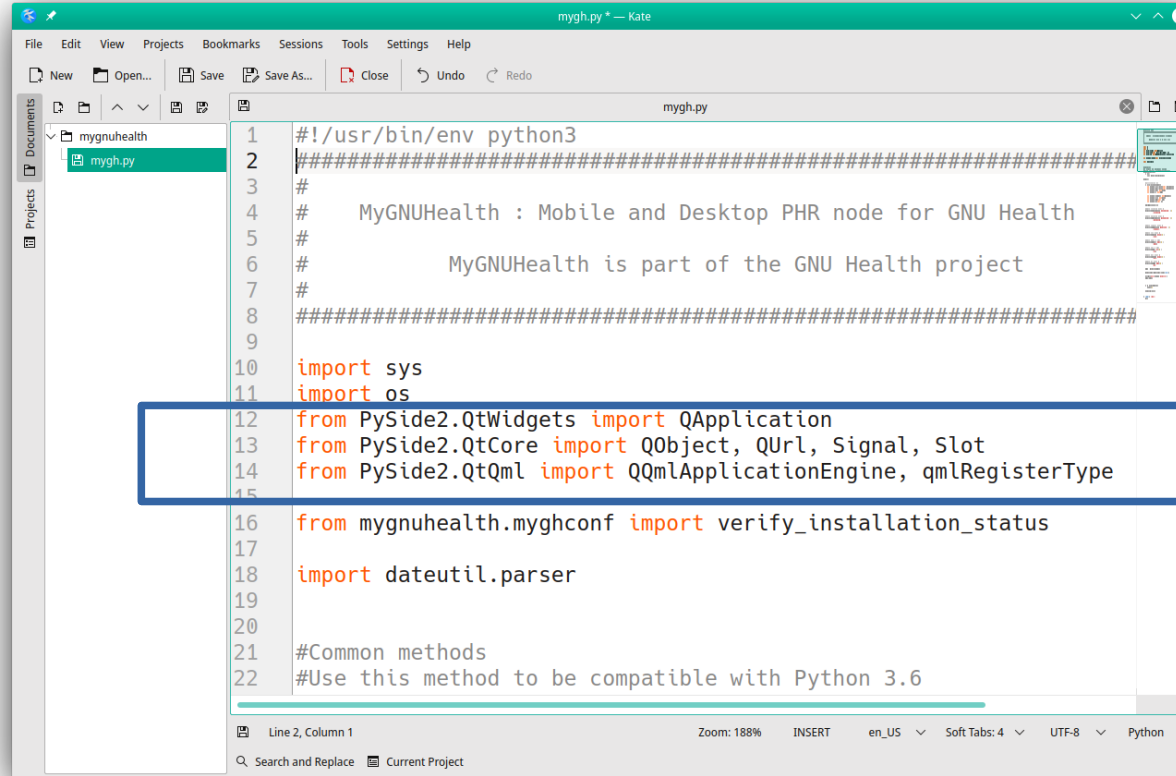
Kirigami is a KDE framework

Built on top of the QML language

Set of QtQuick components to create convergent applications

MyGNUHealth is convergent. It adapts very well to desktops and mobile devices.

# Qt for Python (PySide2)



```
1 #!/usr/bin/env python3
2 #####
3 #
4 #   MyGNUHealth : Mobile and Desktop PHR node for GNU Health
5 #
6 #       MyGNUHealth is part of the GNU Health project
7 #
8 #####
9
10 import sys
11 import os
12 from PySide2.QtWidgets import QApplication
13 from PySide2.QtCore import QObject, QUrl, Signal, Slot
14 from PySide2.QtQml import QQmlApplicationEngine, qmlRegisterType
15
16 from mygnuhealth.myghconf import verify_installation_status
17
18 import dateutil.parser
19
20
21 #Common methods
22 #Use this method to be compatible with Python 3.6
```



# MyGNUHealth running on Plasma Desktop

MyGNUHealth

GNU Health - BIO

Logout

Bio

Psycho

Social

Documents

Emergency

mar, jul 28 '20 - 22:49  
114 / 78  
74 bpm

mar, jul 28 '20 - 22:49  
92 mg/dl

jue, jul 23 '20 - 22:49  
90.3 kg

lun, jul 27 '20 - 22:50  
98 %

MyGNUHealth

GNU Health - BIO

Logout

Blood Pressure & Heart Rate

mar, jul 28 '20 - 22:49  
114 / 78  
74 bpm

mar, jul 28 '20 - 22:49  
92 mg/dl

jue, jul 23 '20 - 22:49  
90.3 kg

lun, jul 27 '20 - 22:50  
98 %

Blood Pressure (mm Hg)

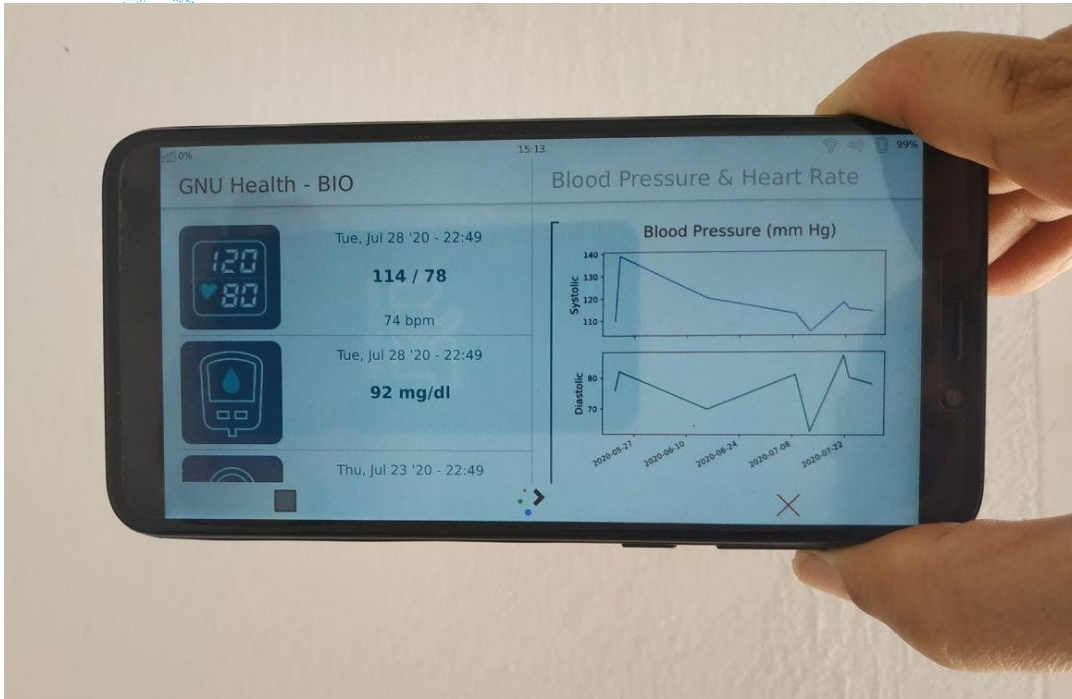
Systolic

Diastolic

Heart Rate (bpm)

Frequency

# MyGNUHealth running on the PinePhone



## Current development environment:

Hardware: PinePhone (“Braveheart”)

OS: KDE Neon (<https://neon.kde.org/>)

KDE Plasma mobile

Qt5

Kirigami (set of QtQuick components)



# Local Storage



MyGNU Health uses TinyDB for storage

Document oriented Database

JSON encoded

Python3 compatible

Platform independent

Easy to port from one device to another

# GH Federation and MyGNUHealth



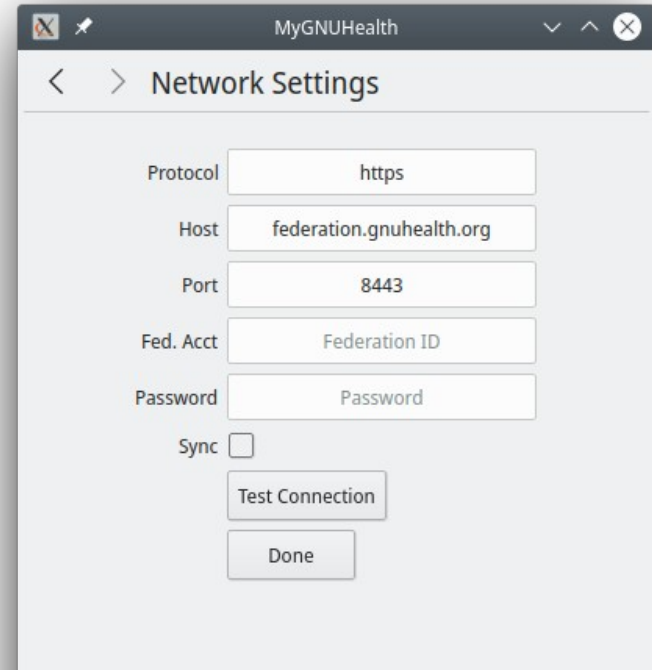
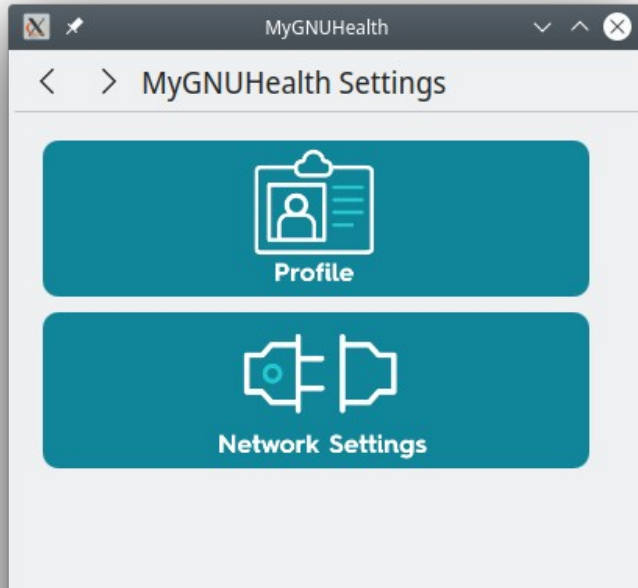
Nodes

Message Server

Information System



# Coupling with GH Federation





# MyGNUHealth nodes in the GH Federation



## Highlights

Every person is a node

Realtime update with her health professional

Person is in control of what to share

Decrease the burden in the public health system

The person is now an active member in the public health system

# GNUHealth in Medical Genetics and Cancer Research

The screenshot displays the GNUHealth application interface. On the left, a window titled 'Variant Phenotypes' shows a search for 'BRCA1' and a table of results. The table has three columns: 'Gene & Protein', 'Variant', and 'Phenotype'. The right side of the interface shows a 3D molecular model of a protein structure, rendered in a ball-and-stick format with various colors representing different atoms. Below the model is a console window showing system information.

Gene & Protein	Variant	Phenotype
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007778 : p.Thr1025Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007781 : p.Val1047Ala	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007782 : p.Pro1150Ser	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007796 : p.Ala1708Glu	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007799 : p.Met1775Arg	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020679 : p.Glu10Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020680 : p.Glu23Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020683 : p.Asp7491Yr	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020690 : p.Ser1187Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020691 : p.Gln1200His	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020692 : p.Arg1204Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020693 : p.Lys1207Asn	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020695 : p.Ser1217Tyr	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_063212 : p.Met1775Lys	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_075666 : p.Arg1699Trp	DI-02602:Breast cancer
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_020896 : p.Pro47Ala	DI-02602:Breast cancer
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_020900 : p.Met299Ile	DI-02602:Breast cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_007757 : p.Cys61Gly	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020702 : p.Cys1697Arg	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_075666 : p.Arg1699Trp	DI-01655:Ovarian cancer
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020679 : p.Glu10Lys	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020680 : p.Glu23Lys	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020690 : p.Ser1187Ile	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020691 : p.Gln1200His	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020695 : p.Ser1217Tyr	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020696 : p.Phe1226Leu	DI-01559:Breast-ovarian cancer, familial, 1
BRCA1 (P38398) :breast cancer 1, early onset	VAR_020697 : p.Arg1243Gly	DI-01559:Breast-ovarian cancer, familial, 1
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023700 : p.Gln255His	DI-01603:Fanconi anemia complementation g
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023702 : p.Ala349Pro	DI-01603:Fanconi anemia complementation g
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023703 : p.Trp647Cys	DI-01603:Fanconi anemia complementation g
BRIP1 (Q98X63) :BRCA1 interacting protein C-t	VAR_023704 : p.Arg707Cys	DI-01603:Fanconi anemia complementation g

```

File Edit View Bookmarks Settings Help
Info) Angles: 0 Dihedrals: 0 Improper: 0 Cross-terms: 0
Info) Bondtypes: 0 Angletypes: 0 Dihedraltypes: 0 Improper: 0
Info) Residues: 224
Info) Waters: 3
Info) Segments: 1
Info) Fragments: 5 Protein: 2 Nucleic: 0
  
```

# Real-time observatory and reporting







# MyGNUHealth

## Misc

Development hosted at GNU.org

Mercurial (hg)

Savannah for tracking

Release 0.9 Beta in December 2020

Development docs at Wikibooks

GPL v3+

Questions : [info@gnuhealth.org](mailto:info@gnuhealth.org)

## TODO

Packaging

i18n

Testing

Security / Block device encryption / others

Connectivity with Open Hardware devices

Documentation

# GNU Health Federation Community Hub



Community public server in Munich  
Demo and test environment  
Main Federation components:

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

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



# Join us at GNUHealthCon 2020

## GHCon2020

V International GNU Health Conference  
Nov. 20 - 21, online event.  
#GHCon2020



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