Sandhi

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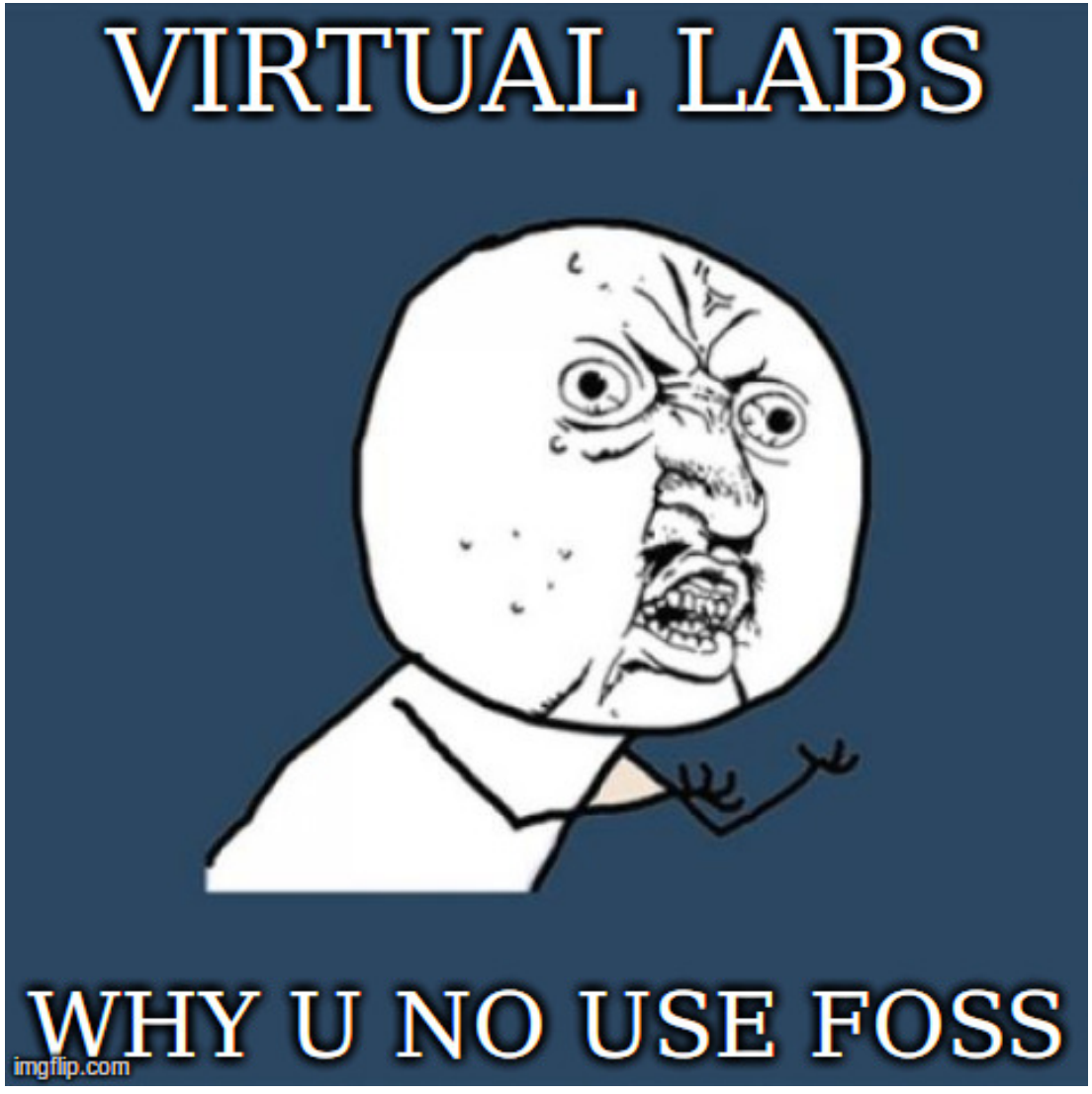
Pre-Sandhi

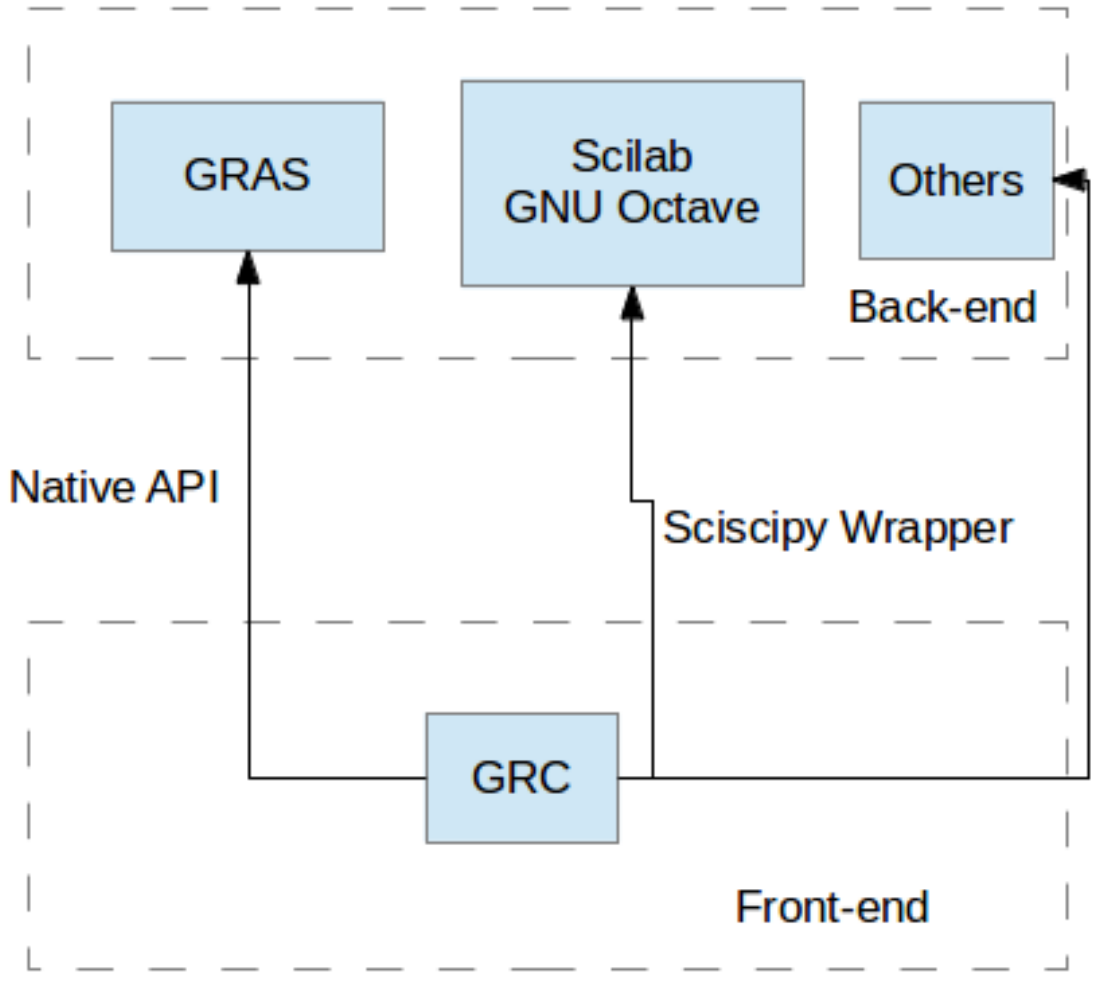
- LabVIEW: A proprietary visual programming software by NI
- Vendor lockdown
- Buy NI DAC cards .. Buy LabVIEW = **Expensive Maxx**
- Little care for support on Free Operating Systems: GNU/Linux.
- Initial target: Virtual Labs, IIT Bombay.


VIRTUAL LABS
WHY U NO USE FOSS
imgflip.com

Objectives

- Free and Open source
- Easy to use — Clean interface — Drag & Drop
- Should run on GNU/Linux smoothly
- Able to carry out control system experiments
- Framework should support **feedbacks**

Architecture



Features

- Light-weight ~20mb without depdendencies
- Good Hardware driver support
- Language support for Development: Scilab, GNU/Octave, Python, C++
- Developed for Control system application
- But can be easily extended for
  - Image Processing*
  - Neural Networks*
  - And any other areas which can be represented as data-flowgraph

Sandhi <3 Scilab

- Sciscipy wrapper - Sylvestre Ledru and Vincent Guffens
- Sample code
  - *from scilab import Scilab*
    sci = Scilab()
    x = sci.rand(20, 20)
    *y = x*x.transpose()*
    y_inv = sci.inv(y)
- RIP: Linker Bug [2011-13]
- Fixed for Scilab 5.4+ YEAH!
- Use pure* functions of Scilab directly
- Provides way to evaluate code-string too.

Current Approach:Functional Approach

- Referential Transparency (Pure and Impure Functions)
- Using GNU Radio's rudimentary type checker
- Function composition = *complex becomes simple*
- Few impure functions are inherited from GNU Radio
- if *(software == reliable)* then *blame(hardware_guys)*

Exciting features in pipeline

- HaPy Wrapper (David Fischer)integrated and tested (for Pure functions)
  - Terse and elegant code
  - Compiled and faster
  - Immutable objects means easily *parallelizable*
- Shifting to cloud based architecture(using RPC)
  - A client side containing smaller GRC, runtime environment
  - Server side containing heaviy libraries
  - Prototyped using RabbitMQ's RPC service(AQMP)
  - Should work well for heavy simulations (if not realtime app)
- Functional block generator

References/Links

- Source code
  `https://github.com/gnu-sandhi/sandhi.git`
- Documentation
  `https://github.com/gnu-sandhi/docs.git`
- Problems using it? Found a bug?
  - Are you sure its a bug and **not** *a feature*?
  - Raise an issue on our github
  - Mailing List: *gnu_lc@googlegroups.com*