Demo of the VLab Services from RWTH Aachen

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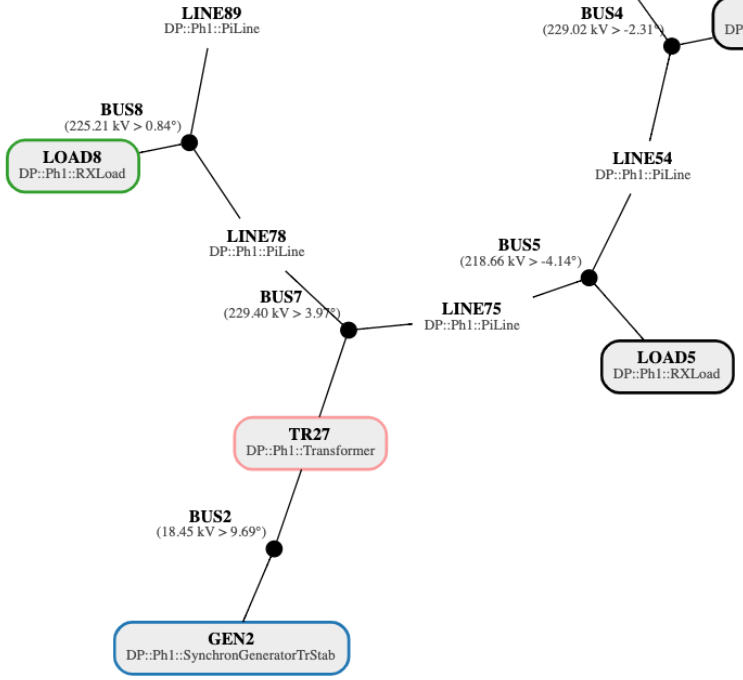
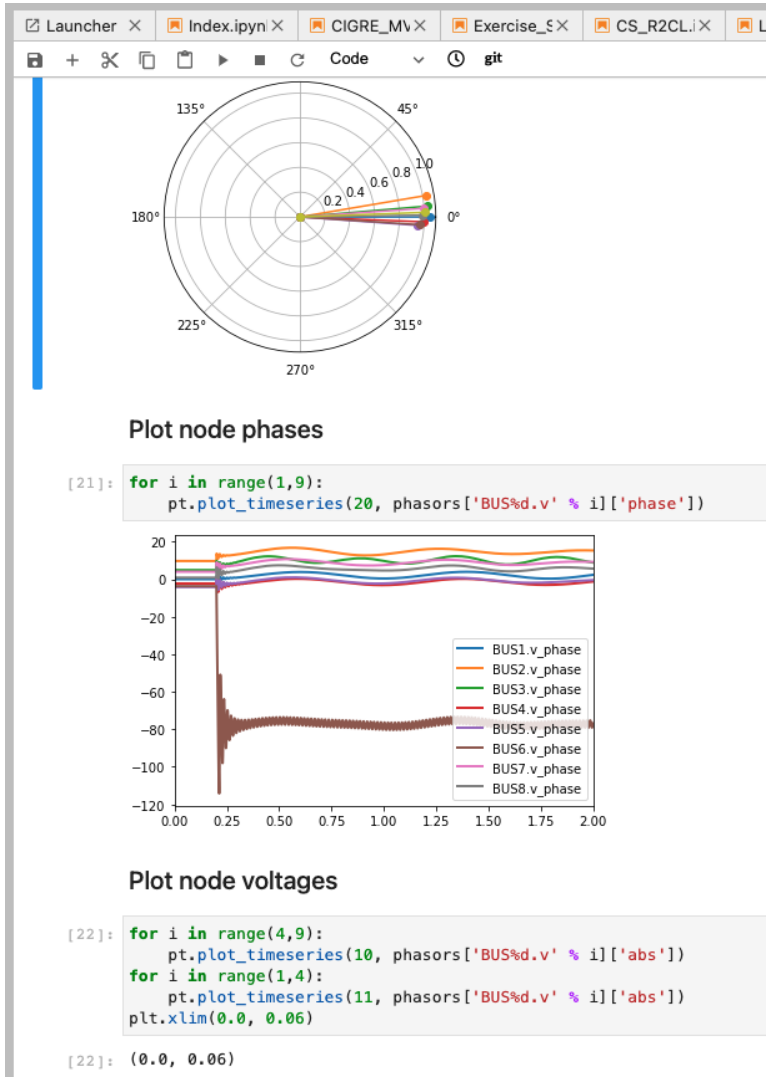
RWTH Vlab



- Web-based Simulation Platform
  - "Simulation-as-a-Service"
  - Bring your own model & data
  - Take-away your results



- Components
  - **JupyterLab + Hub**: Interactive web-based computing environment
  - **DPsim:** C++/Python Simulation Kernel for PF, EMT & DP
- Running on-premises at RWTH in our own Kubernetes cloud
- 100% Open-Source "from the ground up"
  - MPL, GPL licensed

open source initiative
Approved License®

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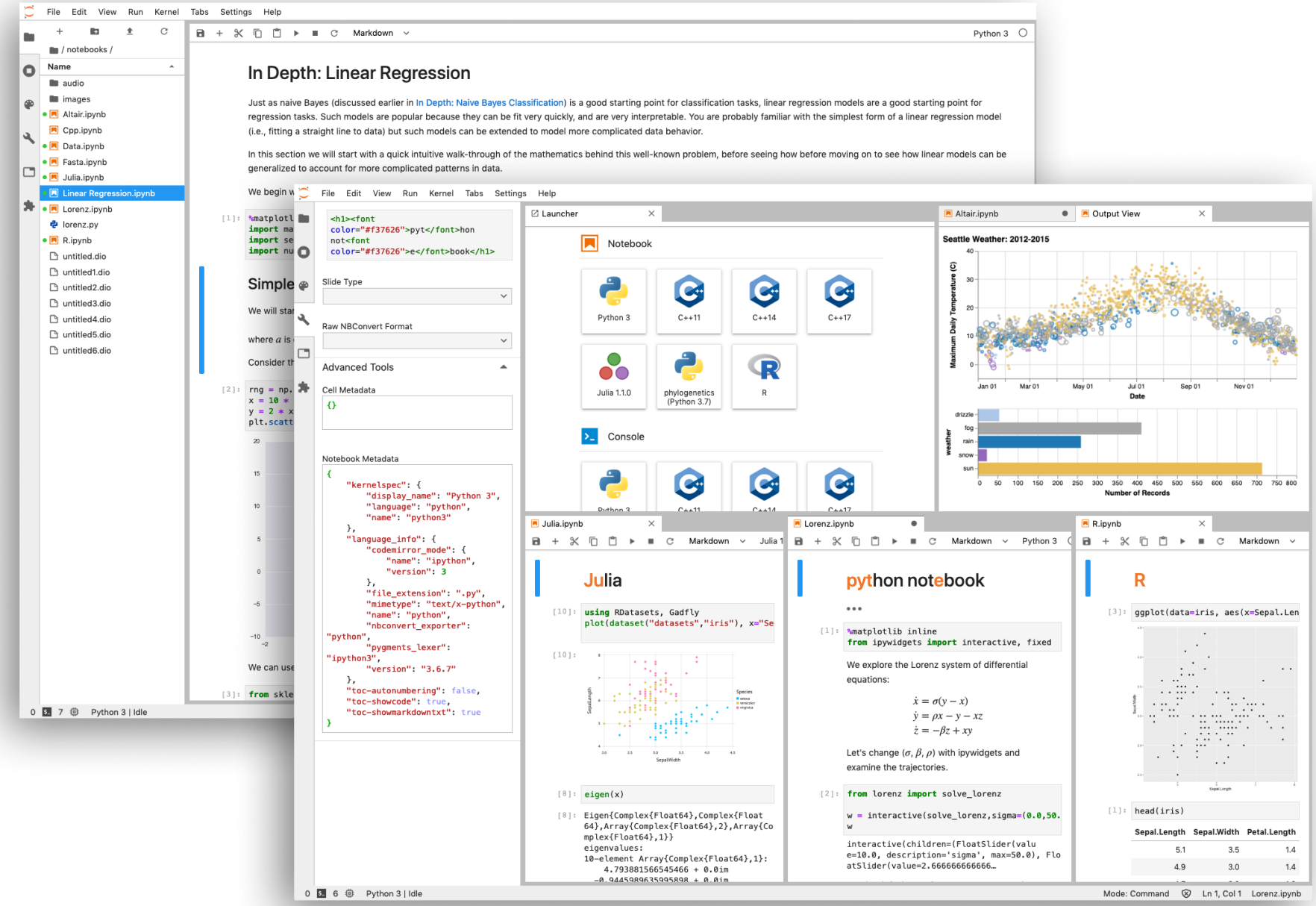
Project Jupyter

- JupyterLab
  - Web-based interactive development environment for Jupyter notebooks, code, and data
  - Highly Extensible: User Interface, Programming Languages, ...

- JupyterHub
  - Multi-user management of JupyterLab instances
  - Persistent home directories
  - Scalable cloud deployments in Kubernetes
  - Integration into ERIGrid 2.0 Single-Sign-On



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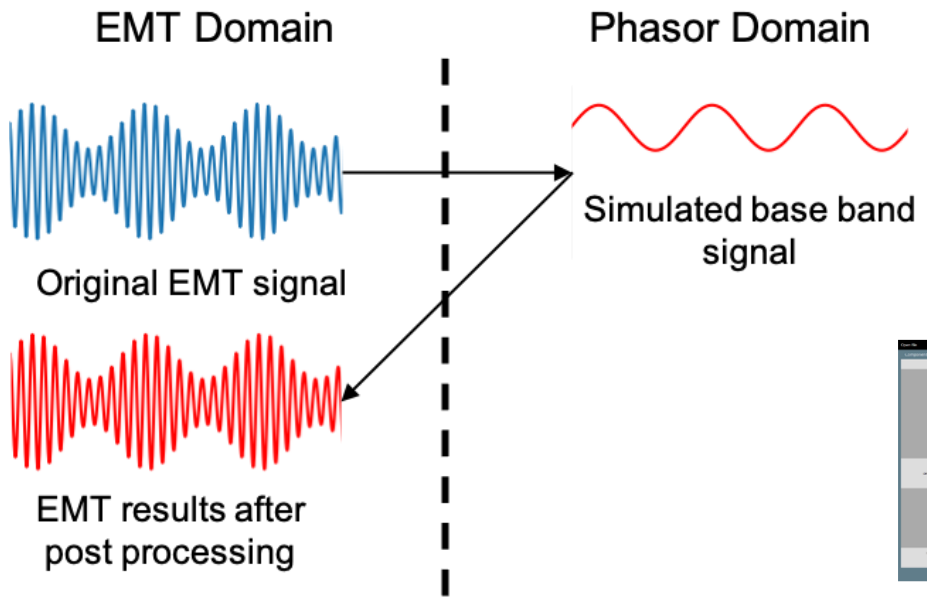
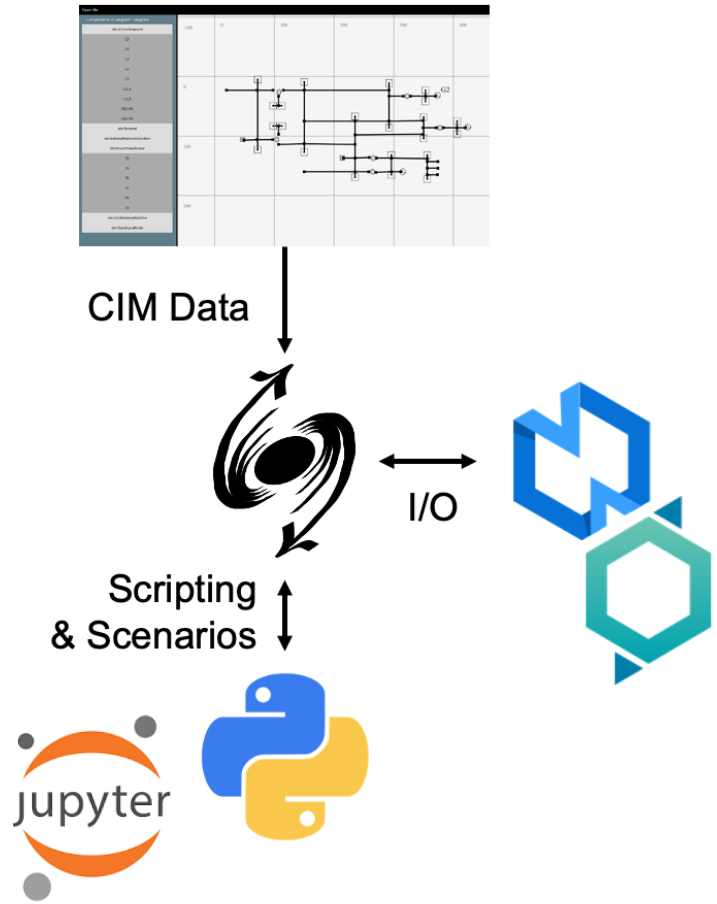
DPsim



- Modified Nodal Analysis Solver
- Supports multiple domains:
  - Electromagnet Transient (EMT)
  - Static Phasors (SP)
  - Dynamic Phasors (DP)
- Modelling via
  - Python, C++
  - Common Information Models (CIM)
- VILLASnode for external interfaces (MQTT, UDP, ZeroMQ, …)
- Real-time and *offline* execution
- Licensed under MPL 2.0
- Details: https://dpsim.fein-aachen.org/docs/concepts/



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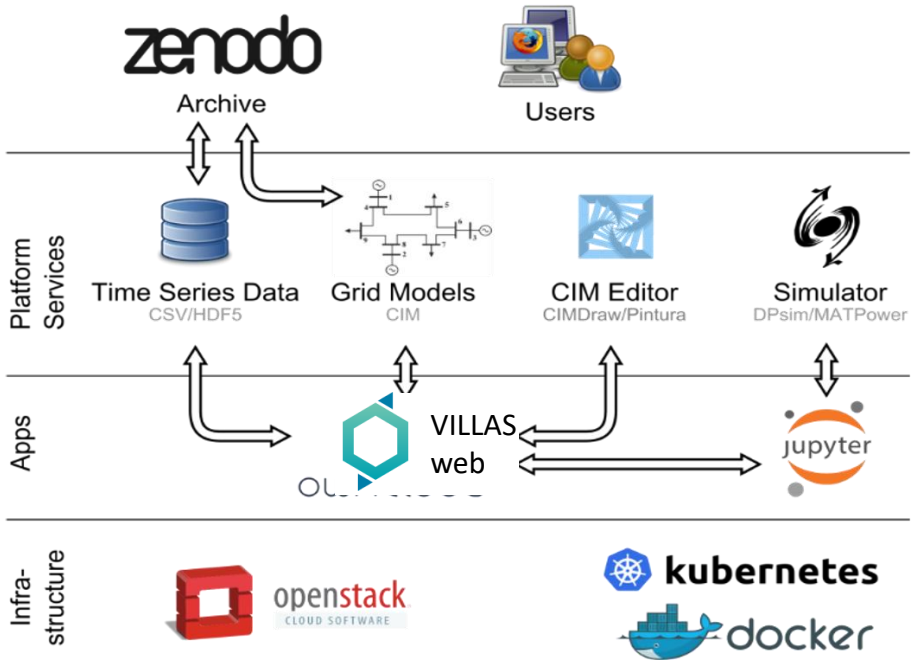
Live Demo

https://vlab.k8s.eonerc.rwth-aachen.de

Outlook

- **SLEW**: "Second Life for Energiewende"
  - RWTH-internal project to bring virtual experiences into teaching
- Extends the Jupyter environment with **VILLASweb**
  - Manages Infrastructure Components: Simulators, Lab Equipment, Gateways, Controllers
  - Preparation and execution of experiments
  - Dashboards for supervision and control
    - Real-time plots, sliders, and other widgets more)
  - Results management
    - Import to JupyterLab
- We aim to bring SLEW to a broader audience outside of RWTH
  - ERIGrid 2 – JRA 3 work-package:
    Task 3.5 "Offline Simulation-as-a-Service Prototype"



Links

- RWTH Vlab: https://erigrid2.eu/vlab/
- DPsim: https://fein-aachen.org/projects/dpsim/
- VILLASweb: https://www.fein-aachen.org/projects/villas-web/
- Project Jupyter: https://jupyter.org
- Second-Life for Energiewende "SLEW"
  - https://www.acs.eonerc.rwth-aachen.de/[...]/SLEW-SECOND-LIFE-FOR-ENERGIEWENDE/?lidx=1
  - https://slew.rwth-aachen.de/

- Source code: https://git.rwth-aachen.de/acs/public

www.erigrid2.eu

@ERIGrid 2.0 Project

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