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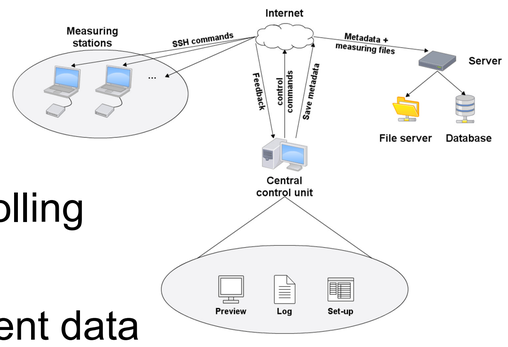
Automatic Measurement System for Distributed Measurement Tasks

A Universal Power Line Communication Systems Measurement Framework

Motivation:

- Spatial diversity in power-line communications (PLC) system requires distributed measurement tasks with precise synchronization



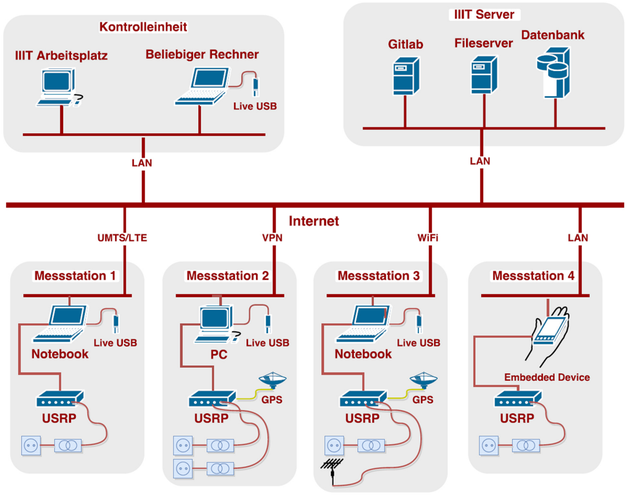
Requirements:

- GPS-based synchronization
- Remote monitoring and controlling
- Fast SQL database backend
- Storage of TB's of measurement data
- Parameterized execution of GNU Radio flow graphs
- Flexible structure of measurement nodes and control units

Overview

Modular design with three main components:

- Control Units
- Measurement Nodes
- Data Servers

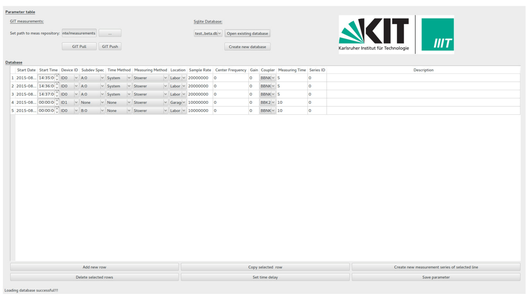


Flexible Submodules:

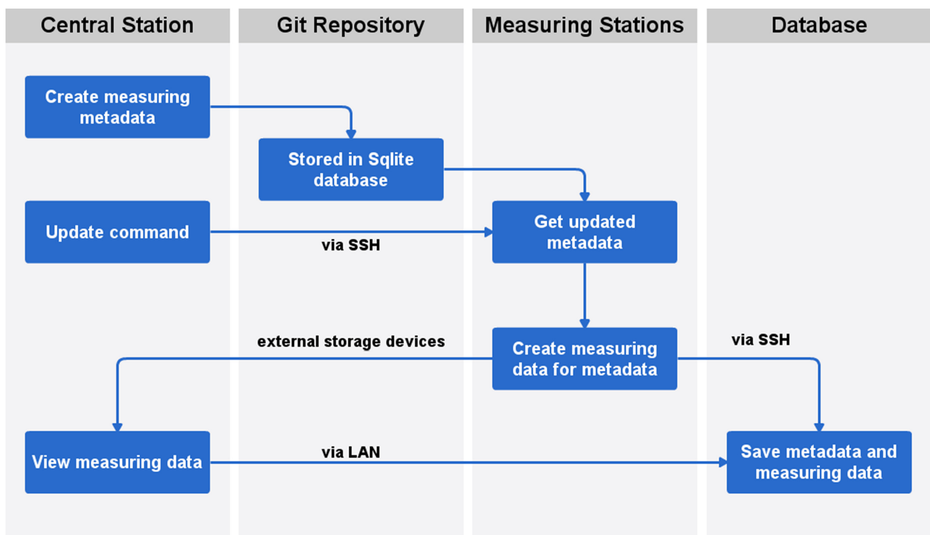
- Connection type (LAN, WiFi, VPN…)
- Platform type (Desktop, Mobile, Embedded)

Database Tool

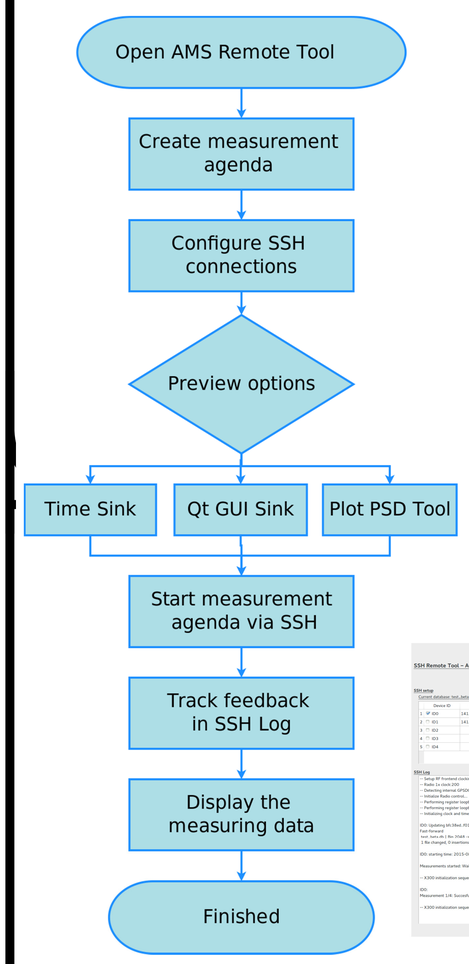
- Creation of measurement timetables saved in a SQLite database
- Stored and synchronized with each measurement node via central GIT repositories
- Supports all relevant measurement parameters



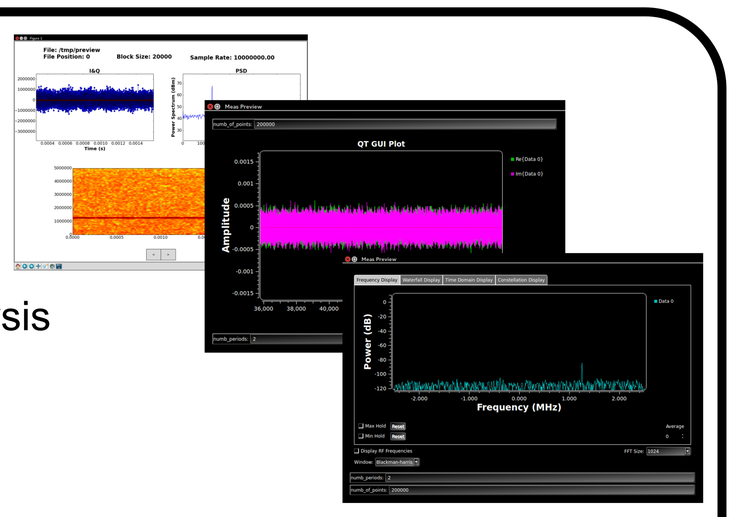
Data Flow Chart



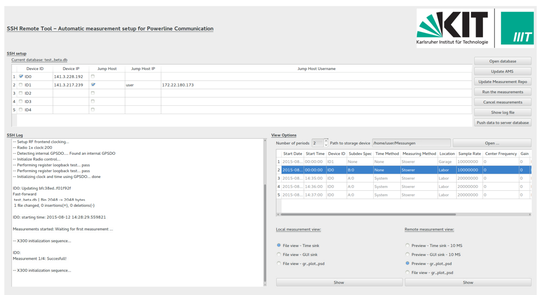
Remote Tool



- Central management unit of all measurement nodes
- Convenient user interface for easy control
- Monitoring of the automatic execution on all measurements nodes according to the database
- Different measurement preview modes for quick analysis
- Secure communication via SSH connections to each measurement node
- Synchronization of measurement tasks via GIT repository servers
- Error management & status logging



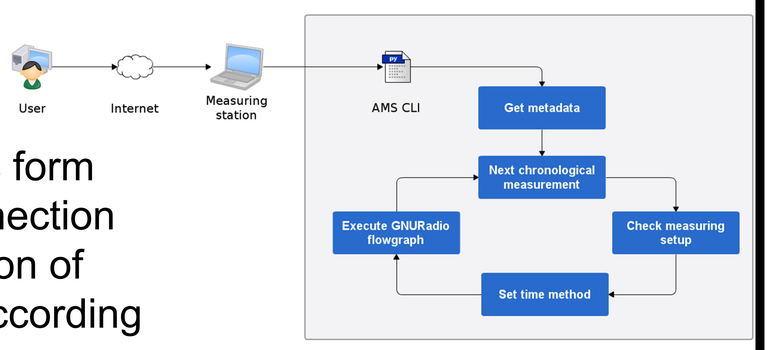
Various Measurement Preview



User Interface

Command Line Interface

- Python based CLI
- Takes the commands form the SSH remote connection for automatic execution of the measurements according to the database



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