Possibilities and constraints of RFI databases

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Overview

Basic functionality of an RFI database system:

1) **Monitor** the RFI situation at a particular site
2) **Extract** relevant parameters from the monitoring data
3) **Store** the information
4) **Query** the stored RFI information

Use cases of RFI DB systems

- Match observing strategy to interference situation
  - Statistical: (statistically) typical RFI for time of day / spatial direction
  - Real-time: current RFI in certain spatial direction
- Provide RFI information to astronomer for offline flagging
  - Time, duration, frequency, width, strength
- Provide input to engineers for design/construction of receiver systems
- Help in identifying permanent/recurring RFI sources
  - Spatial direction, frequency, time of occurrence
  - “Evidence” for violation of protected bands
- Collect long-term RFI statistics
  - Support political actions (CRAF, national legislation)

RFI parameters

Existing RFI database systems often provide spectral plots, e.g.:

- GBT RFI DB: http://www.gb.nrao.edu/IPG/rfiarchivepage.html
- VLA RFI DB: https://science.nrao.edu/facilities/vla/observing/RFI

But: plots contain very little *computer-usable* information (no DB queries)

⇒ Spectra need to be processed to extract RFI parameters:

- Time
- Spatial direction
- Frequency, width & amplitude of RFI lines
  - Gaussian peak fitting or more sophisticated algorithms ?
  - Identify RFI against previously matched lines

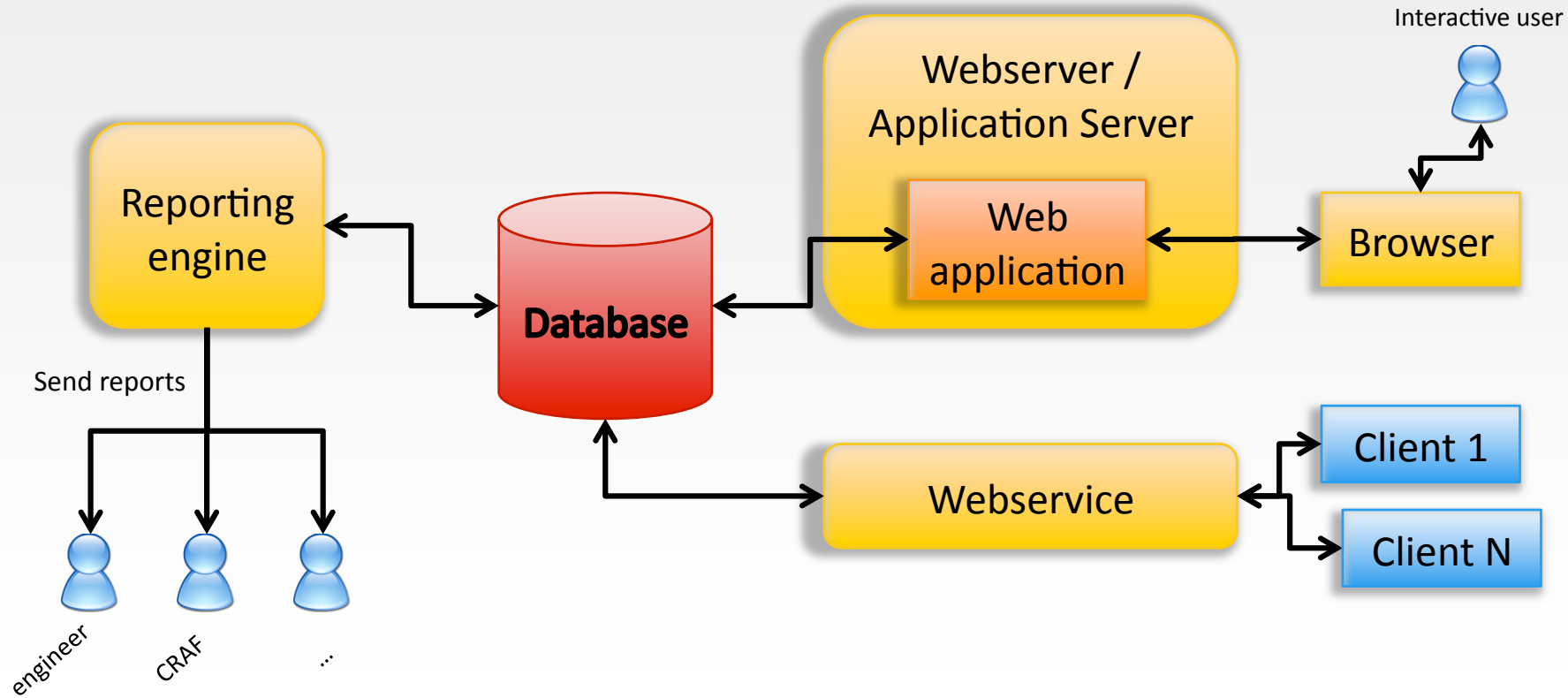

Storage of RFI information

Persistent storage can be in any form, but it is best stored on a relational database management system (RDBMS), e.g. MySQL, PostgreSQL etc.

Advantages of using a RDBMS-Server:

- Fast access to stored information (via indexing)
- Simultaneous access to information from multiple clients across LAN / internet
- Supports queries via standard SQL language
- Many client tools available (reporting engines, plotting, etc.)
- Many development tools available for writing (web-based) clients

Accessing the RFI DB



Querying RFI information

- Sophisticated queries possible, e.g.
  - Get lines with an amplitude larger than *amp* that were seen from *2013-01-01* to *2013-01-07*
  - Get lines with frequencies *freq1 -freq2* between *20:00 – 08:00*
  - Get max. amplitude at night /day.
  - Get times where *line* was not detected
  - Get histogram of RFI amplitudes
  - etc.

Automatic RFI reporting

- Automatic generation/sending of reports via reporting engine
  - General statistic about RFI situation
  - Detection of new recurring RFI signals
  - Disappearance of known recurring RFI signals
  - RFI summary for observing program
  - etc.

Thank you for your attention !