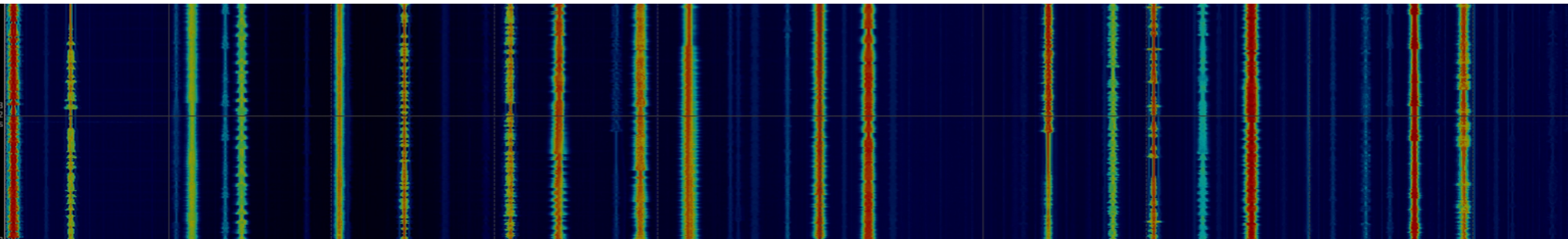


SIMon International

by





About Combit Zrt.

General overview

- Founded in 1997, EU based
- 3 M EUR average turnover
- Member of Grepton group
- 35 own developers
- 150 developers groupwise
- Specialised in custom software development for governmental entities

Data expertise

- 15+ years of Oracle RDBMS administration
- 8 TB is our biggest database and growing daily
- 1.5 million transactions daily
- Helping 1 million citizens a day
- 10+ years of Java experience
- Typical project size is 2000 man-days

Relevant experience

- Public tender won in 2004
- Started developing spectrum monitoring software in 2004
- SIMon International is the third version
- Cutting edge technology

The background is a grayscale image of a corkboard. Several sticky notes are pinned to it. One note in the upper left corner has the words 'Impact' and 'Full' written on it. Another note below it has 'Pow' and 'Wow' written on it. Other notes are visible but their text is illegible. A large, dark gray rectangular box is centered over the image, containing the main title in white text.

Problems and Status before the project

Problems and Status before the project

- Diverse measurement equipment portfolio – multiple vendors
- Monitoring software from multiple vendors

Problems and Status before the project

- Current systems do not follow the actual measurement workflow
- Too many manual tasks
- Installation, training, maintenance is a huge burden

Problems and Status before the project

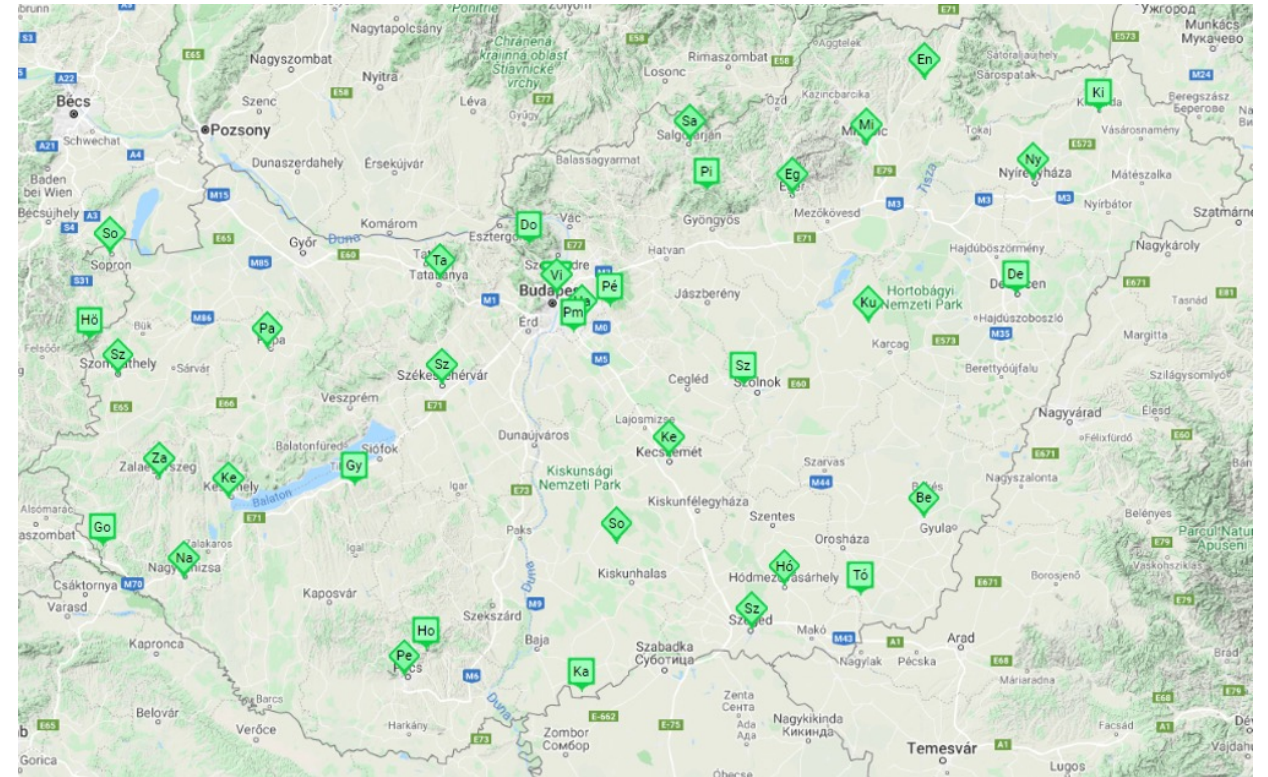
- Want to avoid vendor lock-in as it may evoke issues
- Long term focus is on creating a task specific and low-cost equipment portfolio
- Future proof system for integrating new equipment and the latest technology
- Holistic way for integrating and extending the coverage of the national monitoring station network

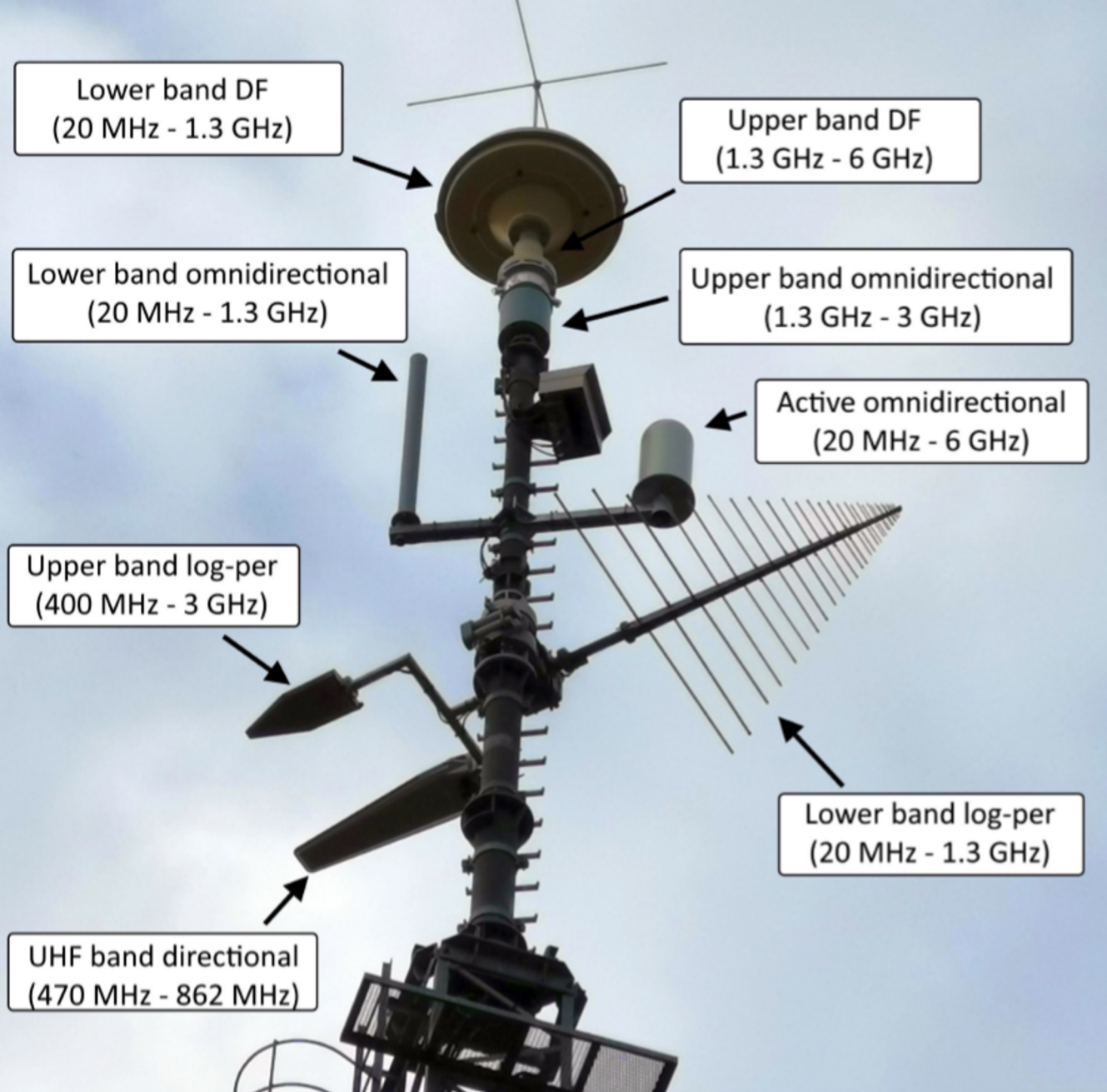
Solution



Radio monitoring network

- 15 fully-equipped stations
- 20 small, compact stations
- 4 mobile stations
- ~ 10 compact monitoring devices, deployed to temporary locations





Structure of a fully-equipped monitoring station



Structure of a small, compact monitoring station



Mobile monitoring station

- Web based – no deployment, less downtime, less training, standardized technology, Windows version changes are not a problem
- Open driver development API based integration of any equipment with proper documentation
- Integrates with license database and can create automated measurements and alerts

- Development had been UX research supported
- Workflow starts with a map, and visualizes data on the map or in a spectrum analyzer
- Direct access to all needed measurement functions of any vendor from the same application

- Unified, flexible data storage model
- Extensibility with further capabilities
- Unmanned monitoring stations
- Continuous (on-site) support

Technology:

- Technology stack used
 - PostgreSQL
 - Java
 - ExtJS
 - WebGL 2



The SIMon International System

Live Demo

SIMon International Business model

Business model

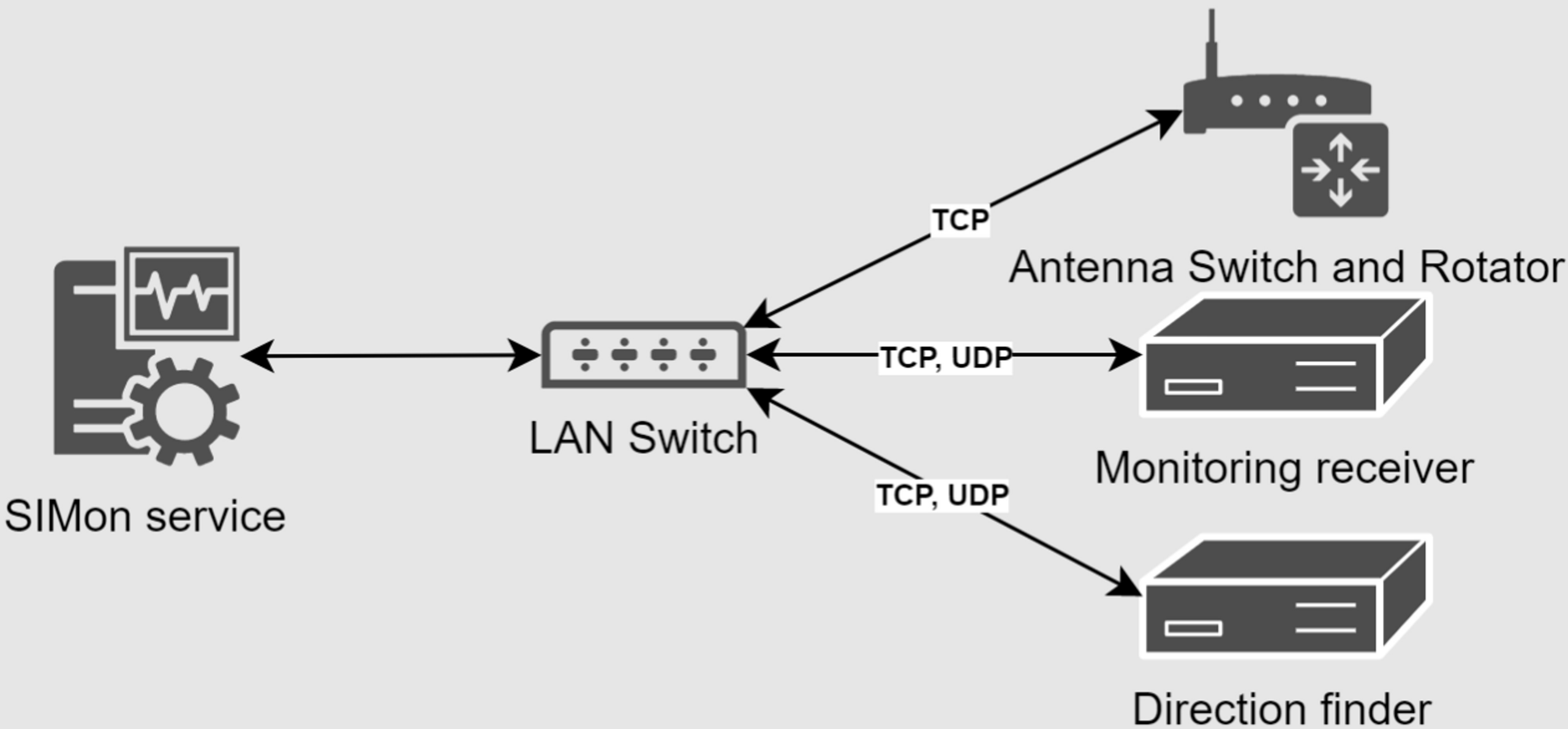
- Onetime license fee per station
 - Unlimited users
 - Unlimited pieces of compatible equipment per station
- Implementation fee
- Support fee
- At cost pilot projects available

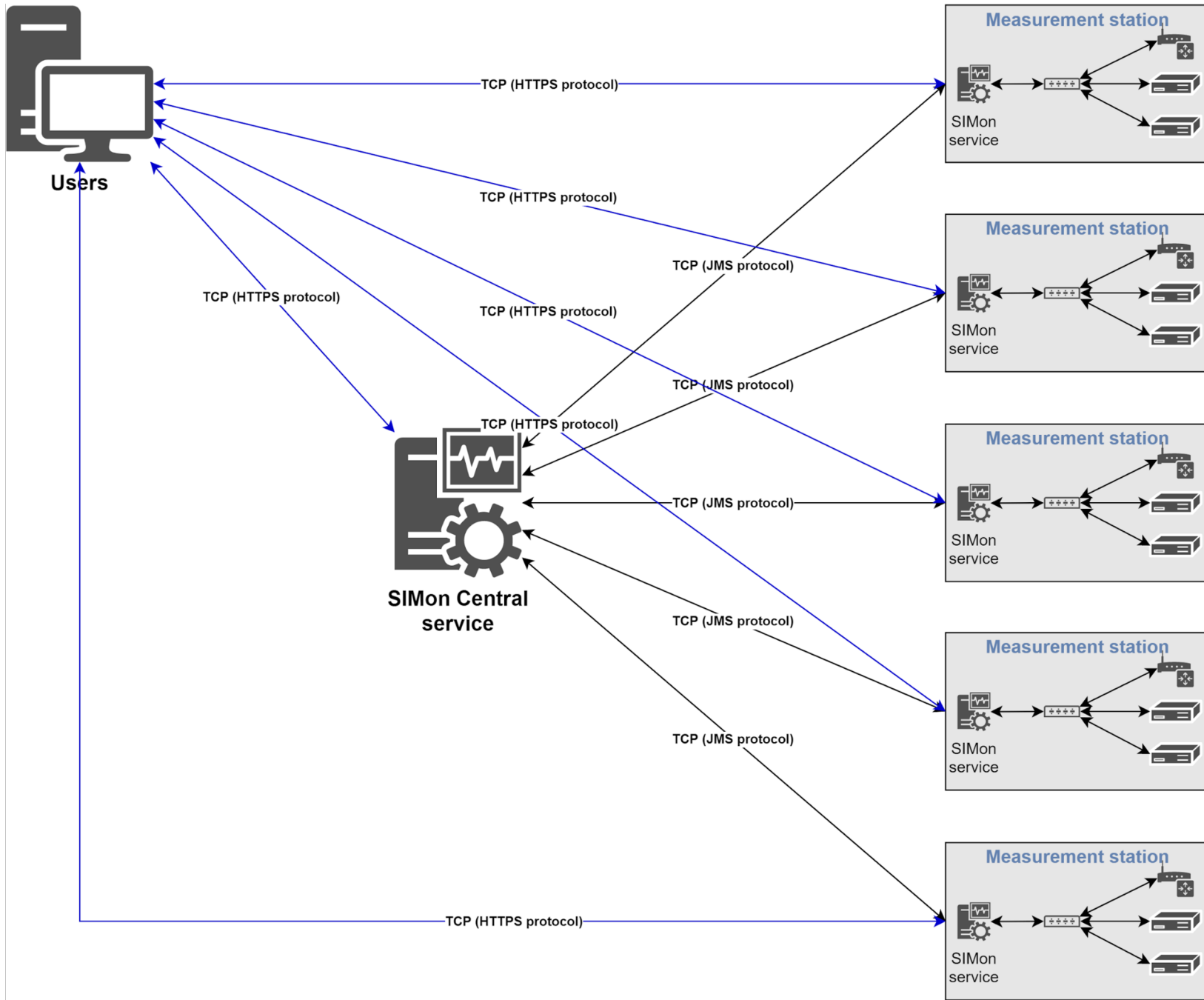
Cooperation

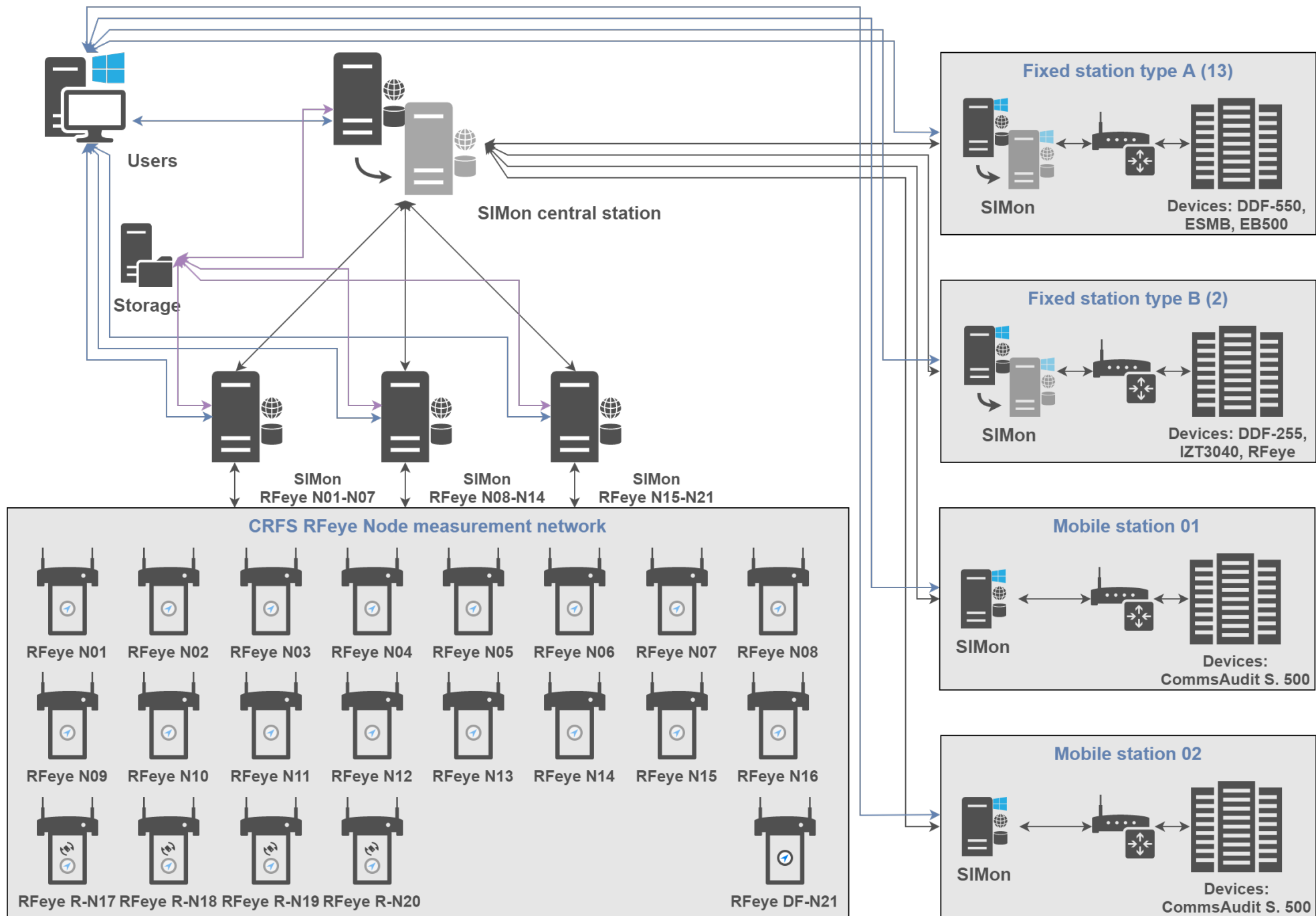
- **Consultation:** technical and professional; full monitoring system configuration
- Fast and flexible delivery of **custom** solutions and requirements
- Professional, high-level **support**, systematic **upgrades**
- **Local** representation
- **Tuition** for the monitoring team

SIMon International system Architecture

Measurement station







Compatible and integrated devices

Compatible devices

- Monitoring (receivers, direction finders), control (antenna switch/rotator), GPS, weather equipment with:
- LAN interface (or serial to LAN adapter),
- Integration documentation (commands, protocols, data decoding instructions).

Integrated devices

- Rohde & Schwarz: DDF-550, DDF-255, EB-500, EM-550, EM-100, ESMB, GB-127, GB-127M, RD-127, ZS-127;
- NARDA: SignalShark 3310, 3320, 3330
- IZT: R3000 series;
- CRFS: RFeye Node 20-6, 50-8, 100-8, 100-18;
- CommsAudit: Spectra SRDF, CA4909-1;
- STMM: KM44 and KM88 switch, RK3 rotator
- Compu-Consult: TELE-OPERATOR UTS v.16 DVB-T/T2 Dual LAN monitor
- Boreas: Weather station;

Network requirements

Network requirements

- Connection types supported:
 - Wired (Copper, Fiber optic),
 - Wireless (3G HSPA+, 4G LTE, 5G, P2P microwave),
- Security:
 - VPN connection between the central server and station
- Connection Speed for a station:
 - Minimum: 5 Mbit/s download and upload speed,
 - Typical: 30 Mbit/s download and upload speed,
 - Recommended: 80 Mbit/s download and upload speed,
 - The upload speed is the more important, because the station uploads the measurement results to the central server or the client in “real-time”
 - The upload speed should be even higher if the upload in “real-time” of I-Q data or DVB transport streams is required.