



Technical Infrastructure Monitoring: Modernising a 20-Year-Old system for CERN Technical Services

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Challenge

How can a 20-year-old software ecosystem, essential for the safe operation of CERN's technical services, be efficiently migrated to a modern, manageable, and cost-effective infrastructure while minimising downtime and maintaining high availability?

Key Features

- Data-driven acquisition from heterogeneous data sources.
- End-user GUIs to configure & monitor the system and dashboarding.
- Data transformations (aggregation, filtering, etc.)
- Command/Set, also from GUI layer
- Acquisition data with metadata (data-tag metadata, alarms, etc.)
- Monitor and troubleshoot the system (tag/alarm/process viewers, Grafana dashboards)

Highly Available

- The services should be running 24/7/365
- Event during Long Shutdown (LS)

Critical

- All the services provided allow to run the LHC, SPS, PS and cryogenics safe

Current Issues

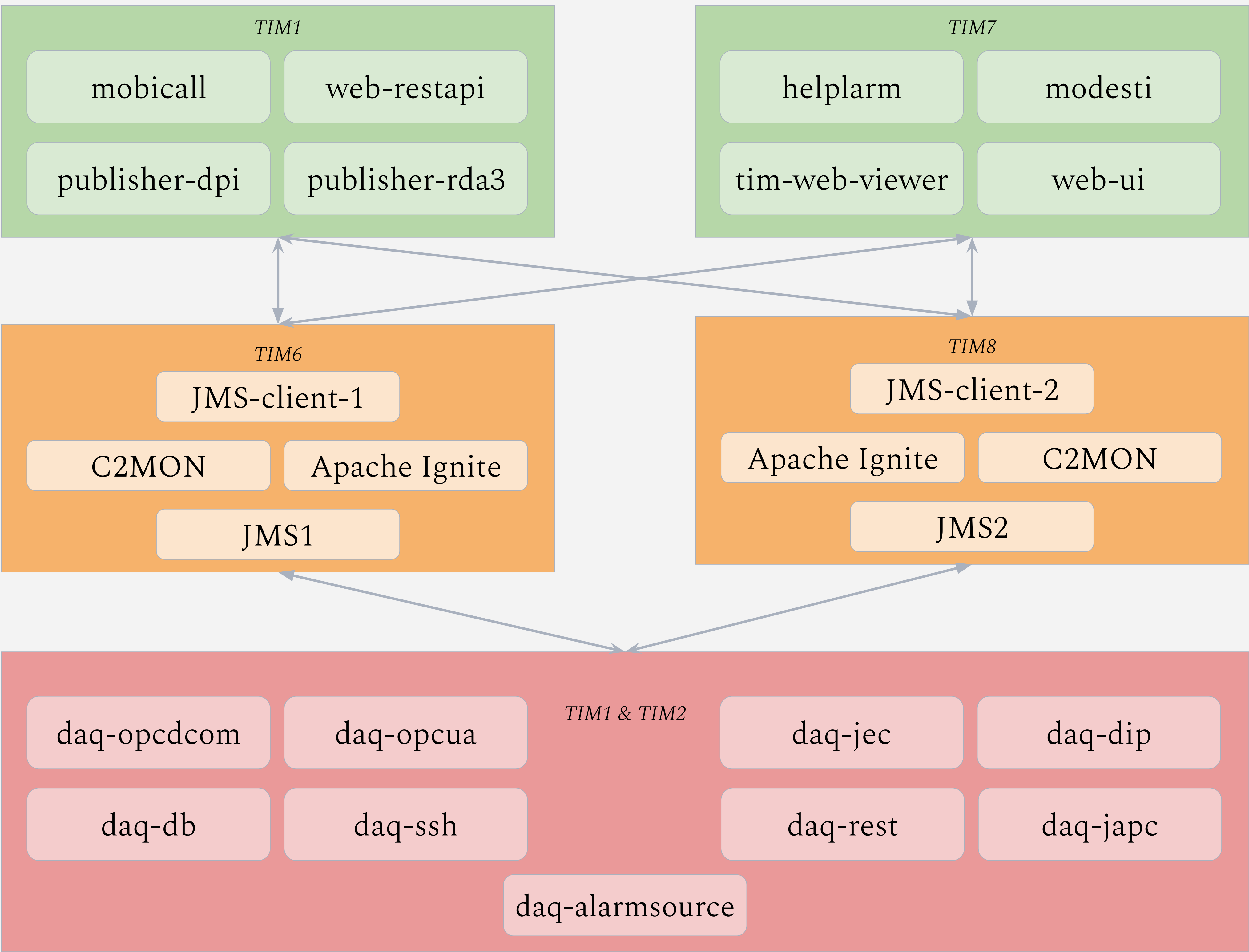
- Risks associated with used technologies
- Need to modernise the 20+-year-old system
- Growing needs to increase global efficiency
- Alternatives available on the market
- Rapidly changing software eco-system

Short-Term Goals

- Modernate DevOps
- Industrial process monitoring
- Standardise libraries and processes
- Upgrade infrastructure
- Use industrial standards

Mid-Term Goals

- Consolidate configuration
- Improve system supervision
- Modernise end-user GUI
- Enable data processing rules
- Migrate to Kubernetes (K8s)



GUI

UI to interact with TIM service. MODESTI (configuration), TIM view (visualisation + dashboard editor), HelpAlarm (alarms)

Processing Layer

Consumes data gathered by DAQs process it and transfers to the client processes via JMS client API. The C2MON allows to define rules (data transformations).

Acquisition Layer (DAQs)

Set of standalone processes which receives data from different hardware/protocols (PLC, WINCCOA, OPCUA) and transfers them via c2mon client API to processing layer (C2MON).

References

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Key Metrics and Statistics

- 15 000 devices
- 28 000 alarms monitored
- 1168 buildings with equipment



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