The Monitoring Logging and Alarm System of the ASTRI Mini-Array gamma-ray air-Cherenkov experiment at the Observatorio del Teide

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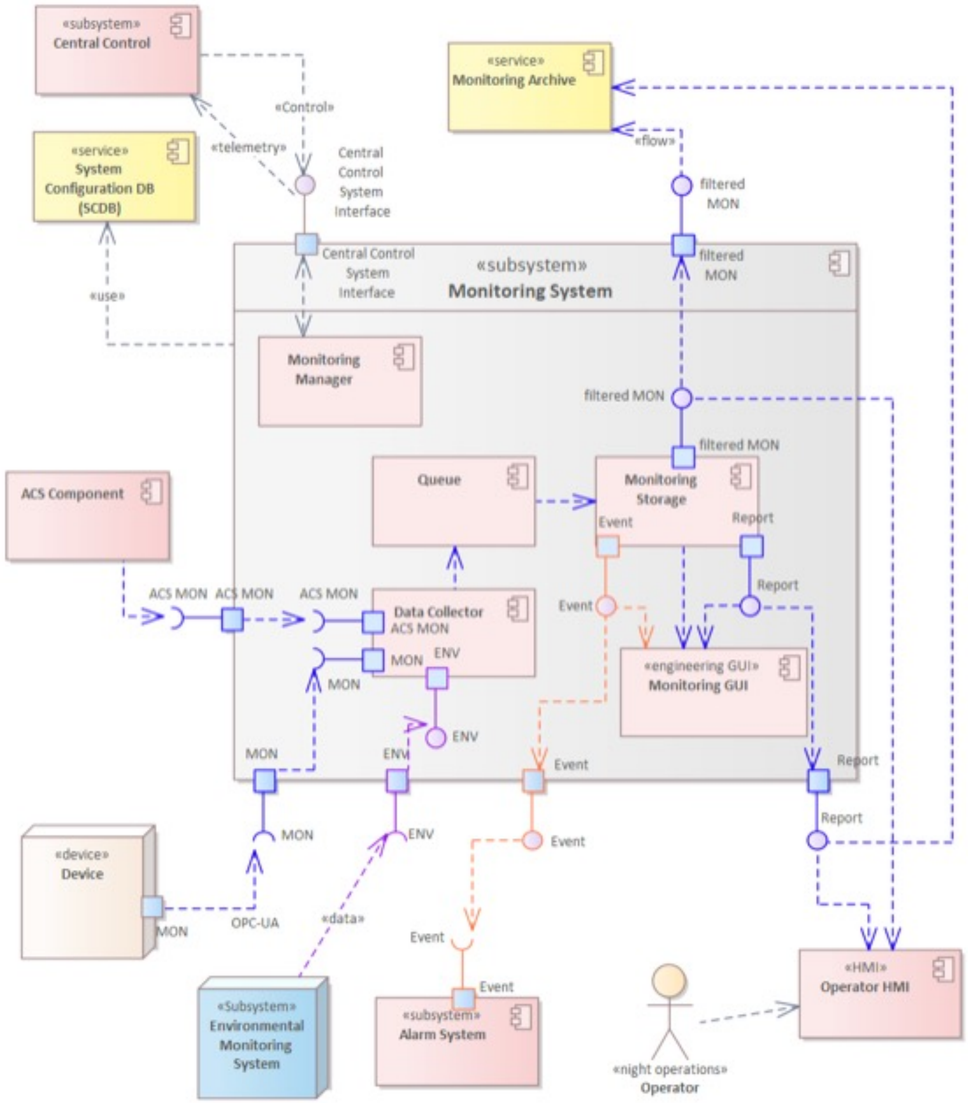
CNS5 – Forum della Ricerca Sperimentale e Tecnologica in INAF, 22-24 Jun 2022

Monitoring System



Deals with a variety of environmental housekeeping data from sensors (**telescopes**, **weather stations**, and other **auxiliary devices**);

expected about **20000 monitoring points**, **sampled at** no more than **1 Hz**;

main functionality are: **collection**, **persistence**, and (limited) **processing**;

components are **Collector**, **Queue**, **Dispatcher**, and **Manager**.

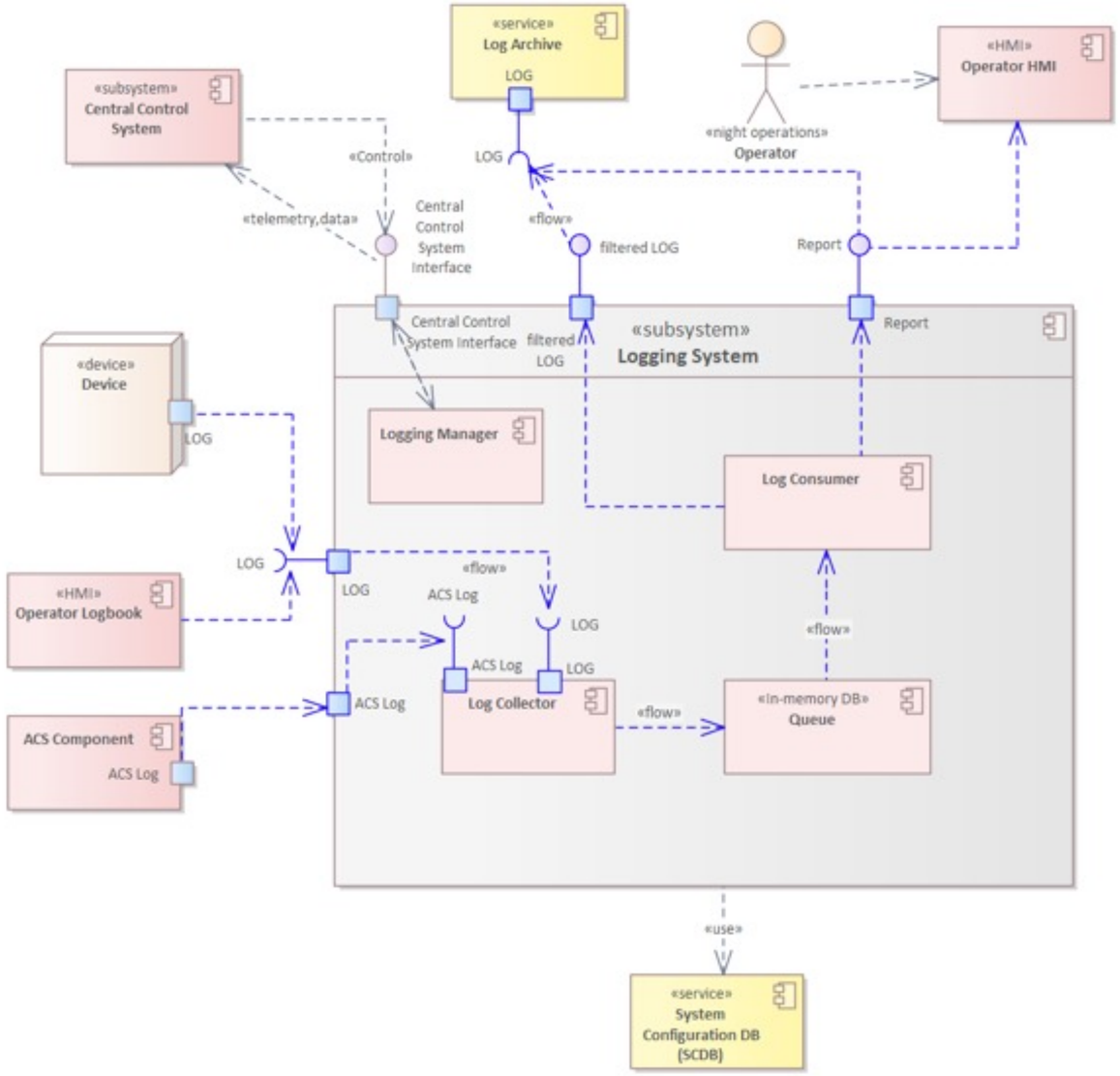
Logging System (LOUD)

Collects log messages from **subsystems** using the control framework, **observation scripts**, **low-level firmware**, **hardware** systems, and **records of** actions of the user over **the HMI**;

expected **data throughput** is about **200 Mbps**;

implements **filtering** capability both at the device and central level based on **log priority;**

components are: **Collector**, **Queue**, **Consumer**, **Manager**.



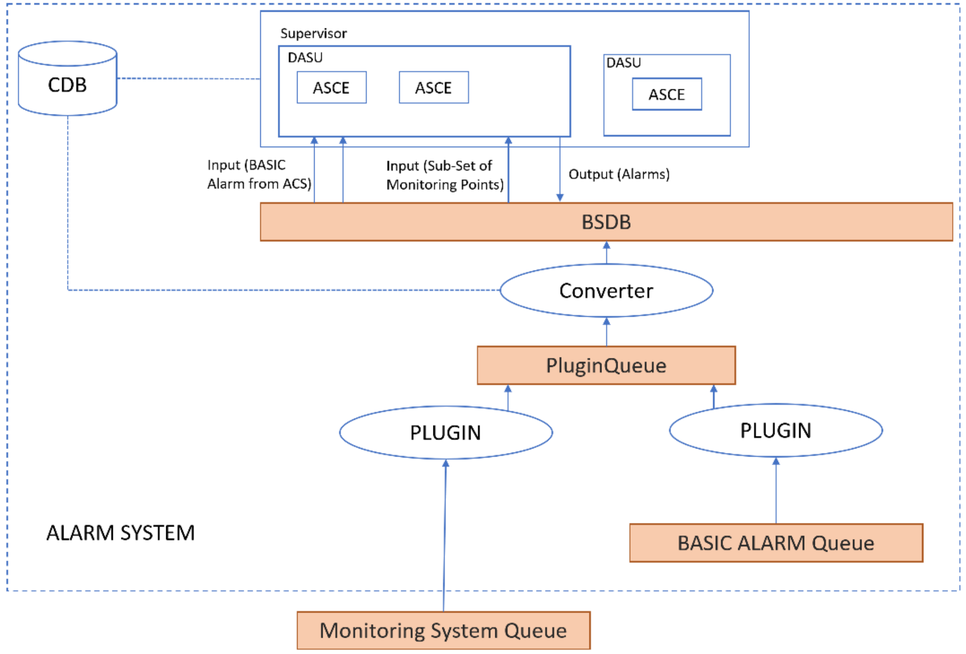
Alarm System (AS)

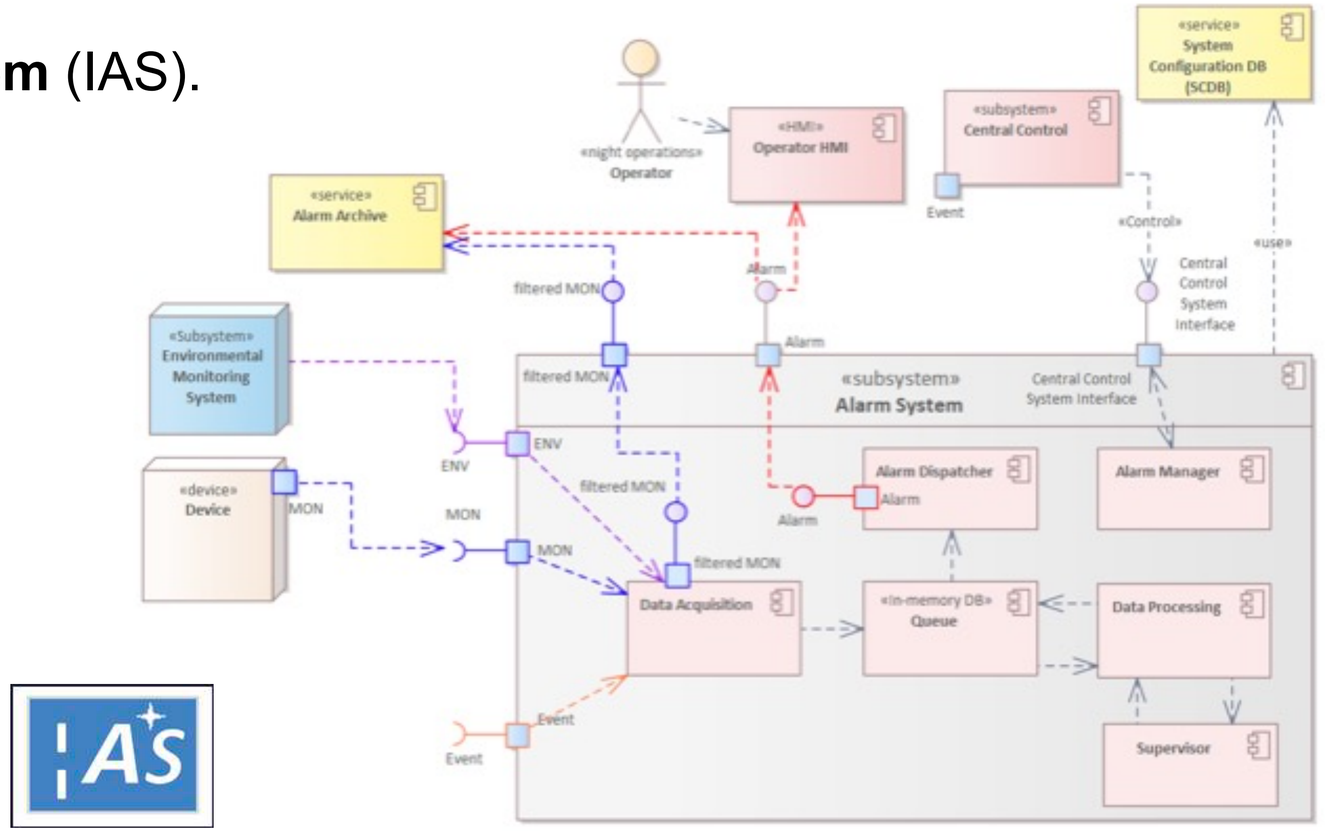
Mini-Array

Provides the service that **gathers**, **filters**, **exposes**, and **persists** all the relevant **alarms raised by devices** (such as the telescopes) and **software processes**;

creates new **alarms** based on a selection of the most critical monitoring points**;**

customization of the **Integrated Alarm System** (IAS).





Final remarks

- Based on the ALMA Common Software (**ACS**) and designed to **scale up with the number of devices**;
- Designed and built considering the current software tools and concepts coming from **Big Data** and **Internet of Things (IoT)**;
- Software stack based on **open-source** software;

- Future work is planned to integrate Machine Learning algorithms to perform **anomaly detection** and **failure prediction**.

Thanks

Mini-Array

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This work is supported by the following Institutions: