



IMC-AESOP

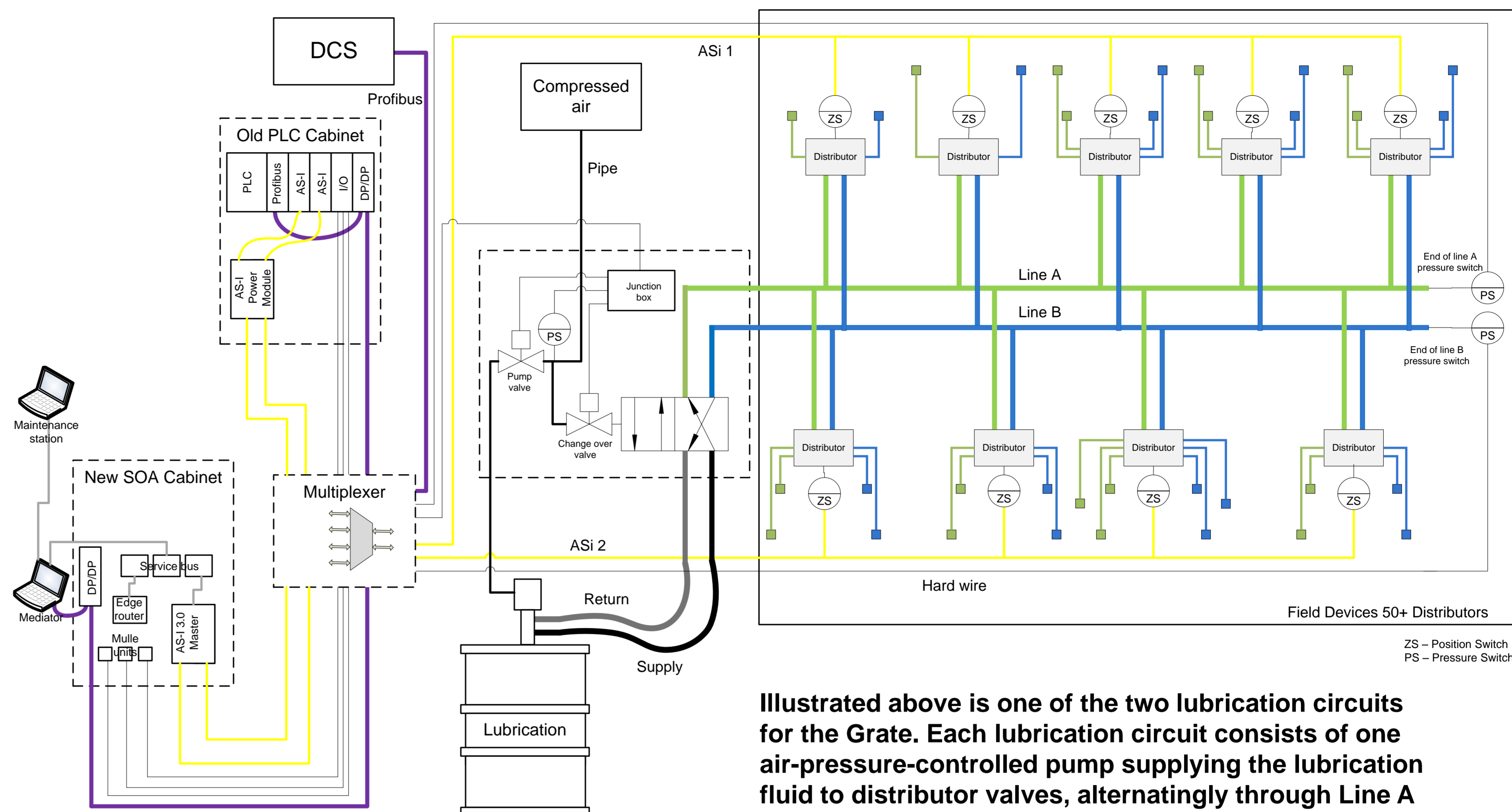
# Use Case 1: Plant Lubrication



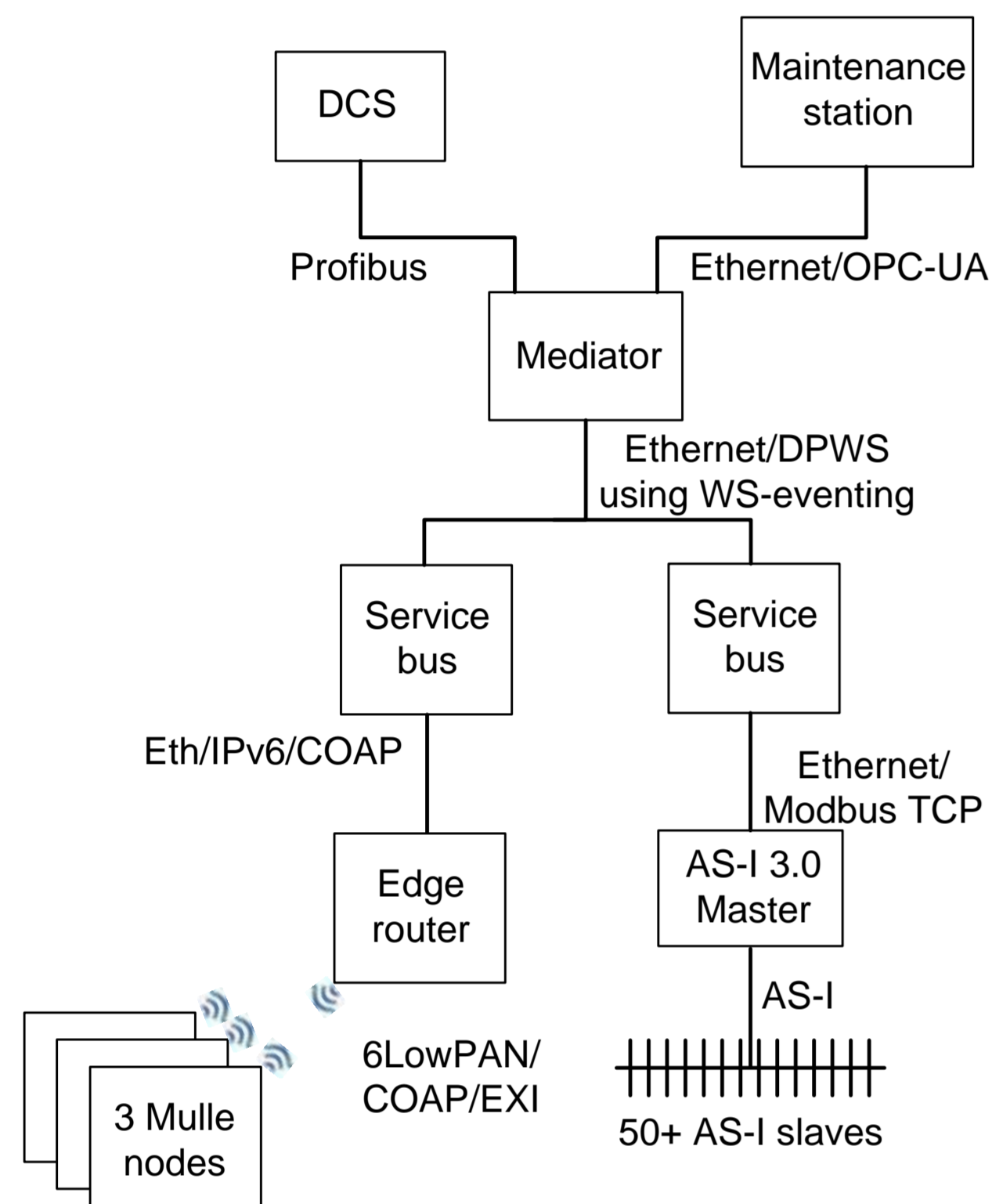
The site for Use Case 1: Plant Lubrication was the LKAB pelletizing plant KK4 in Kiruna, Sweden. At the pelletizing plant a mixture of ground up iron ore and additives is rolled into small balls which are then heated to become pellets.



The LKAB KK4 travelling grate (background) and rotary kiln (foreground), which together form the warm process of the pelletizing plant.



Illustrated above is one of the two lubrication circuits for the Grate. Each lubrication circuit consists of one air-pressure-controlled pump supplying the lubrication fluid to distributor valves, alternatingly through Line A and Line B.

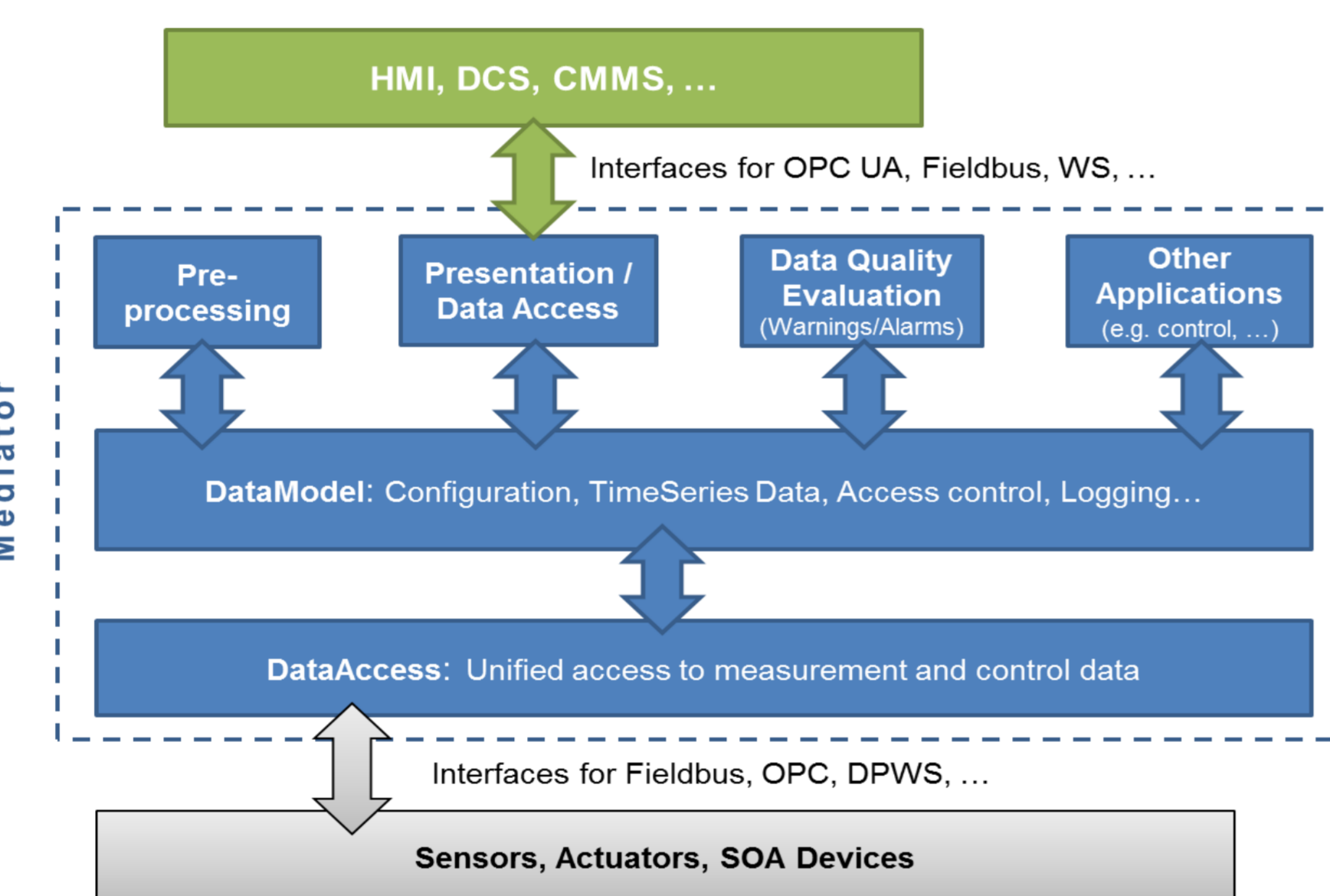


SOA architecture of the use case.

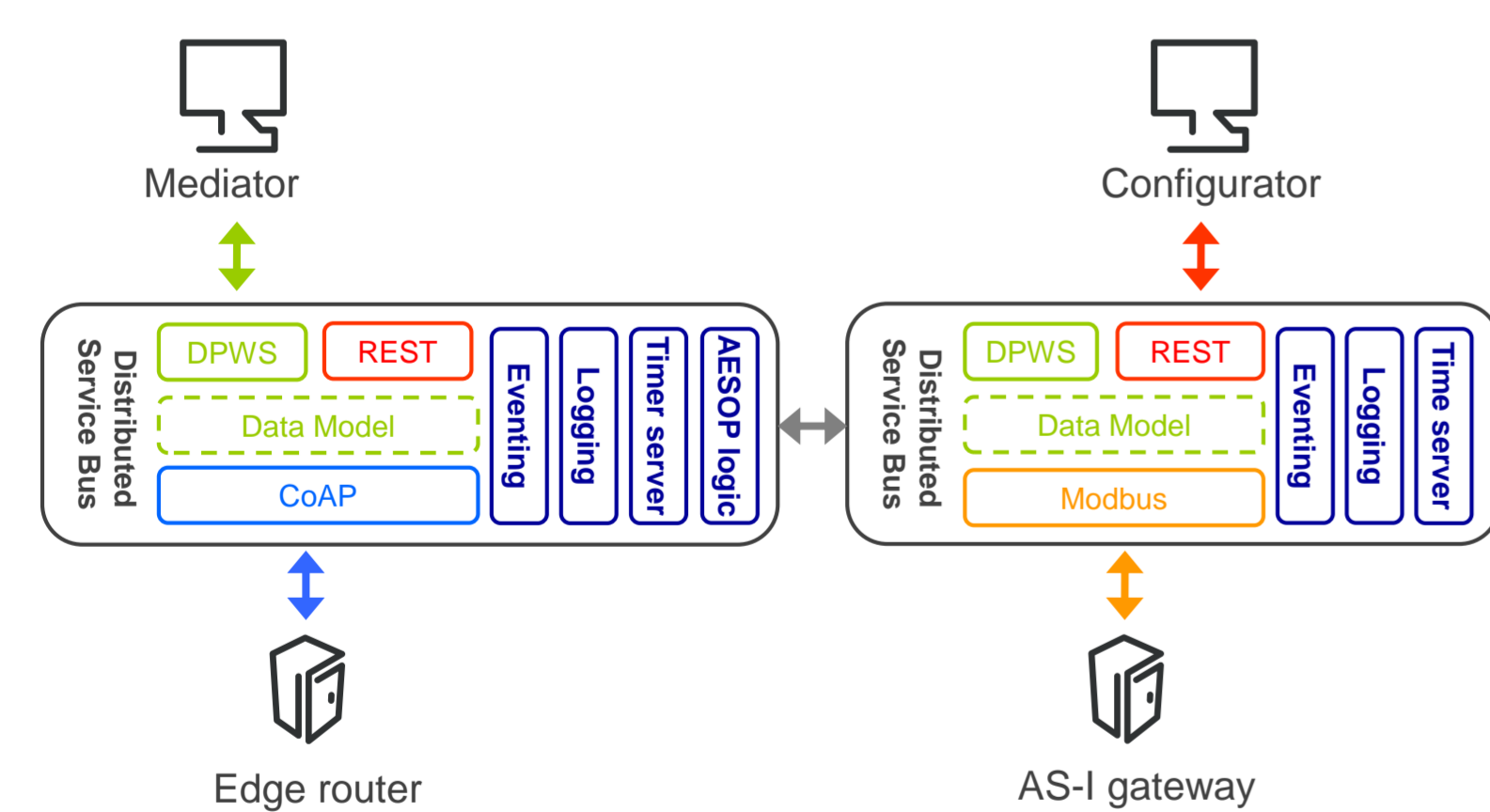
Use Case 1 consisted of replacing the traditional control system of the grate lubrication system with an IMC-AESOP architecture.

Several SOA based components were developed to achieve a smoother integration.

The Mediator provides a runtime system for monitoring and control of process facilities by integrating both legacy as well as SOA-based technologies.

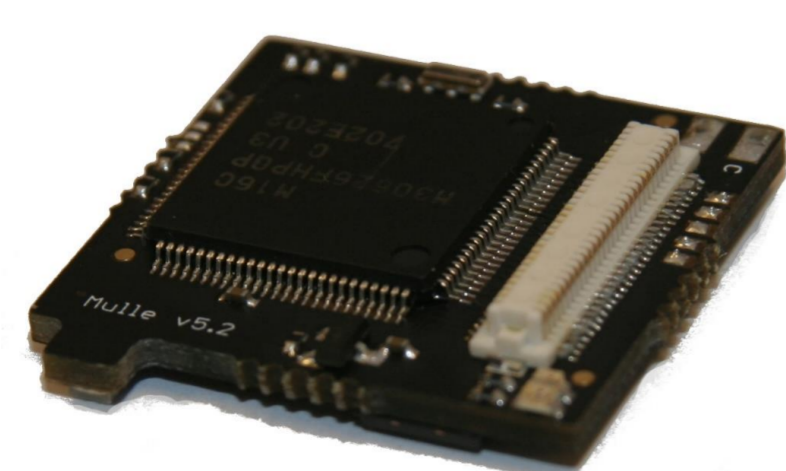


Basic structure of the Mediator



The Distributed Service Bus

The Distributed Service Bus provides an additional integration of heterogeneous systems supporting various communication media, protocols, and data models. The integration is enabled through loose coupling-based protocol connectors.

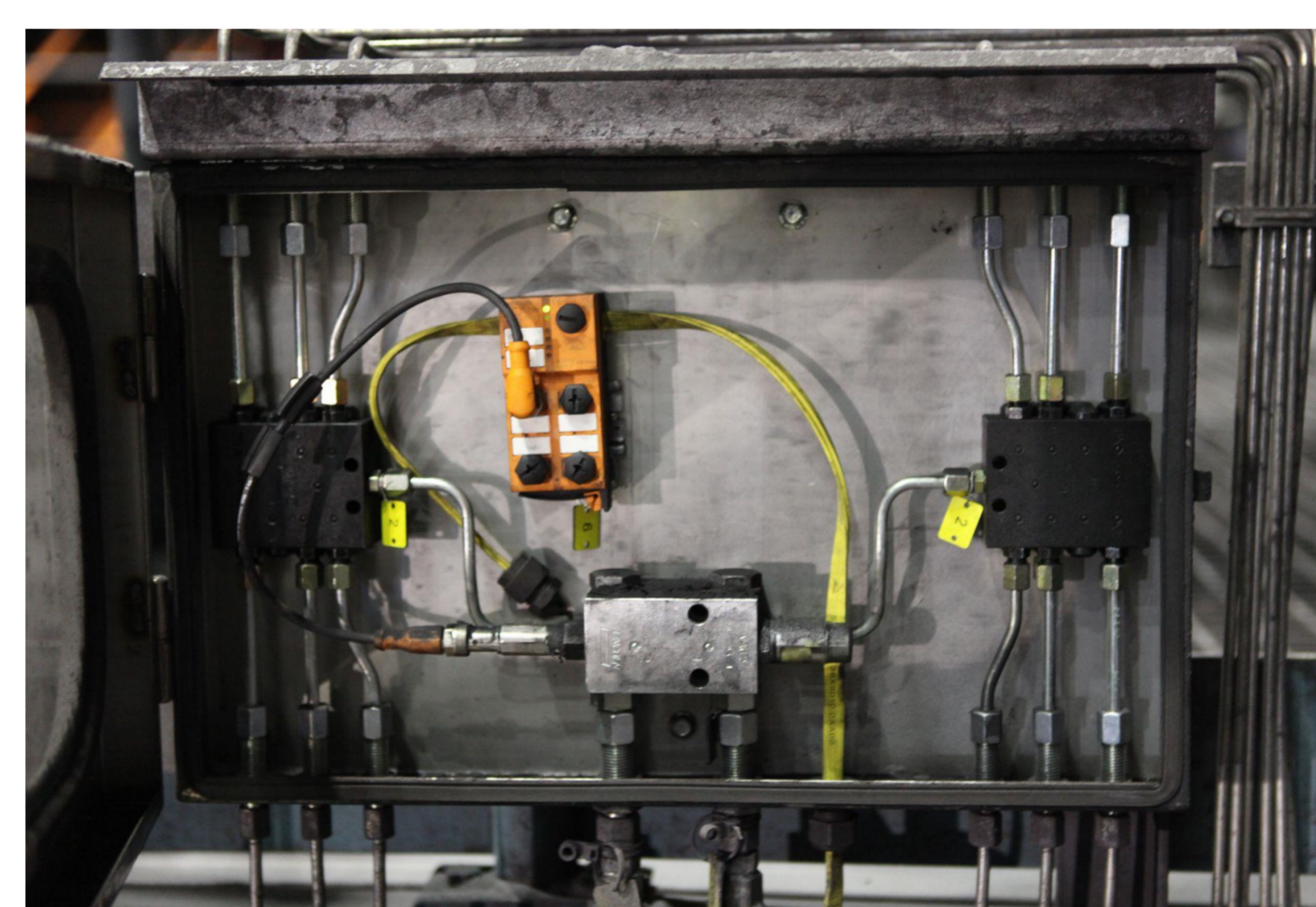


The Mulle hardware

Mulle devices were used as I/O nodes connecting lubrication pressure switches, air pressure switches, pump valves, change over valves, and indication lights.



Core components of the Grate lubrication system.



One of the many distribution valves, with the position switch and AS-i slave for supervision.

The core components of the Grate lubrication are the magnetic valves which control the lubrication pump and the change over valve.

The distribution valves are operated through the alternating pressure in the distribution lines Line A and Line B. As the pressure is rising in one of the distribution lines a set amount of lubrication fluid is distributed to a number of lubrication points, in this case on one of the Grate Support Shafts.

The position of the distribution valve is detected by an AS-i Pressure Switch, which is supervised by the control system.



A lubrication point on one of the Grate support shafts.

