Practical Work 3
DAI - HEIG-VD

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I. Multicast Distributed System Monitoring Protocol

A. Overview

The Multicast Distributed System Monitoring Protocol (MDSMP) serves as a crucial tool for efficiently transmitting and collecting system metrics in distributed environments. Designed to streamline the process of monitoring, MDSMP enables systems to send metrics data to a central monitoring server. This protocol is especially well-suited for scenarios where real-time insights into system performance are essential.

B. Protocol

MDSMP employs text-based messages following the Prometheus metrics format, as described in the Prometheus documentation (https://prometheus.io/docs/concepts/data_model/). This standardization ensures compatibility with Prometheus-based monitoring and facilitates easy integration into existing monitoring ecosystems.
Since MDSMP is based on UDP, it operates without establishing a formal connection between clients and the server. This results in a lightweight and efficient communication model, reducing overhead and latency.
The port used for all multicast messages is 9378.
Multicast addresses groups are defined as follows:

- cpu : 230.0.0.1
- ram : 230.0.0.2
- dsk : 230.0.0.3

All messages exchanged within the MDSMP protocol must be encoded in UTF-8. This standardized encoding scheme ensures compatibility across diverse systems and prevents data corruption during transmission.

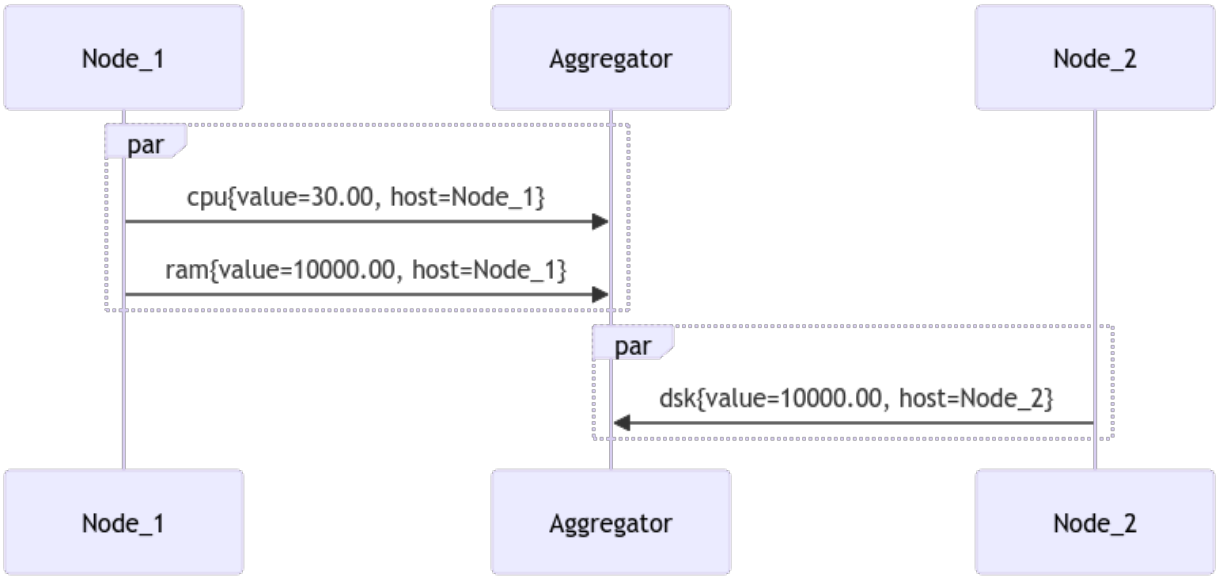
C. Messages

1) *Sending data:*

1. `<type>{value=<value>, host=<host>}`
    1. `<type>` : Type of the data sent (cpu, ram, dsk)
    2. `<value>` : Value of the sent data
        1. cpu : CPU consumption in percentage
        2. ram : RAM consumption in MB
        3. dsk : Disk consumption in MB
    3. `<host>` : Name of the machine sending the data (hostname). Must be unique for each machine.

D. Examples

The next figure contains an example of two nodes sending data to the aggregator. Since the messages are sent using the fire-and-forget method messages are sent without expecting anything in return, the messages can also be sent in parallel.


Node_1
Aggregator
Node_2
par
cpu{value=30.00, host=Node_1}
ram{value=10000.00, host=Node_1}
par
dsk{value=10000.00, host=Node_2}
Node_1
Aggregator
Node_2