Enhancing Observatories With Fog Computing
Ammar Kazem, Guillaume Pierre, Laurent Longuevergne

To cite this version:
Ammar Kazem, Guillaume Pierre, Laurent Longuevergne. Enhancing Observatories With Fog Computing. SSDBM 2024 - 36th International Conference on Scientific and Statistical Database Management, Jul 2024, Rennes, France. pp.1-1, 2024. hal-04634470

HAL Id: hal-04634470
https://inria.hal.science/hal-04634470
Submitted on 4 Jul 2024

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License
ENHANCING OBSERVATORIES WITH FOG COMPUTING

OBJECTIVES
- Define the current state of practice in environmental monitoring systems used by observatories.
- Underline the challenges and common requirements for future systems.
- Highlight the potential of fog computing in observatories.

METHODOLOGY
We conducted a survey with observatories affiliated with:
- OZCAR
- Réseau Zone Atelier
- TERENO, ANAEE, ...

CURRENT PRACTICES
The survey identified two types of observatories:
- Event-oriented observatories representing 54% of the surveyed observatories
- Long-term oriented observatories representing 46% of the surveyed observatories

And the usage of two types of environmental monitoring systems:
- Data logging
- Environmental sensor network

ADVANTAGES OF CURRENT SYSTEMS
- Adapted to power constraints
- Durable and tested hardware
- Widely recognized in the community

DRAWBACKS OF CURRENT SYSTEMS
- Insufficient processing power
- Local view of data
- Limited visibility into hardware status

COMMON SYSTEM CHARACTERISTICS
- Event Detection and Prediction
  - Utilizing both in situ and external data to detect specific events and forecast them in advance.
- System Health Monitoring
  - Ensuring the earliest possible detection of any hardware failures within the system.
- Real Time data Transmission
  - Enabling the transmission of data in near real-time as needed.

POTENTIAL OF FOG IN OBSERVATORIES
1. Detection of rain
2. Collection of data from the rainfall sensor
3. A model combines the data from the sensor with external data to detect a rain event
4. Another model is alerted of the event and orders a response

CONCLUSION
Observatories' data are strategic. Integrating fog computing into environmental monitoring systems could significantly enhance processing capabilities and provide a comprehensive view of situ data globally. These key improvements would support the development of essential functionalities. Special attention must be given to the unique challenges in observatories, such as limited energy and connectivity.