MODA:
A Meta-OS for Distributed Applications

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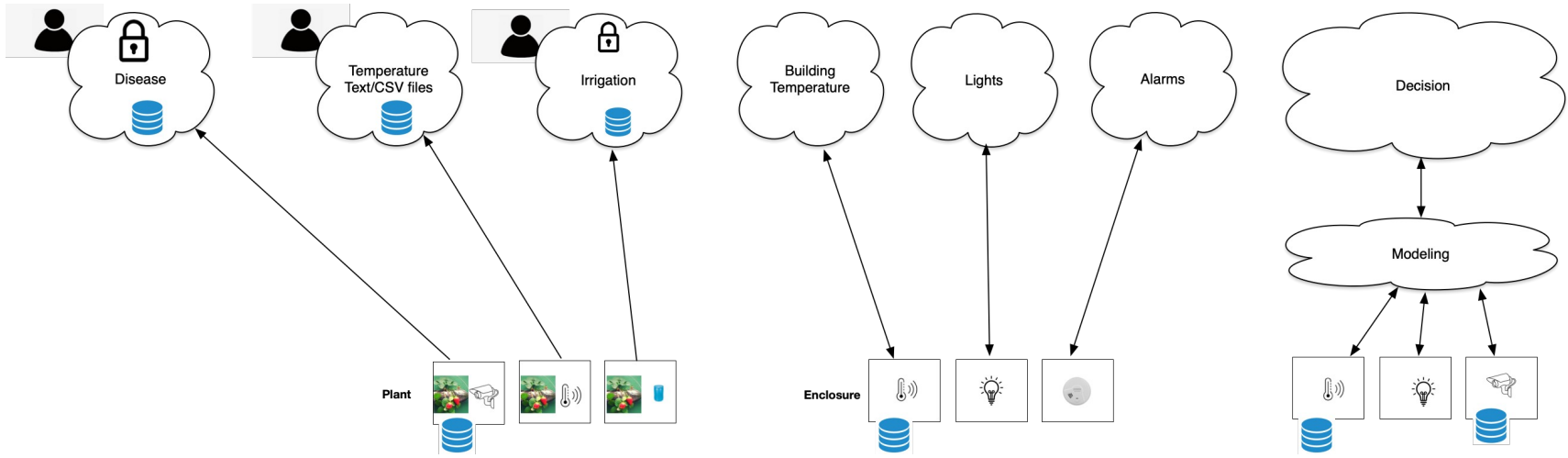Roberto Minerva

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MODA
Meta operating system
for distributed application

IOT today a fragmented verticalized world - the agriculture example

Why MODA?

- Application development still faces important pain-points:
    - Proprietary, fragmentary and verticalized approaches requiring overlays, multiple gateways and different cloud applications and providers
    - Security and privacy
        - IoT applications need to respect universal data privacy and enforce digital sovereignty
- The **computer board** as a new Internet paradigm
    - Hence it needs an **operating system (a Meta-OS)**
    - Move away **from telephone network models and client server heritage**
    - The **IoT-to-edge-to-cloud** is one realization of that vision
    - Data valorization is key
        - Data as the fuel for 21st century networks

What is MODA?

MODA is the **operating system** for the new **distributed Internet**

It provides the infrastructure that allow applications to be easily developed such as:

- Discovery services
- Communications and publish-subscribe
- Semantic integration and data management
- Implementation of commonly-used functionalities
- APIs, tools and libraries for running code across multiple heterogeneous nodes

Main MODA functionalities

Orchestrating in-network and on-device computing over heterogeneous systems, minimising of the overhead for service federation

Enabling reusability across applications and users to support an open application development ecosystem

"Extreme modularity" as design choice allowing functional distribution, pipelining, scalability and adaptability

Managing the network processing units, in-network computation placement along the IoT-to-edge-to-cloud continuum to support the distributed applications now and in the future

Supporting data and Intelligence services as data-driven approaches and artificial intelligence are fueling a rapid evolution of new network services and applications

Conceptual view of MODA
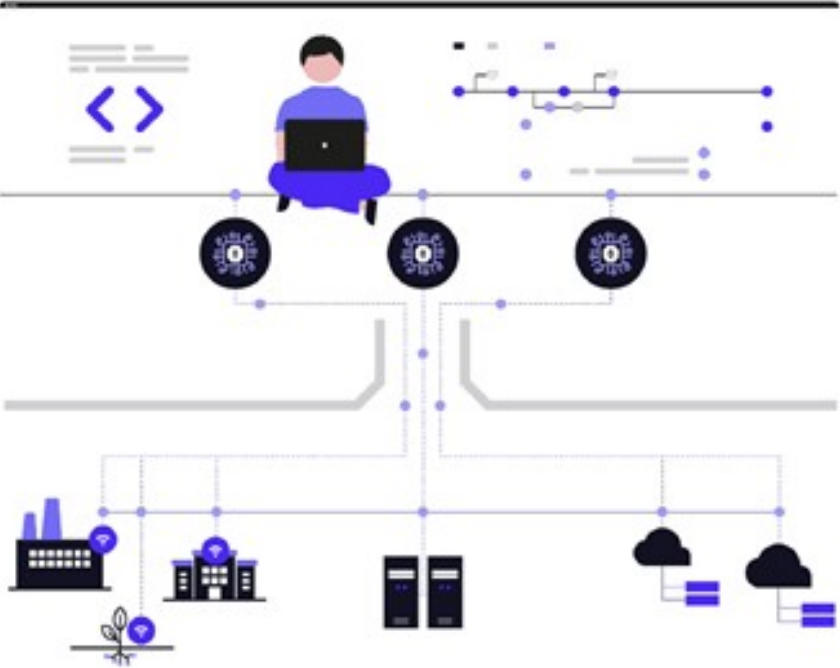
Application Interface
- SDK
- composition refining
- digital markets

Orchestration
- intelligence modelling
- choreography
- execution control

Data management
- data transformation
- data description
- data retrieving

Distributed communication
- network aware computing
- multi-tenancy
- peering & availability

Exposure
- perception
- actuation
- storage & compute

Link to COINRG: Research Topics

Discovery (storage, function, computation)

Distributed abstractions and protocols

Decentralized security & trust

Federated learning

Use cases

Questions ?