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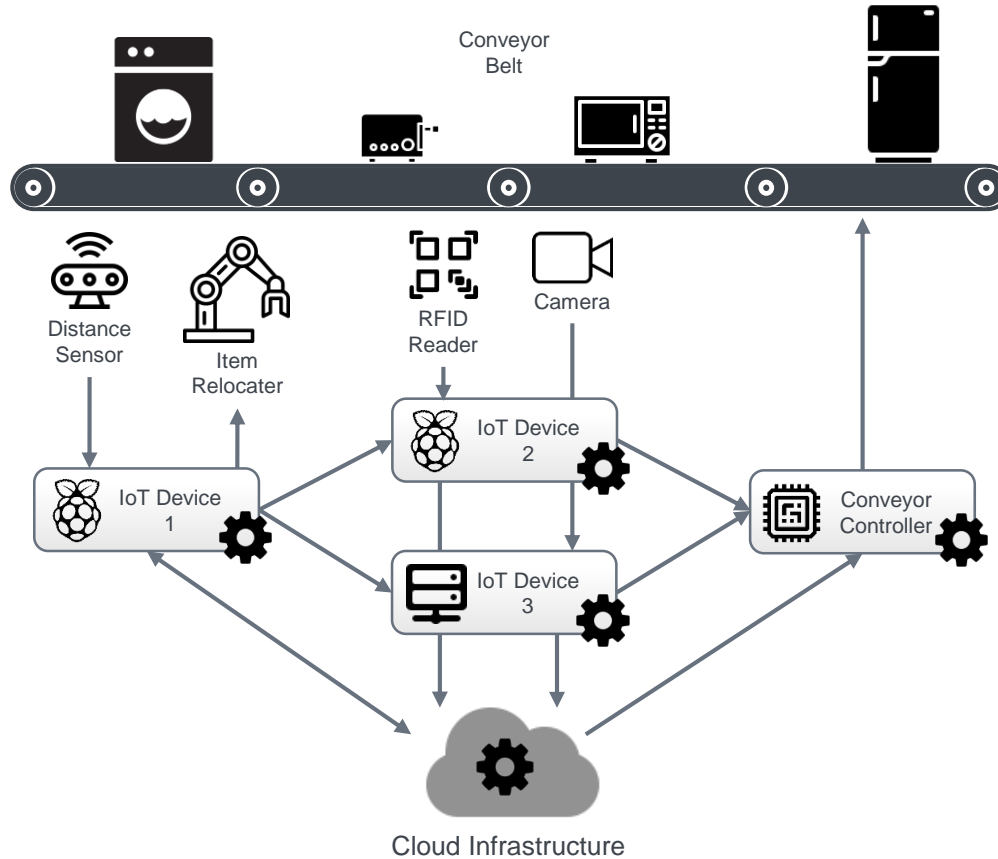


# A lightweight messaging engine for decentralized data processing in the Internet of Things

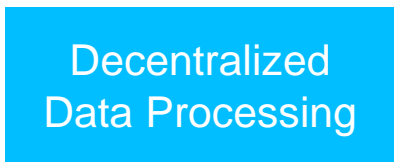
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# Conveyor Belt Scenario



# Benefits and Challenges of Decentralized Data Processing



## Benefits



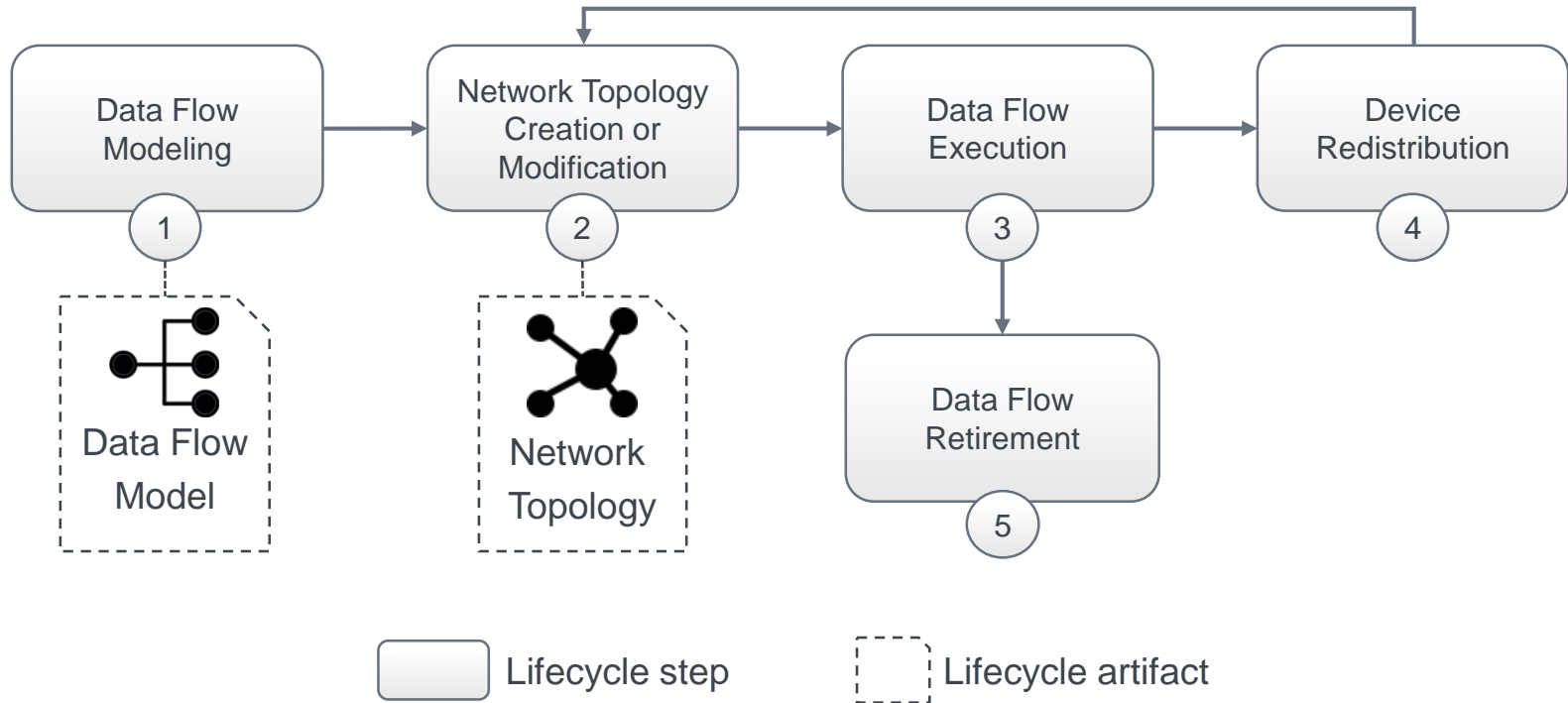
- Less communication overhead
- Scalability
- Utilization of device's computing resources
- Privacy enhancing

## Challenges

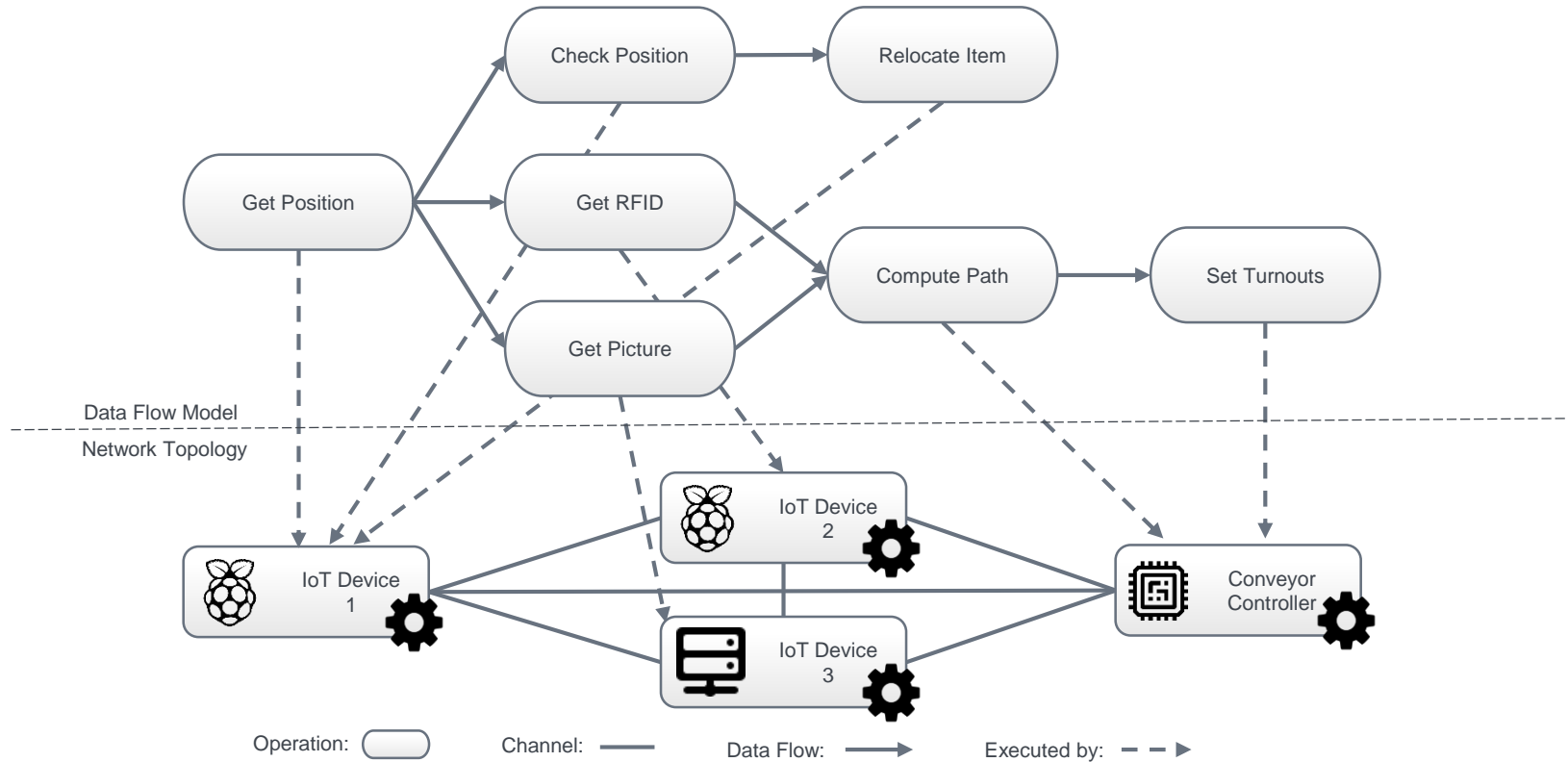


- Lightweight solution
- Dynamic environments
- Autonomous devices
- Utilization of multiple heterogeneous hardware

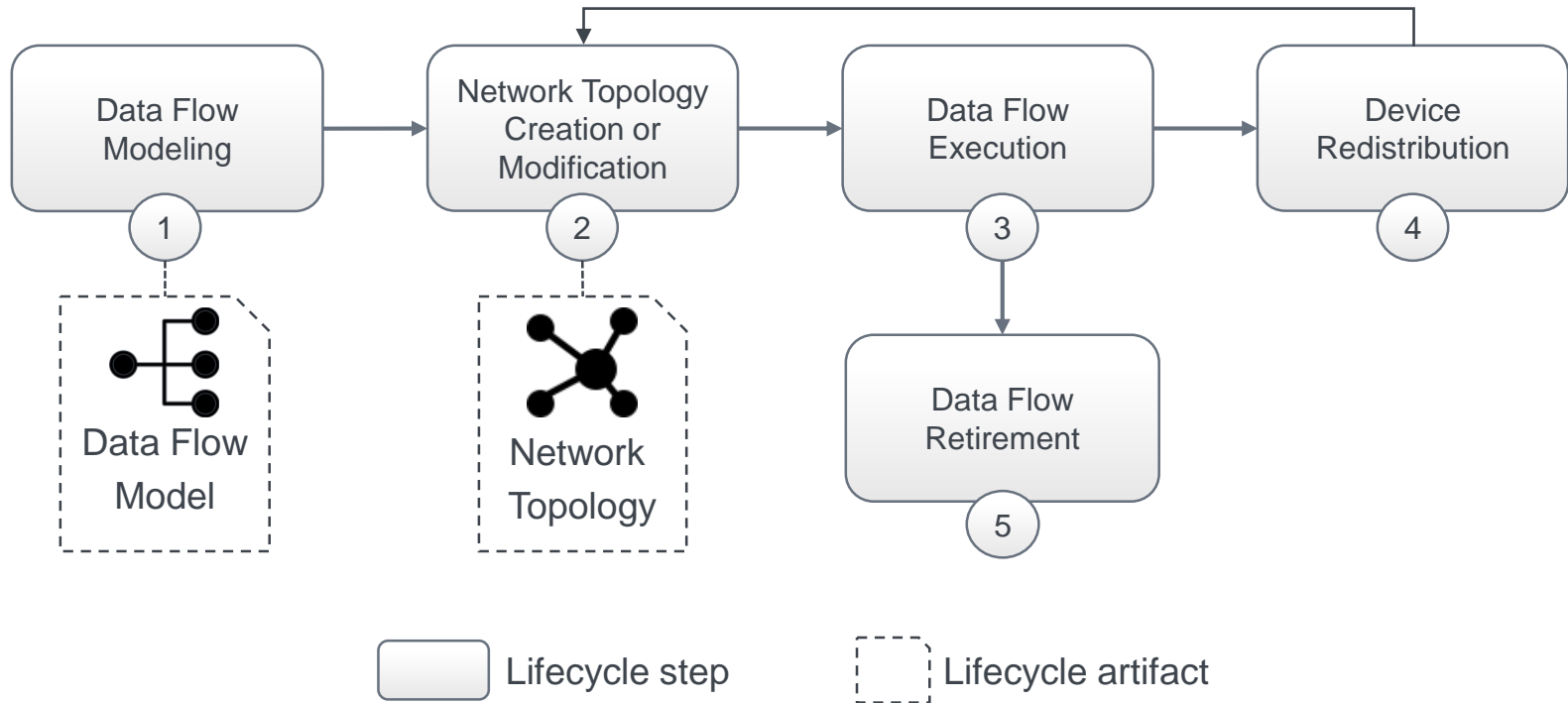
# Life Cycle Method



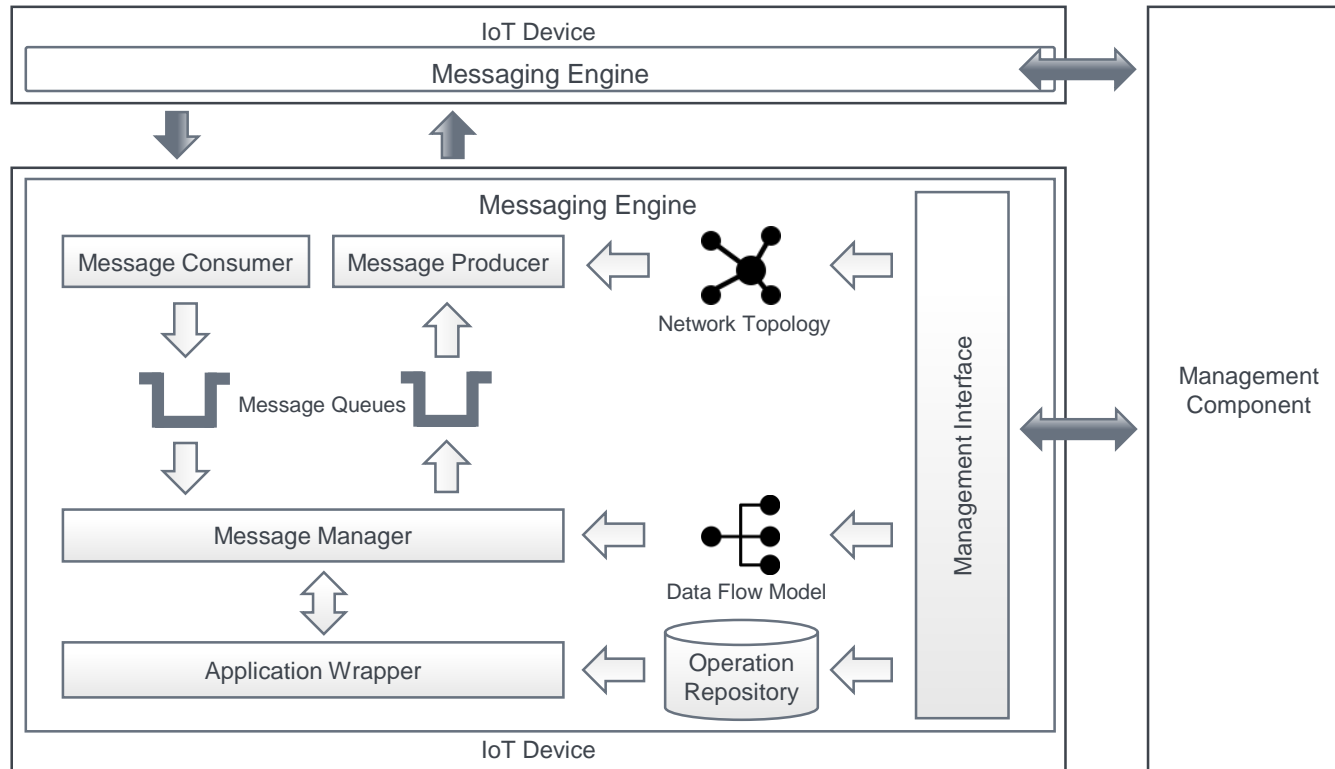
# Data Flow Model and Network Topology



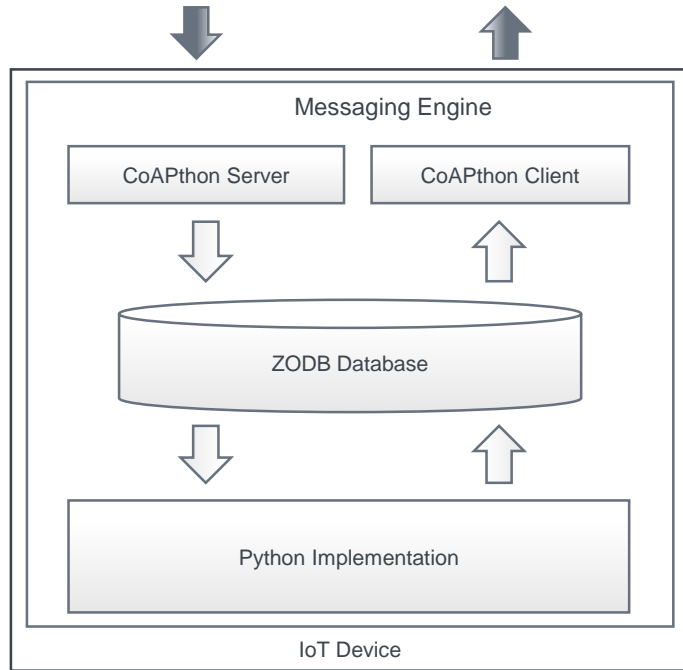
# Life Cycle Method



# Messaging Engine Architecture



# Implementation



- Constrained Application Protocol (CoAP) for communication
- Python implementation with CoAPthon library
- ZODB database for message queues and model storage
- Test environment with multiple Raspberry Pis and virtual machines



# Evaluation

- Comparison to a centralized solution with a process engine
- Measured time spent between receiving, processing and replying
- Compared the measured times to a simple HTTP script
- Overhead must be compared to the time a process engine needs

 Mean overhead of the messaging engine: **0.168 seconds**

# Conclusion

- Lightweight solution ✓
- Dynamic environments ✓
- Autonomous devices
- Heterogeneous hardware



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# Thank you!

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