

# Context Aware Sensor Configuration Model for Internet of Things

Semantic –Driven Sensor Configuration Approach to Support Sensing as a Service

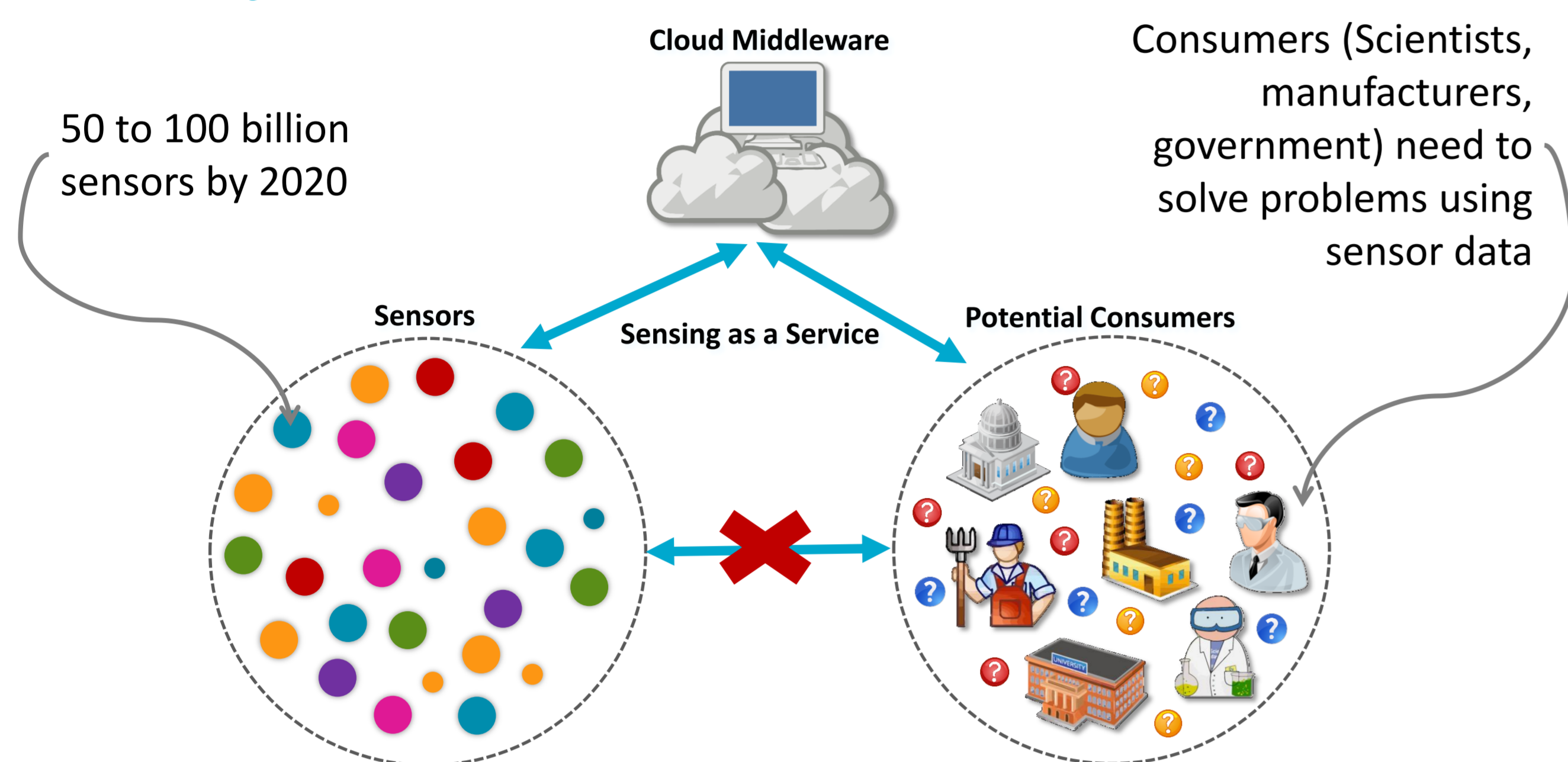
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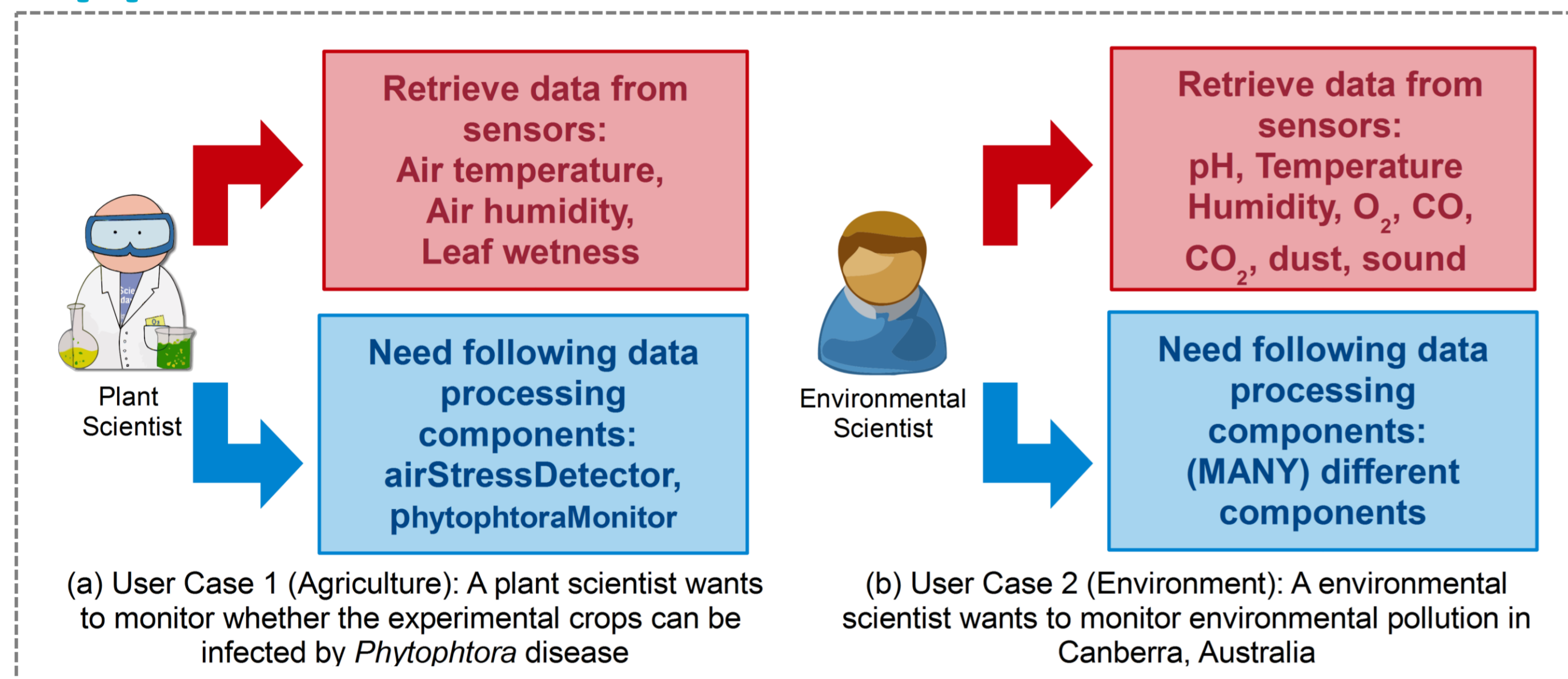
We propose a Context Aware Sensor Configuration Model (CASCoM) to address the challenge of automated context-aware configuration of filtering, fusion, and reasoning mechanisms in Internet of Things middleware. This model helps non-IT experts to configure sensors and data processing components efficiently and effectively without knowing and addressing underlying complexities. To enable further processing, CASCoM produces data streams that can easily be fed into applications or services.

## Trends, Statistics and The Problem

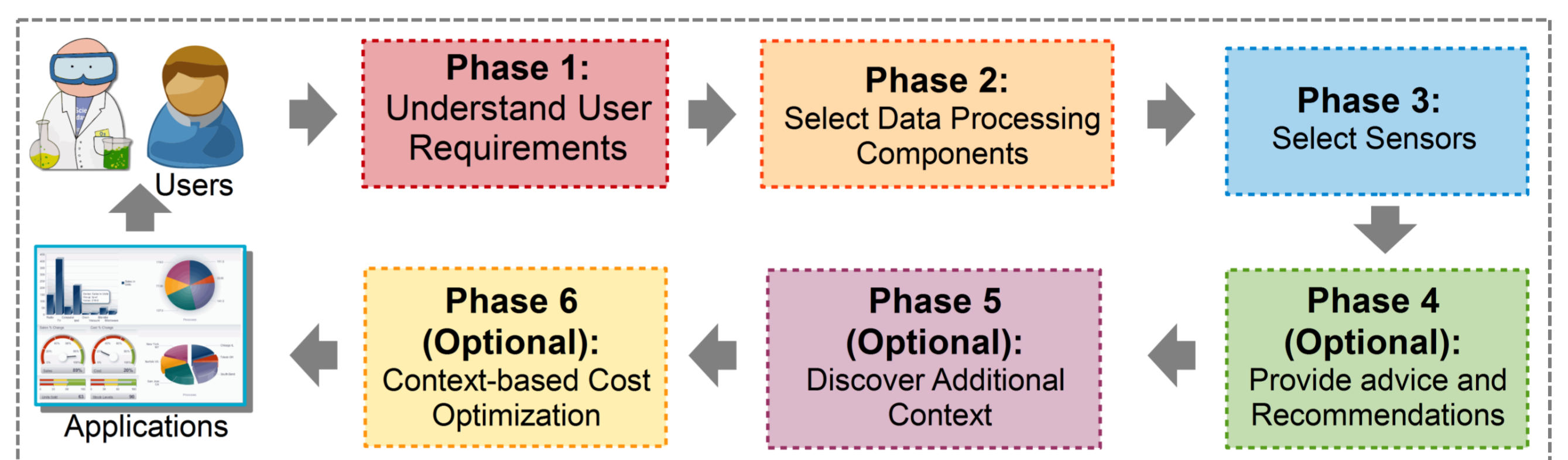


*'How to develop a model that allows non-IT experts to configure sensors and data processing mechanisms in an IoT middleware according to the users requirements?'*

## Application Scenarios



## The Proposed Model: CASCOM



- CASCoM consists of 6 phases and supports several advanced features
- Reduces the complexity of the IoT middleware configuration process
- Users allowed to define priorities in relation to context properties

## Multi Ontology-based Data Model

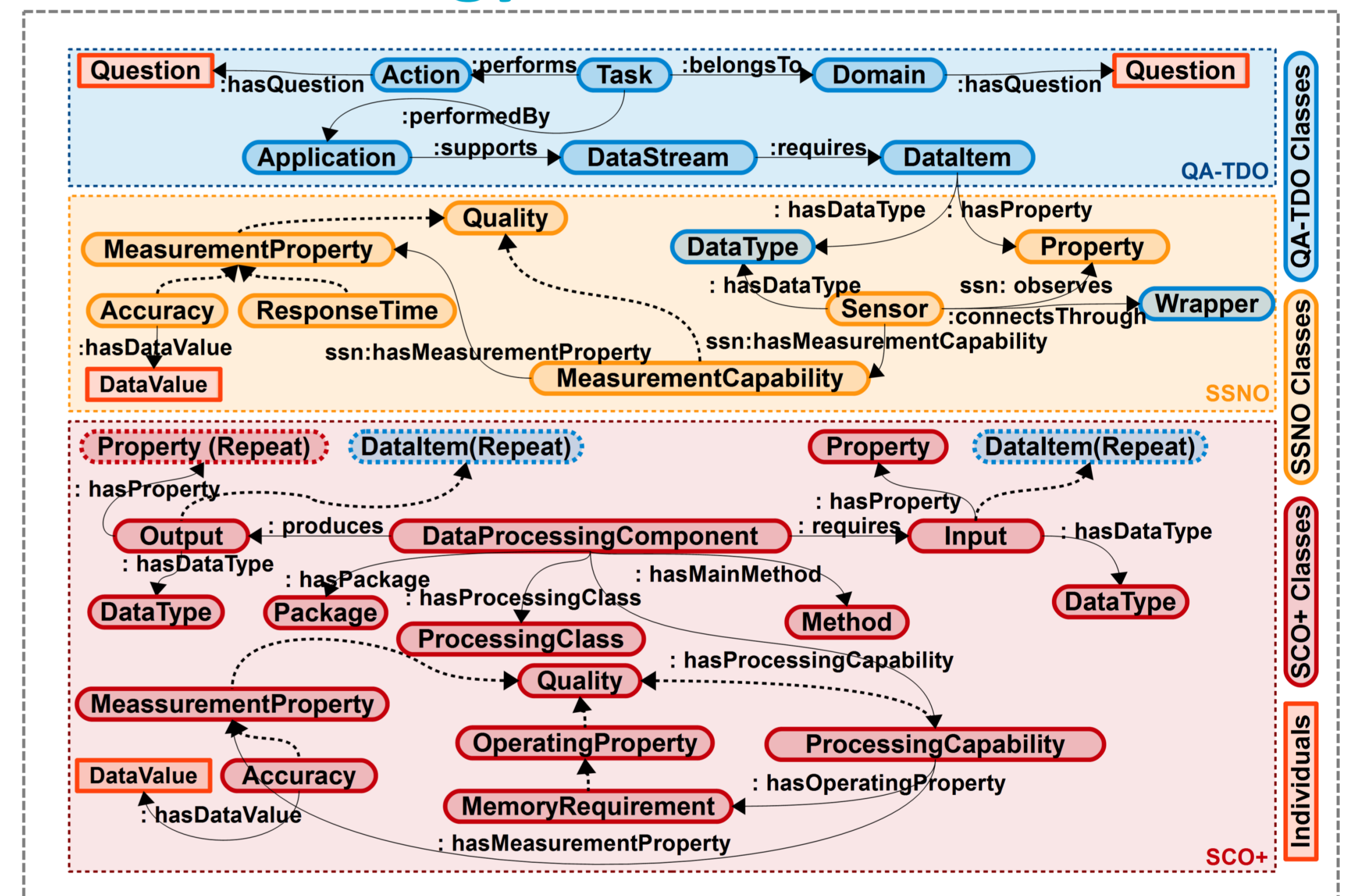


Figure 3: We used three different data models to describe sensors and data processing components such as Semantic Sensor Ontology and Software Component Ontology. Additionally we developed our own ontology to model additional knowledge that describes domains, tasks and so on to support Q&A based filtering.

## Ease of IoT Middleware Configuration

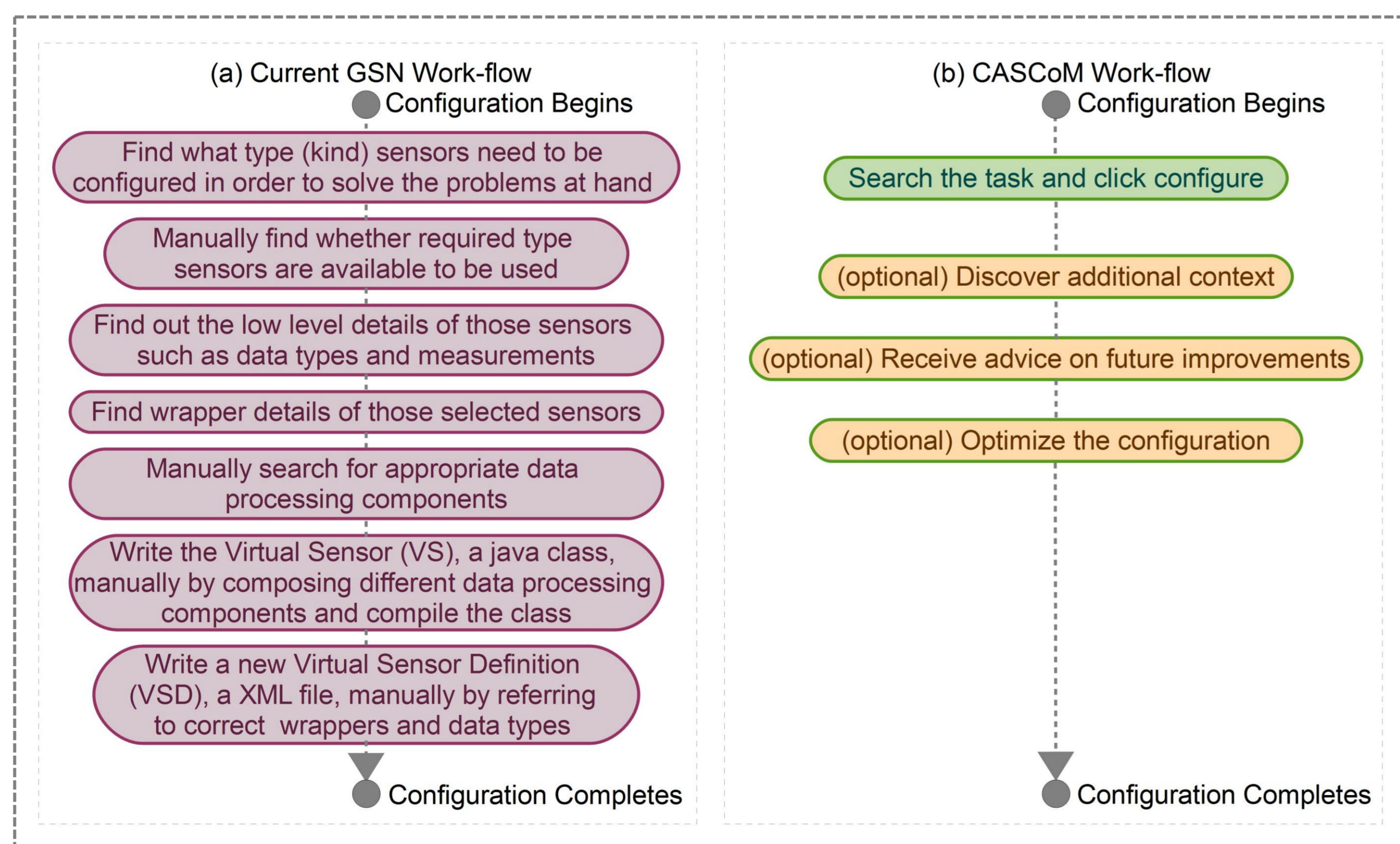


Figure 2: (Left) A number of steps need to be performed manually by sensor data consumers in GSN middleware (Right) Simplified IoT middleware configuration process proposed where we have reduced number of steps to be completed

## Results and Lessons Learned

- CASCoM allowed three types of users ( a GSN expert, an IT expert, and a non-IT expert) to complete the given tasks 50, 80 and 250 times faster in comparison to the existing approach.
- The expert saved 88% time by using CASCoM.
- Scalable – NO algorithmic changes required – Only required to add data to the semantic model

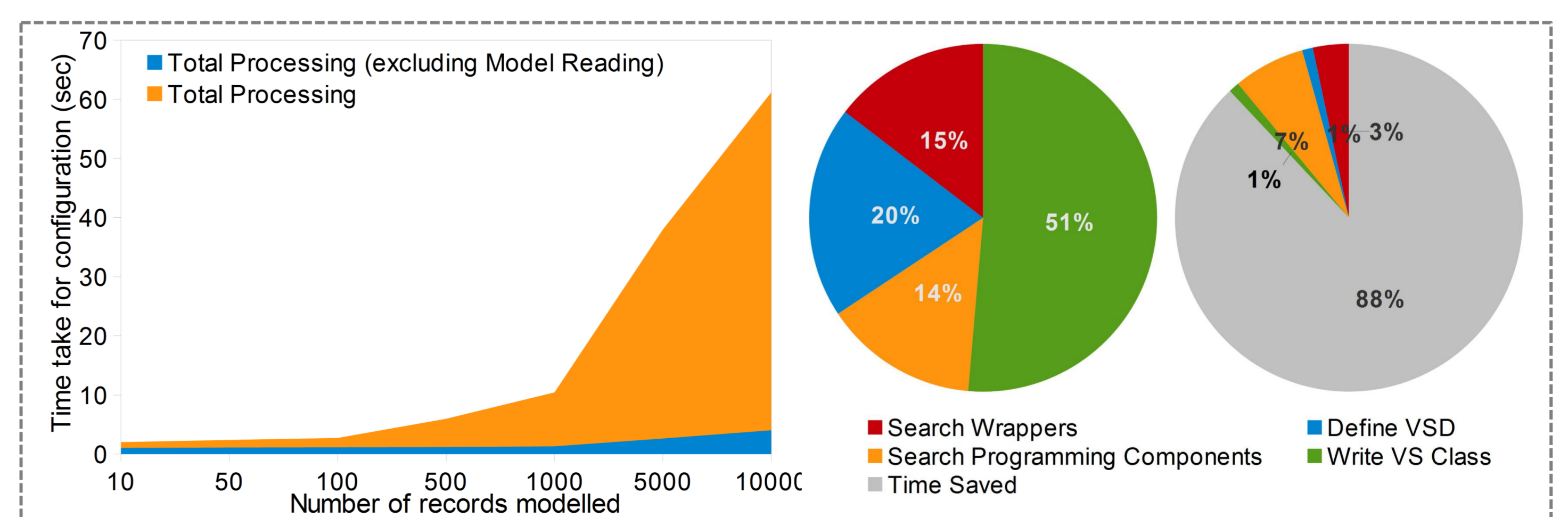


Figure 4: (Left) Shows CASCoM can perform well even with large knowledge bases with 10,000 sensor descriptions (Right) shows the amount of time that can be saved by adopting CASCoM instead of the manual sensor configuration approach.

### FOR FURTHER INFORMATION

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### REFERENCES

Charith Perera, Arkady Zaslavsky, Michael Compton, Peter Christen, and Dimitrios Georgakopoulos, Semantic-driven Configuration in Internet of Things Middleware, Proceedings of the 12th International Semantic Web Conference (ISWC) (Posters & Demos), Sydney, Australia, October, 2013

### ACKNOWLEDGEMENTS

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