

Complex Event Processing for Internet of Things

[IHDCB339] Introduction to the scientific process

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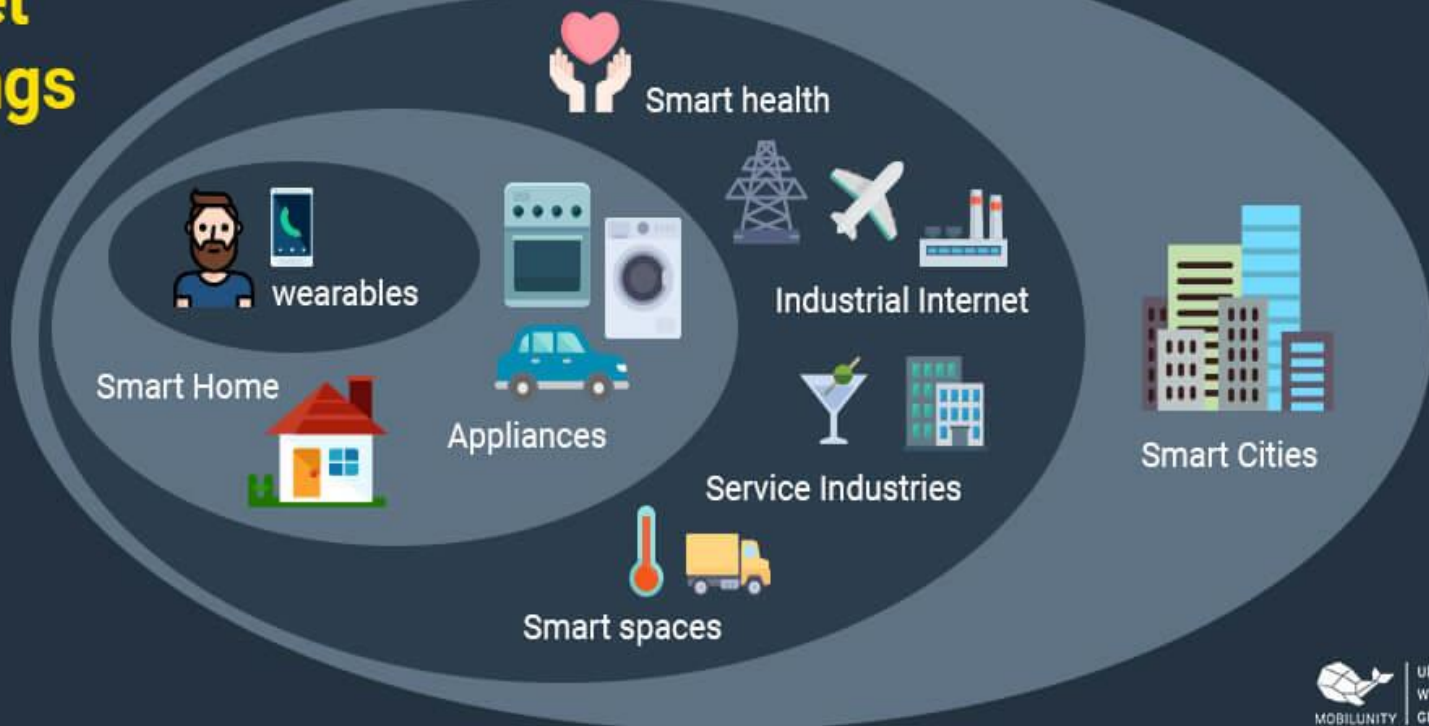
Introduction



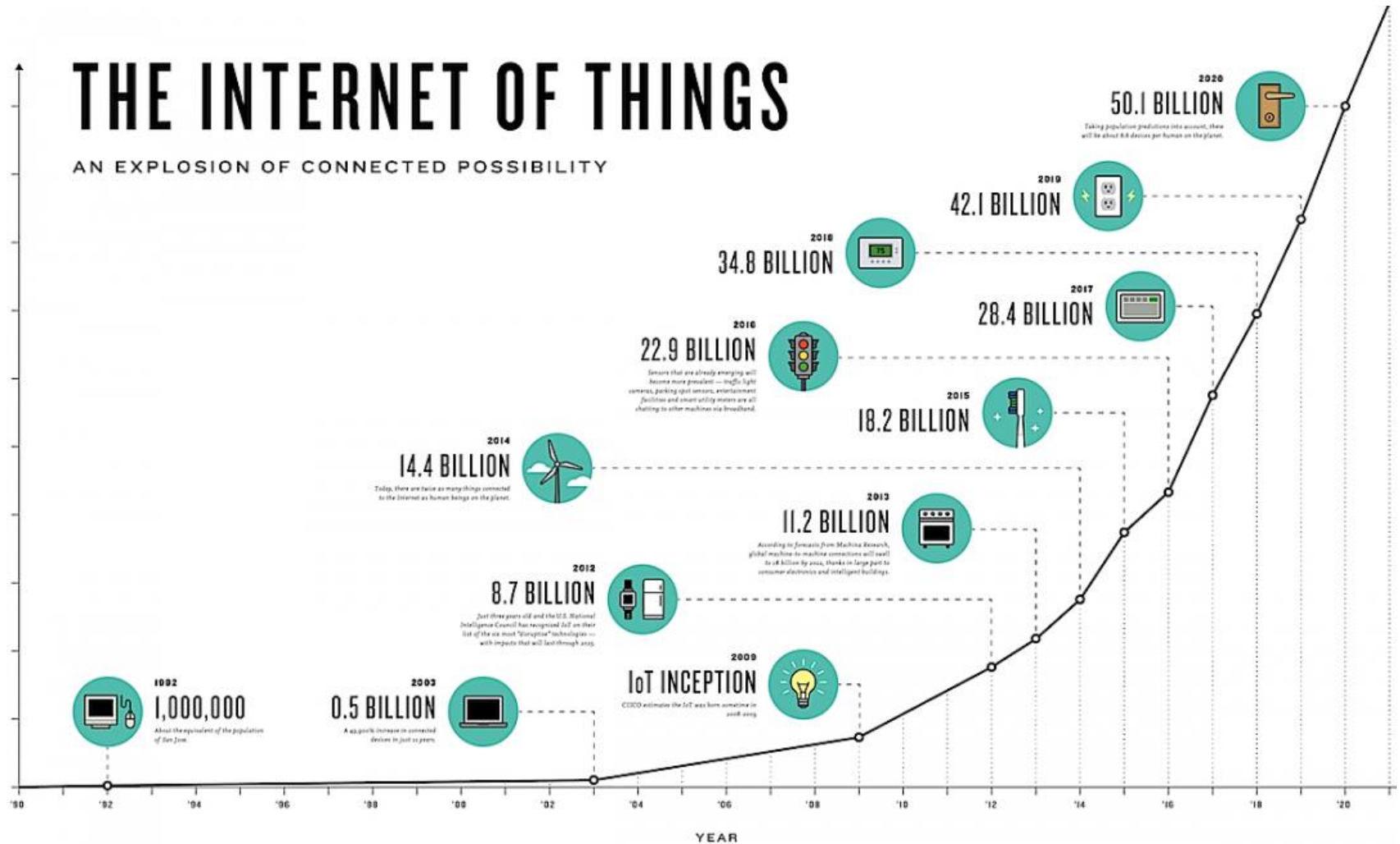
Introduction

“System of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.”

Internet of Things

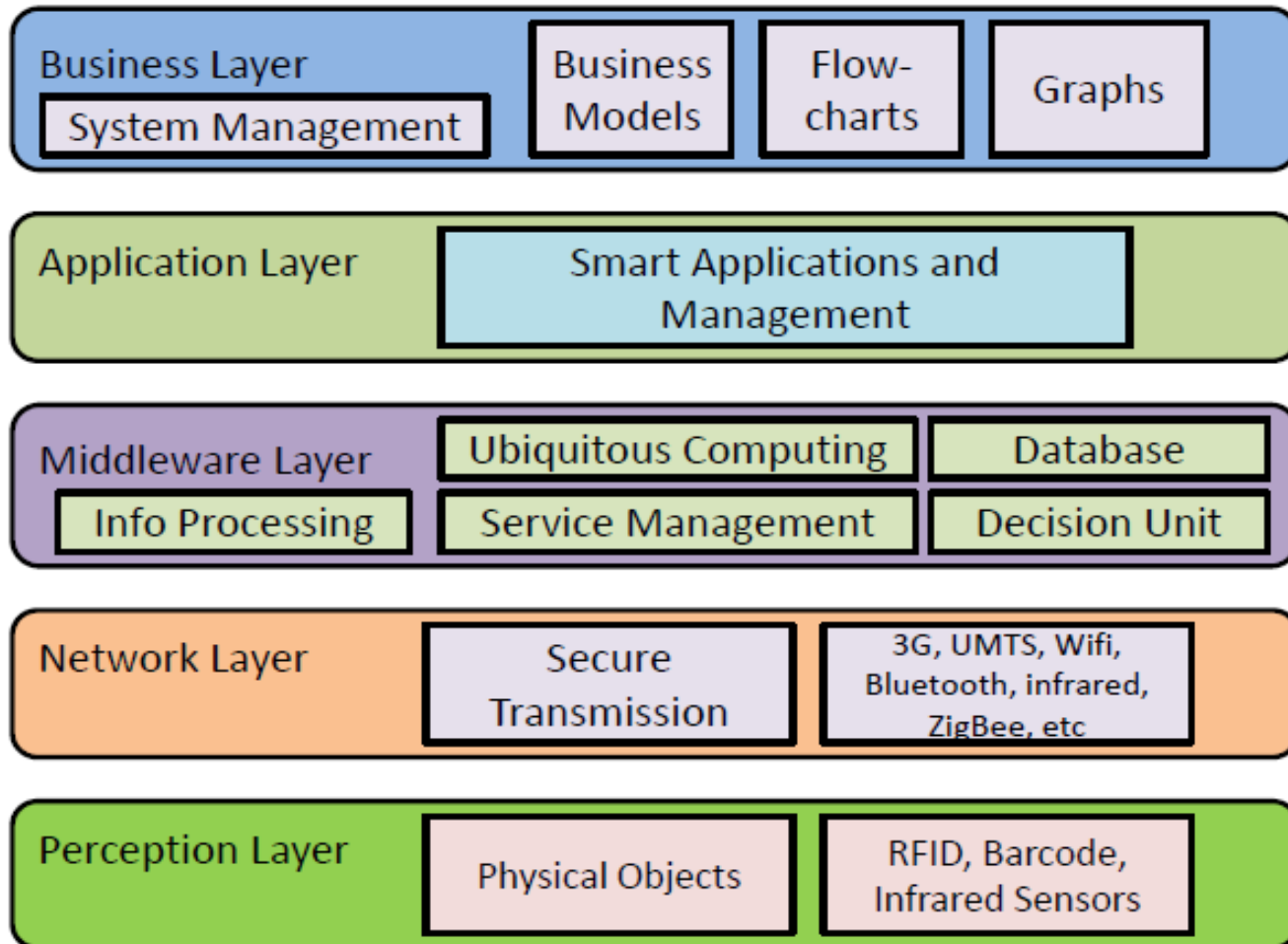


Introduction

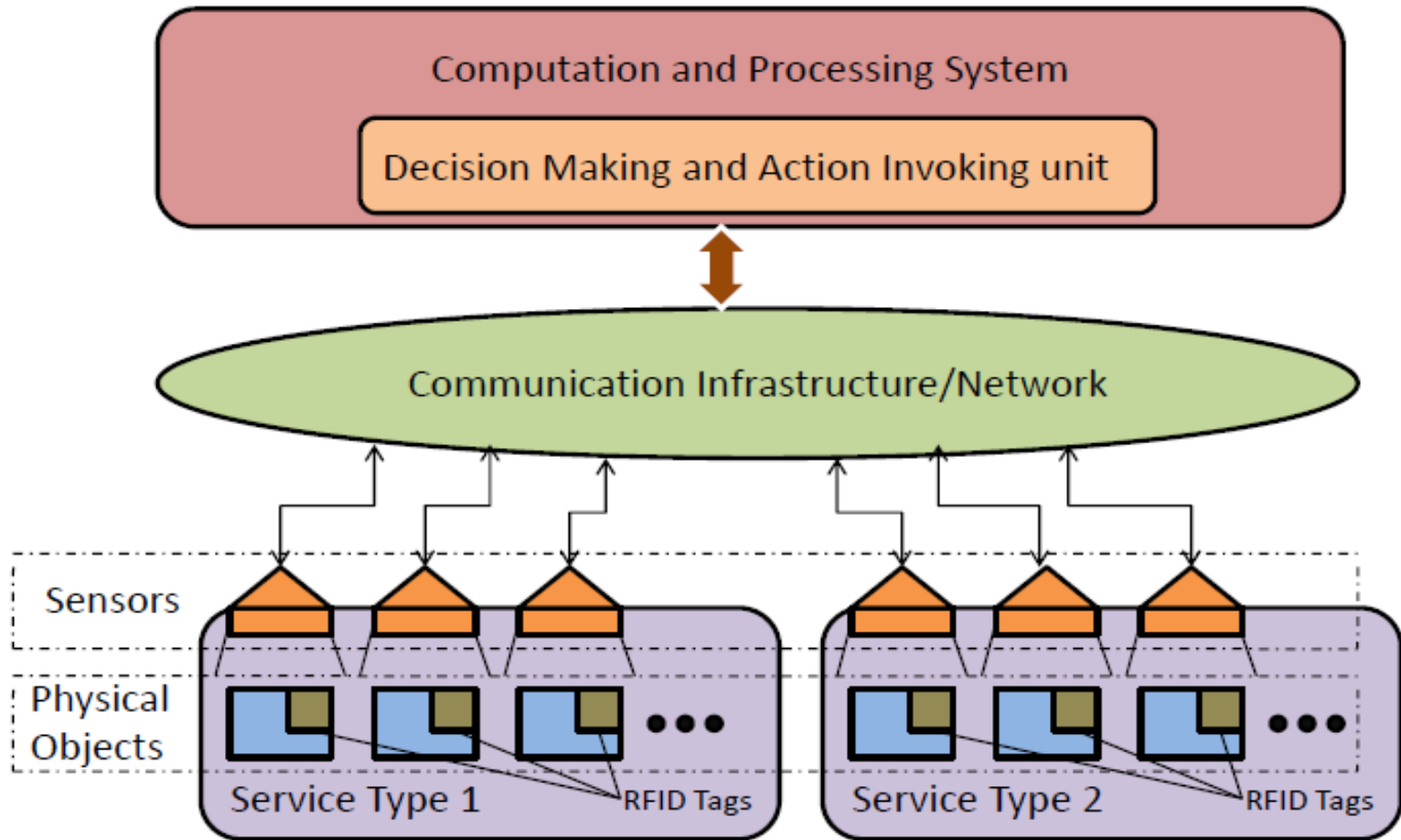


Introduction

Generic Architecture :



Introduction



Complex Event Processing



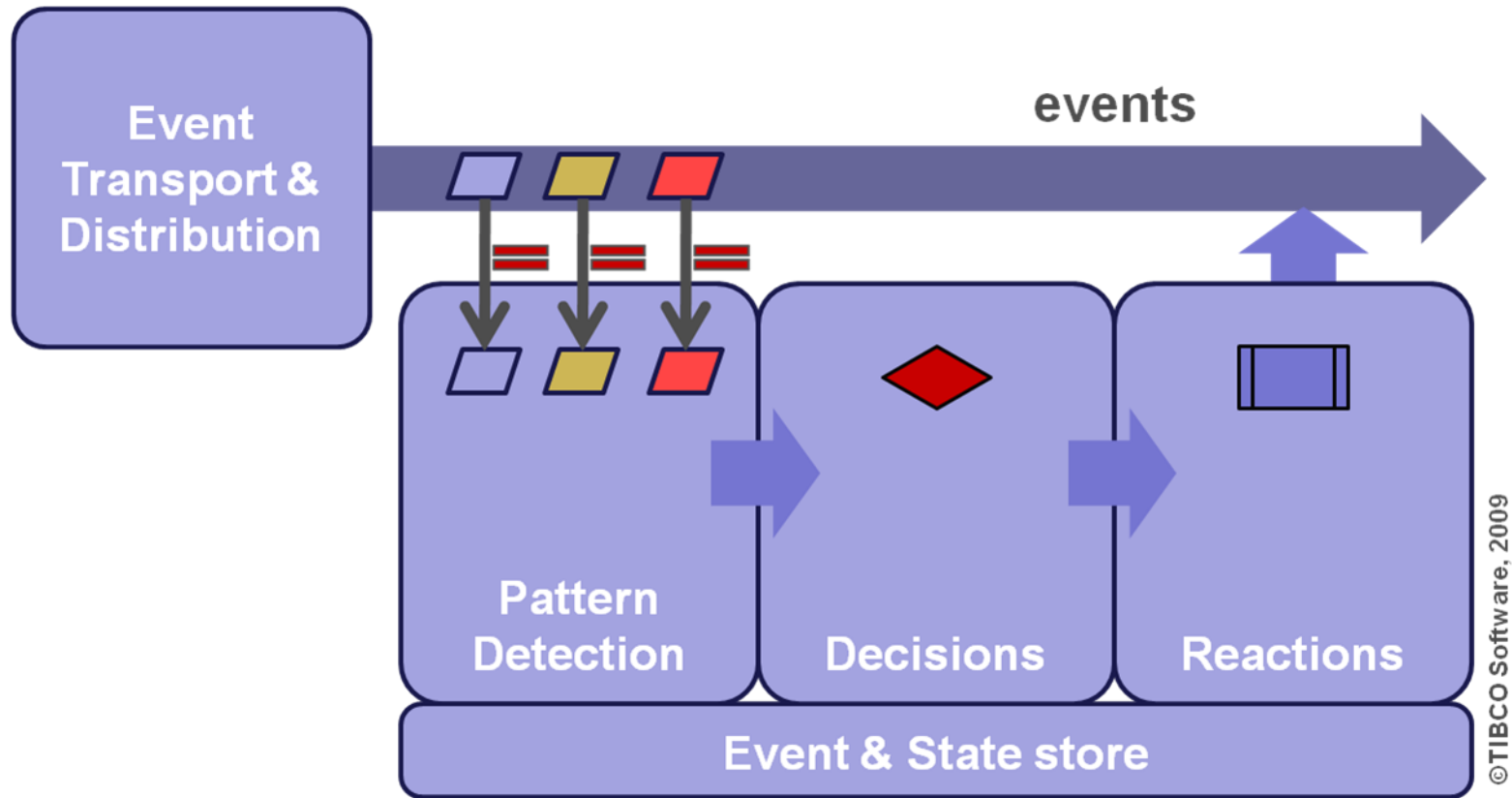
Complex Event Processing

Definition : "[...] Set of methods and techniques for tracking and analyzing real-time streams of informations and detecting patterns or correlations of unrelated data (complex events) that are of interest to a particular business."

Important : **Event Correlation**

Complex Event Processing

CEP Engine :



Complex Event Processing

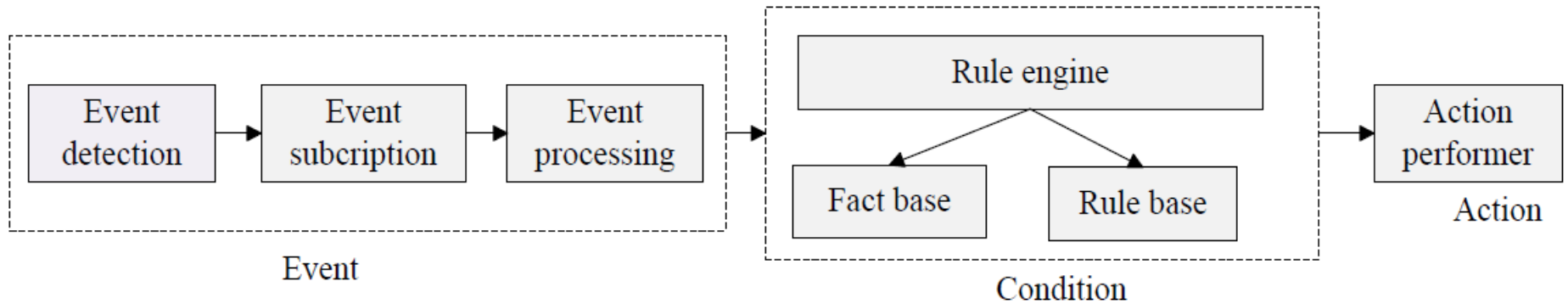
Event Pattern Language : "An Event Pattern Language (EPL) is a language used by CEP engines in order to describe the relations between events (Event Correlation) matching a specific pattern."

Operators :

- **Selection**
- **Projection** => Extraction of attributes
- **Window**
- **Conjunction** => 'AND'
- **Disjunction** => 'OR'
- **Sequence** => Ordering
- **Repetition**
- **Aggregation** => Specific operation on attributes (e.g: average)
- **Negation** => 'NOT'

Complex Event Processing

Event Condition Action Pattern :

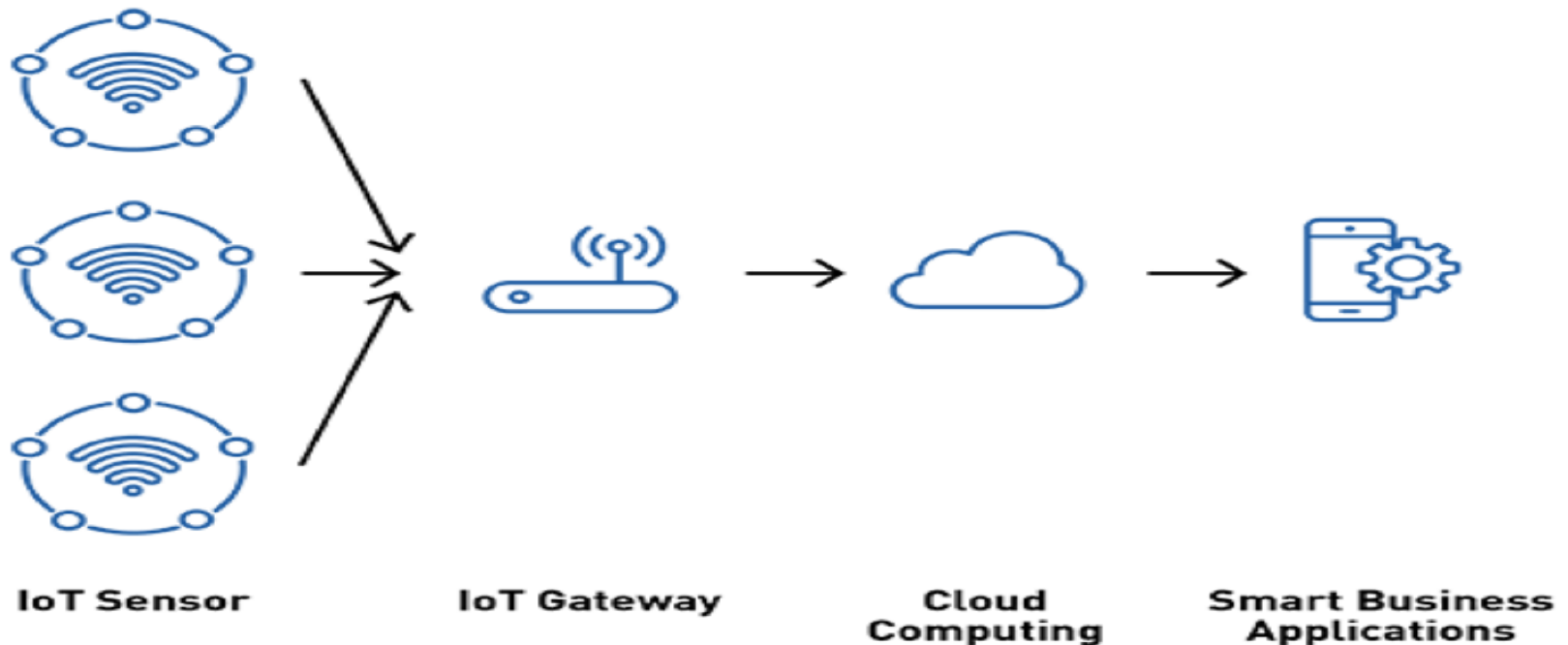


Computing Levels



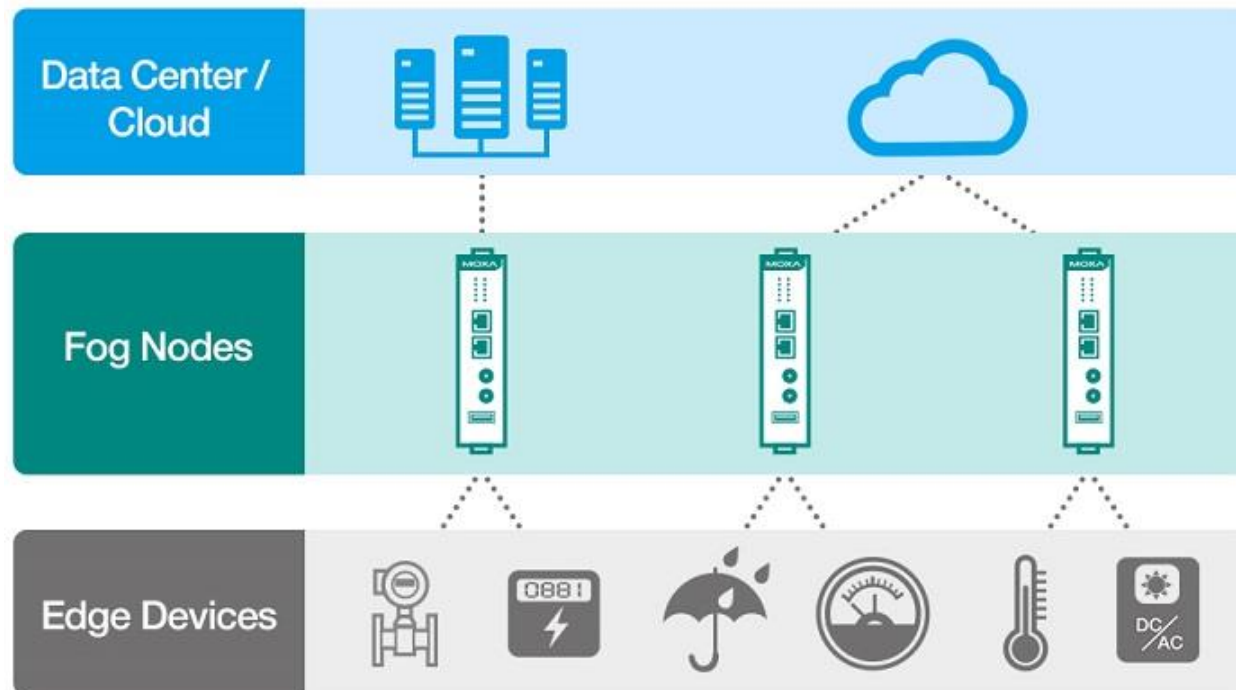
Computing Levels

Cloud Computing: "[...] On-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user."



Computing Levels

Fog Computing: "Both cloud computing and fog computing provide storage, applications, and data to end-users. However, fog computing has a closer proximity to end-users and bigger geographical distribution.."



Computing Levels

Edge Computing: "[...] Distributed computing paradigm which brings computation and data storage closer to the location where it is needed, to improve response times and save bandwidth."



Problematisation



ProblematISATION

”Which Internet of Things architecture is adapted for an evolving solution where the connected objects are growing day by day ? ”

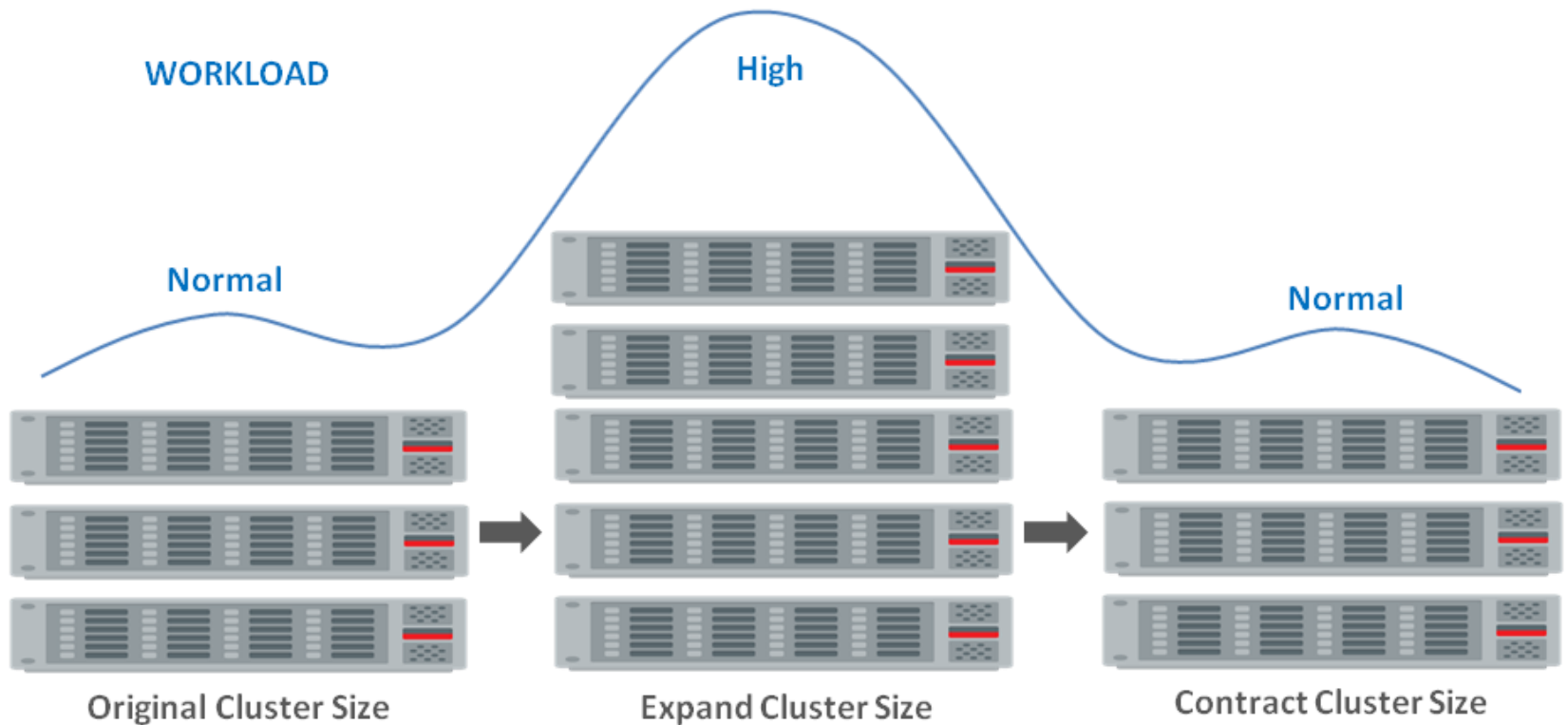
Aspects:

- Scalability
- Reliability
- Monitorability
- Extensibility

Problematisation

Scalability :

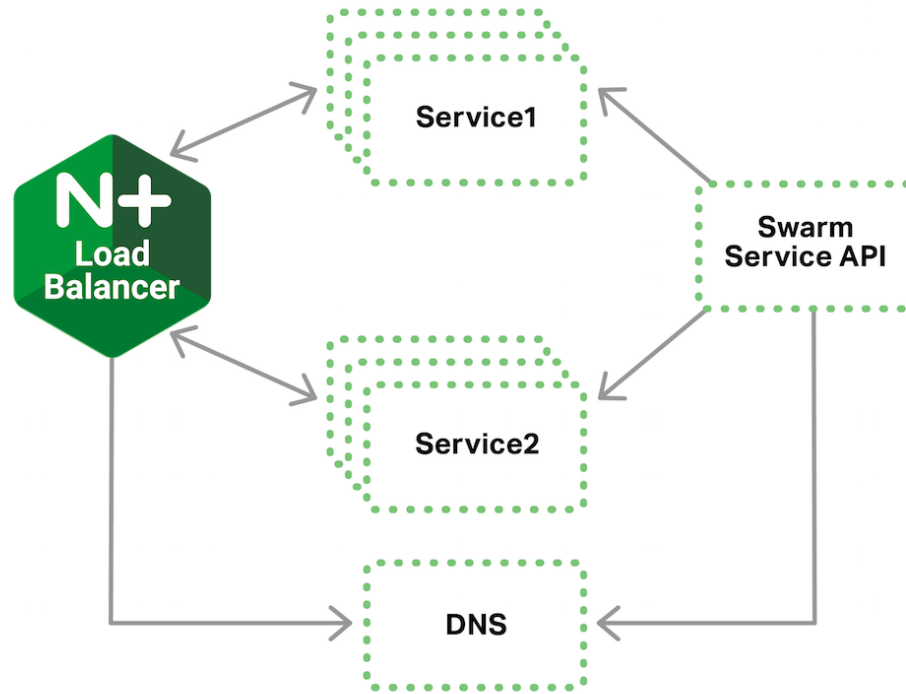
- Hardware scalability



Problematisation

Scalability :

- Software scalability



Problematisation

Reliability : "An IoT solution should be fault tolerant and as much the hardware and the applications must me robust."

500 Internal Server Error

Sorry, something went wrong.

A team of highly trained monkeys has been dispatched to deal with this situation.

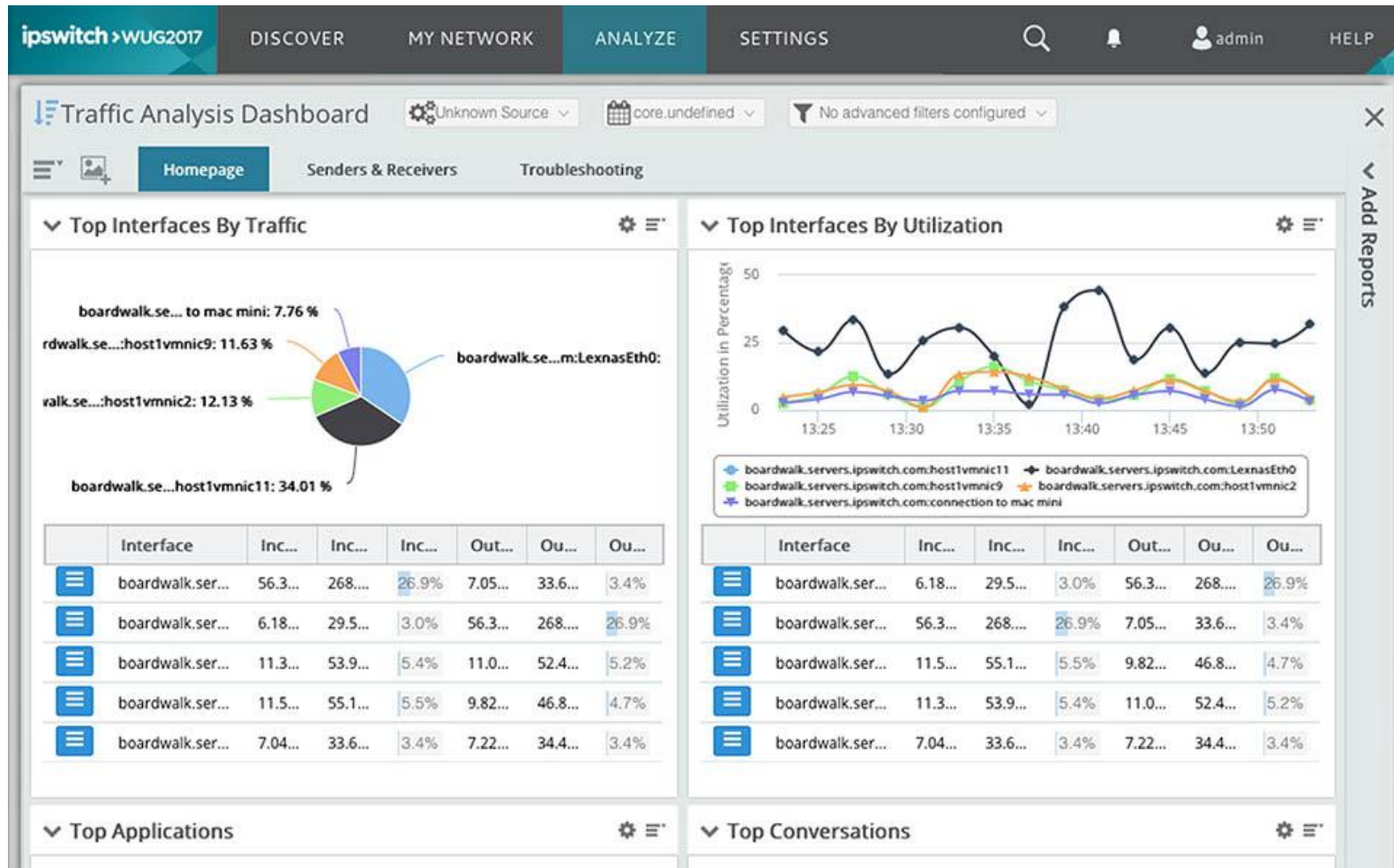
If you see them, send them this information as text (screenshots frighten them):

```
APkpgMWhlZDfqpUbbMqGVMXUaR3363zKv4rqo1SDGDTGe3zez-EeK3K1  
G6Ti3Cz4jwBRw0EIdVBAYfMvw1KxZXId92isD-hGMZzz4rc3WFOsj05y  
y3ZBzHC67_iYqUFh5wWdzXn41BKAK6dOW9_xZ-Y1zRUbHSlqFUYwUU4g  
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```



Problematisation

Monitorability :



ProblematISATION

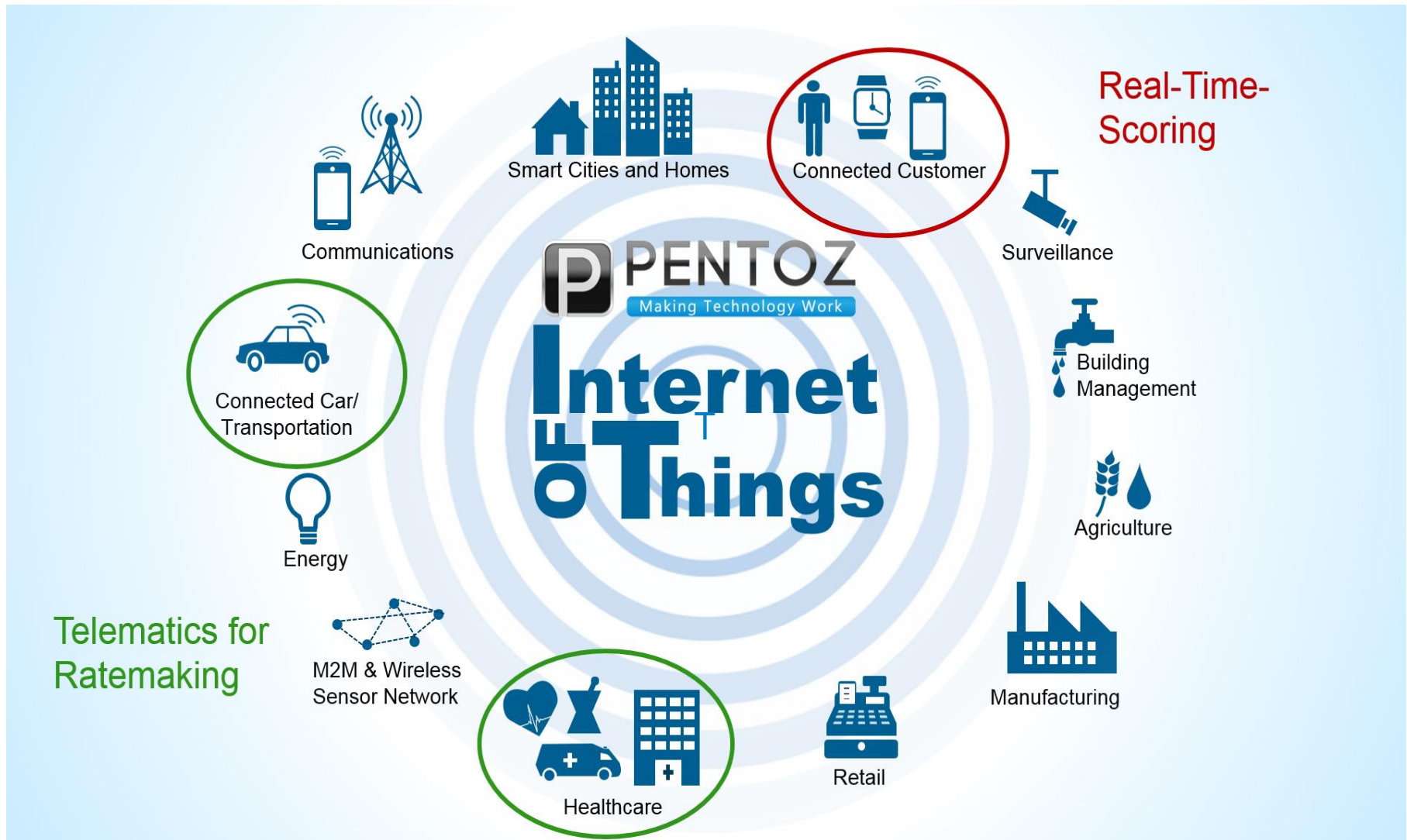
Extensibility :



Conclusion



Conclusion



Questions



Questions

