

IoT challenges

State of the art

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LIGM/ESIEE Paris

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Outline

1. Introduction

2. State of the art

3. First contribution

4. Second contribution

5. Conclusion

1. Context

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1. Introduction

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1. Context

Context

Introduction

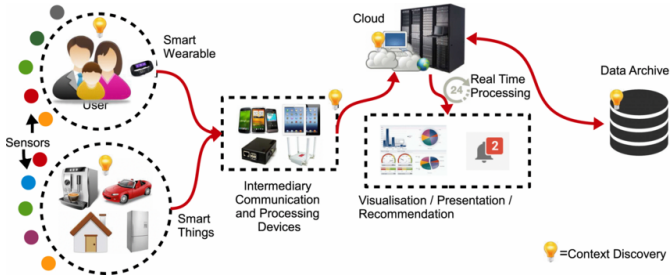


Figure 1: The IoT Platform

- ➡ Connect sensors to the gateway.^[1]
- ➡ Connect the gateway to the infrastructure.¹
- ➡ Store & Analyze sensors data.²

¹jhh

²P. Thubert, M. R. Palattella, and T. Engel, "6TISCH Centralized Scheduling: When SDN Meet IoT," in *2015 IEEE Conference on Standards for Communications and Networking (CSCN)*, 00033, Tokyo, Japan: IEEE, Oct. 2015, pp. 42–47.



Figure 2: The IoT problematics

- ➡ How to communicate sensors efficiently
 - ➡ IEEE 802.15.4, 6LowPAN
 - ➡ Throughput, Delay, Jitter, Loss rate and Availability.
- ➡ How to communicate sensors with the infrastructure efficiently
 - ➡ LPWAN, LoraWan
 - ➡ Heterogeneity ?
- ➡ How to extract knowledge from sensors data.
 - ➡ Data mining: Classification, Clustering
 - ➡ Deep learning: Machine learning



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 - ➡ Throughput, Delay, Jitter, Loss rate and Availability.
- ➡ How to communicate sensors with the infrastructure efficiently
 - ➡ LPWAN, LoraWan
 - ➡ **Heterogeneity ?**
- ➡ How to extract knowledge from sensors data.
 - ➡ Data mining: Classification, Clustering
 - ➡ Deep learning: Machine learning

Motivations

Introduction

➡ First Motivation

➡ First Motivation

- * First Motivation
- * Second Motivation

➡ Second Motivation

➡ Second Motivation

➡ First Motivation

➡ Second Motivation

➡ Third Motivation

➡ First Motivation

➡ Second Motivation

➡ Fourth Motivation

➡ First Motivation

➡ Second Motivation

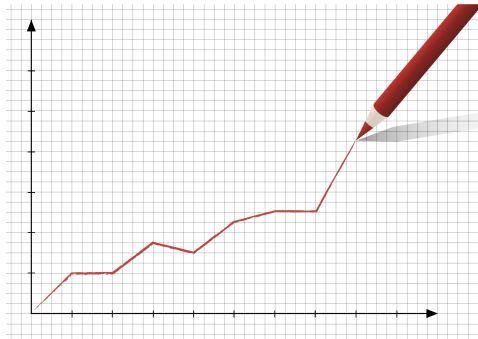


Figure 3

Goals

Introduction

- ➡ First goal
 - ➡ First goal
 - * First goal
 - * Second goal
 - ➡ Second goal
- ➡ Second goal
 - ➡ First goal
 - ➡ Second goal
- ➡ Third goal
 - ➡ First goal
 - ➡ Second goal
- ➡ Fourth goal
 - ➡ First goal
 - ➡ Second goal

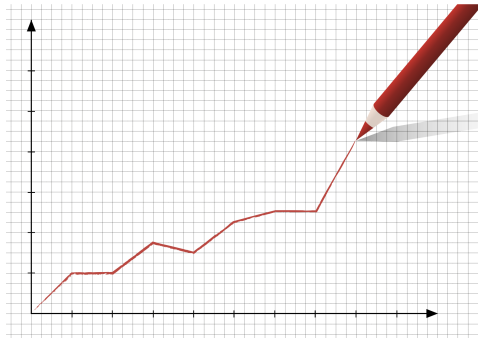


Figure 4

Challenges

Introduction

➡ First Challenge

- ➡ L'objectif est de réduire le taux de mortalité
- ➡ L'objectif est de rendre nos route plus sure

➡ Second Challenge

- ➡ Connecter les pietons et le vehicule
- ➡ augmenter la précision GPS
- ➡ réduire la latence

➡ Third Challenge

- ➡ Connecter les pietons et le vehicule
- ➡ augmenter la précision GPS
- ➡ réduire la latence

Contributions

Introduction

➡ First contribution

- ➡ Privacy settings
- ➡ Information propagation
- ➡

➡ Second contribution

- ➡ Privacy settings
- ➡ I

➡ Third contribution

- ➡ Privacy settings
- ➡ I

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State of the art

Standardization

Conclusion

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1. Related work
2. Contagion process
3. Experimentation
4. Results exploitation
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1. Related work

2. Contagion process

3. Experimentation

4. Results exploitation

5. Conclusion

2. Contagion process

Related work

Comparison

Paper	A1	A2	A3	A4

Table 1: An example table.

Related work

Comparison

Paper	A1	A2	A3	A4

Table 2: An example table.

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... (step 1)

Methods

➡ Privacy threats

- ➡ Privacy settings
- ➡ Information propagation
- ➡

➡ Privacy protection

- ➡ Privacy settings
- ➡ I

... (step 2)

Methods

➡ Privacy threats

- ➡ Privacy settings
- ➡ Information propagation
- ➡

➡ Privacy protection

- ➡ Privacy settings
- ➡ I

... (step 3)

Methods

➡ Privacy threats

- ➡ Privacy settings
- ➡ Information propagation
- ➡

➡ Privacy protection

- ➡ Privacy settings
- ➡ I

... (step 4)

Methods

➡ Privacy threats

- ➡ Privacy settings
- ➡ Information propagation
- ➡

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Experimentation

Experimentation

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Results

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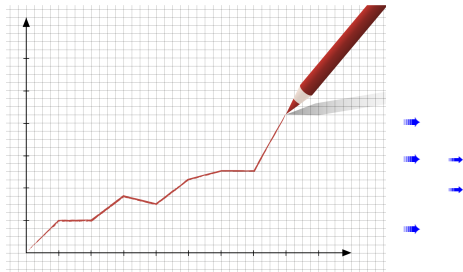


Figure 5

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Conclusion

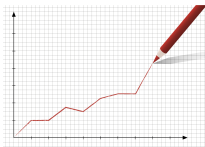


Figure 6: Cag.

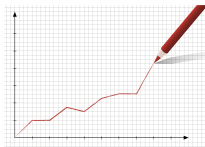


Figure 8: Cag.

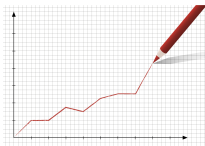


Figure 7: Cag.

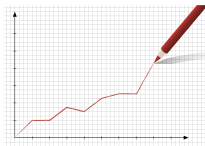


Figure 9: Cag.

Challenges

Conclusion

➡ Privacy threats

- ➡ Privacy settings
- ➡ Information propagation
- ➡

➡ Privacy protection

- ➡ Privacy settings
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Table 3: An example table.

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Table 4: An example table.

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Methods

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- 5. Conclusion

Results

Comparison

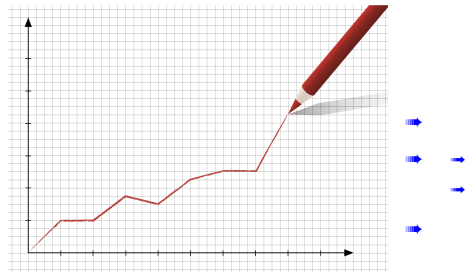


Figure 10

Outline

1. Introduction

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5. Conclusion

Conclusion

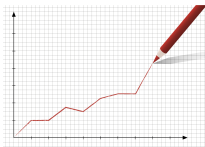


Figure 11: Cag.

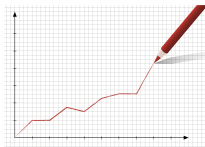


Figure 13: Cag.

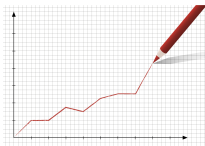


Figure 12: Cag.

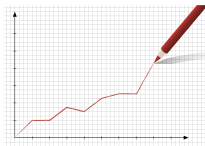


Figure 14: Cag.

Challenges

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- ➡ Information propagation
- ➡

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Conclusion

Routing protocol	Control Cost	Link Cost	Node Cost
OSPF/IS-IS	✗	✓	✗
OLSRv2	?	✓	✓
RIP	✓	?	✗
DSR	✓	✗	✗
RPL	✓	✓	✓

Table 5: Routing protocols comparison _rpl2_

Application protocol	Rest-Full	Transport	Publish/Subscribe	Request/Response	Security	QoS	Header size (Byte)
COAP	✓	UDP	✓	✓	DTLS	✓	4
MQTT	✗	TCP	✓	✗	SSL	✓	2
MQTT-SN	✗	TCP	✓	✗	SSL	✓	2
XMPP	✗	TCP	✓	✓	SSL	✗	-
AMQP	✗	TCP	✓	✗	SSL	✓	8
DDS	✗	UDP TCP	✓	✗	SSL DTLS	✓	-
HTTP	✓	TCP	✗	✓	SSL	✗	-

Table 6: Application protocols comparison

Conclusion

Routing protocol	Control Cost	Link Cost	Node Cost
OSPF/IS-IS	✗	✓	✗
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HTTP	✓	TCP	✗	✓	SSL	✗	-

Table 6: Application protocols comparison

Thank you !

Challenges

Conclusion

⇒ Privacy threats

- ⇒ Privacy settings
- ⇒ Information propagation
- ⇒

⇒ Privacy protection

- ⇒ Privacy settings
- ⇒ I

Challenges

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Thank you !

References

- [1] P. Thubert, M. R. Palattella, and T. Engel, "6TISCH Centralized Scheduling: When SDN Meet IoT," in *2015 IEEE Conference on Standards for Communications and Networking (CSCN)*, 00033, Tokyo, Japan: IEEE, Oct. 2015, pp. 42–47 (p. 4).