

Valorisation de publication

Pourquoi faire une these ?

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IoT devices

Context

Connected devices (billions)



	2016	2022	CAGR
Wide-area IoT	0.4	2.1	30%
Short-range IoT	5.2	16	20%
PC/laptop/tablet	1.6	1.7	0%
Mobile phones	7.3	8.6	3%
Fixed phones	1.4	1.3	0%
	16 billion	29 billion	10%

Higher Categories



Figure 1: IoT devices [1].

IoT platforms

Context

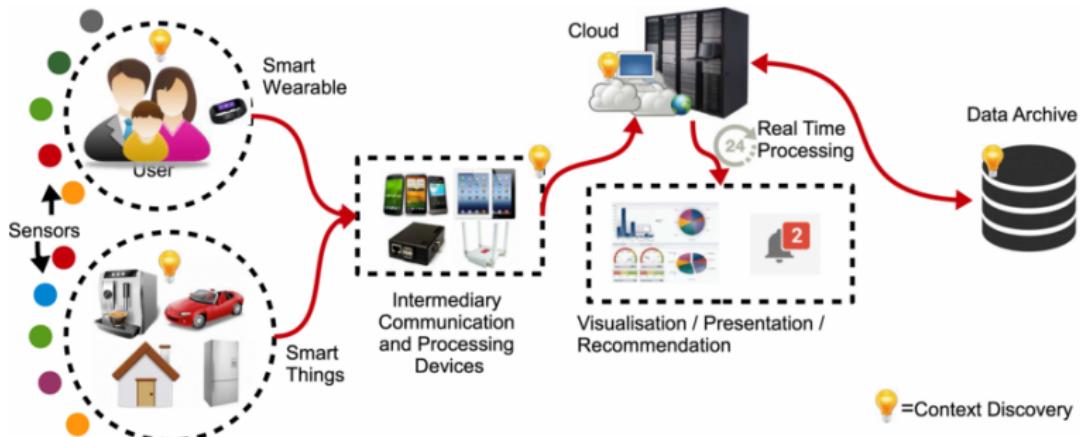


Figure 2: IoT platform.



Figure 3: IoT challenges.

IoT applications requirements

Context

Challenges/Applications	Grids	EHealth	Transport	Cities	Building
Resources constraints	✗	✓	✗	-	✗
Mobility	✗	-	✓	✓	✗
Heterogeneity	-	-	-	✓	✗
Scalability	✓	-	✓	✓	-
QoS constraints	-	-	✓	✓	✓
Data management	-	✗	✓	✓	-
Lack of Standardization	-	-	-	-	✓
Amount of attacks	✗	✗	✓	✓	✓
Safety	-	✓	✓	-	✓

Table 1: Main IoT challenges [2] [3]



Figure 4: IoT Applications.

IoT wireless communication

Context

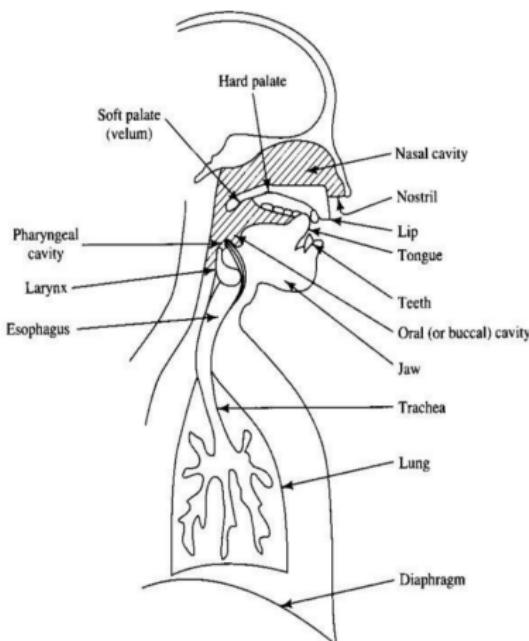


Figure 5: Human voice.

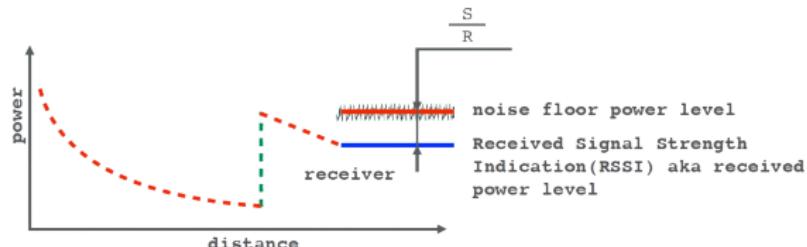


Figure 6: SNR & RSSI.



Figure 7: Time on air.

IoT wireless communication

Context

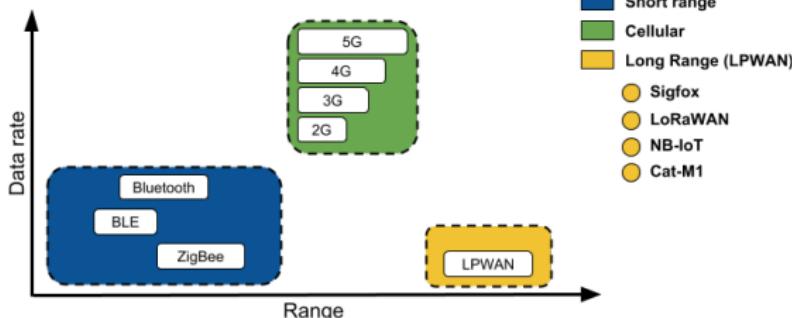


Figure 8: Wireless communication diversity.

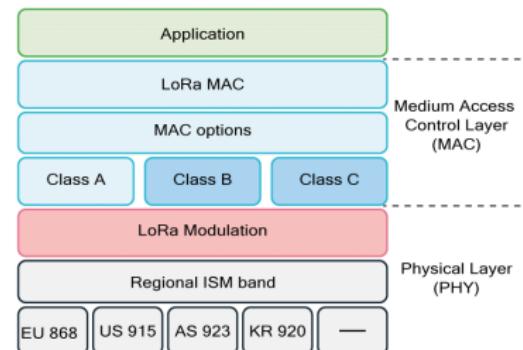


Figure 9: LoRa and LoraWan stack.

Problematic

Where is the problem ?

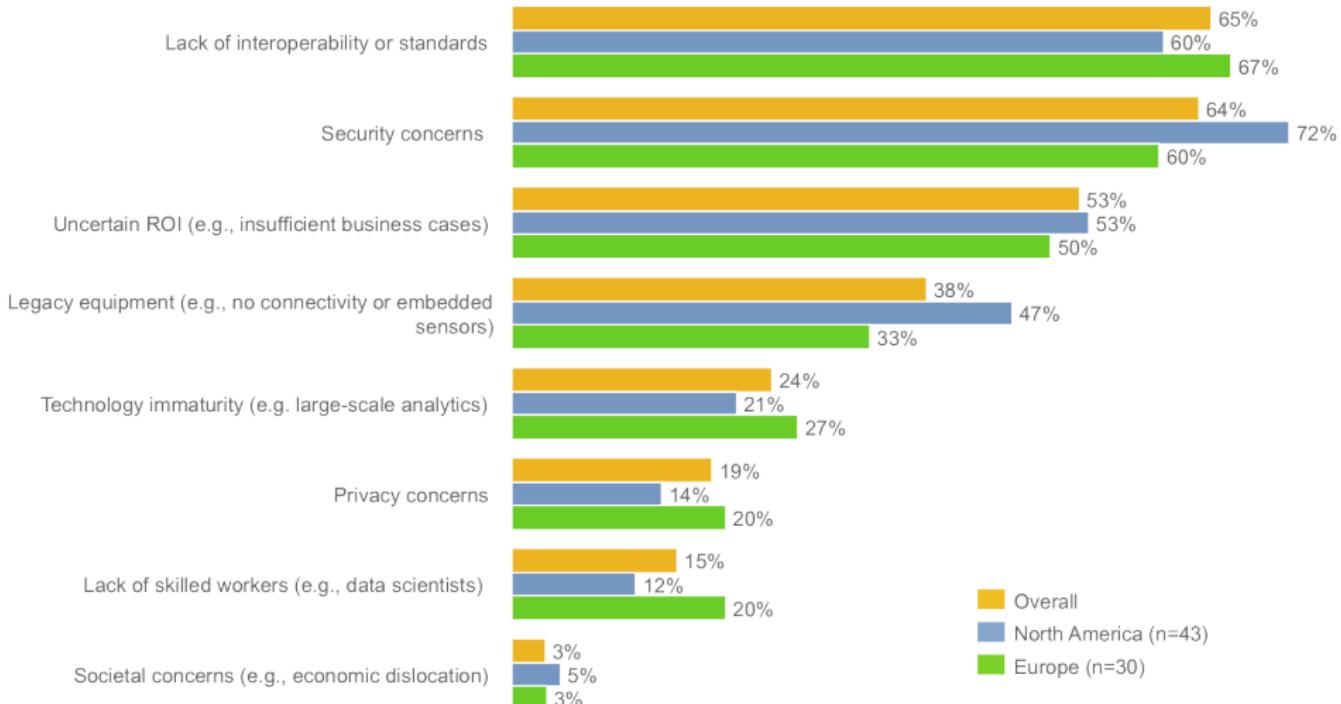


Figure 10: Key barriers in adopting IoT in the industry [4].

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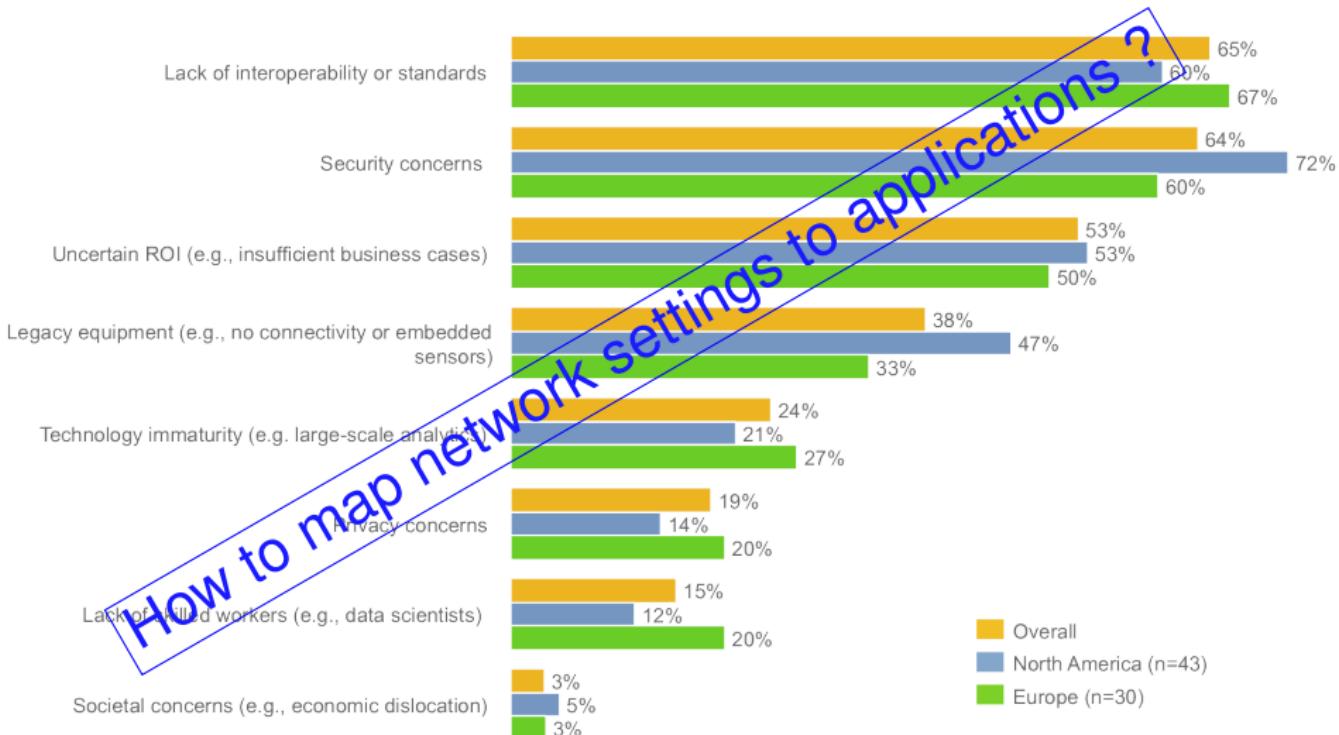


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Network slicing

Motivations

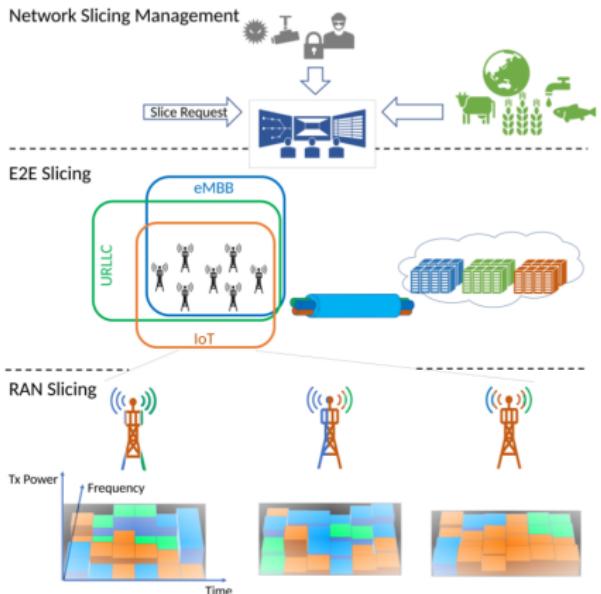


Figure 11: Network slicing [5].

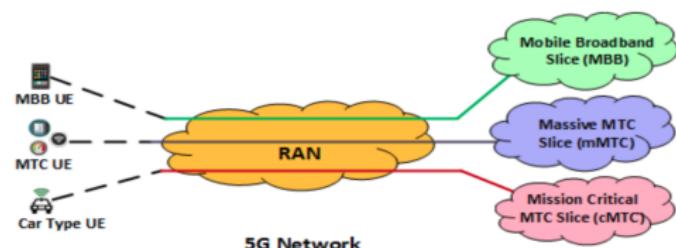
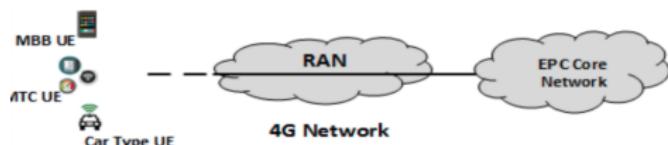


Figure 12: Network slicing concept [6].

Contribution

Motivations

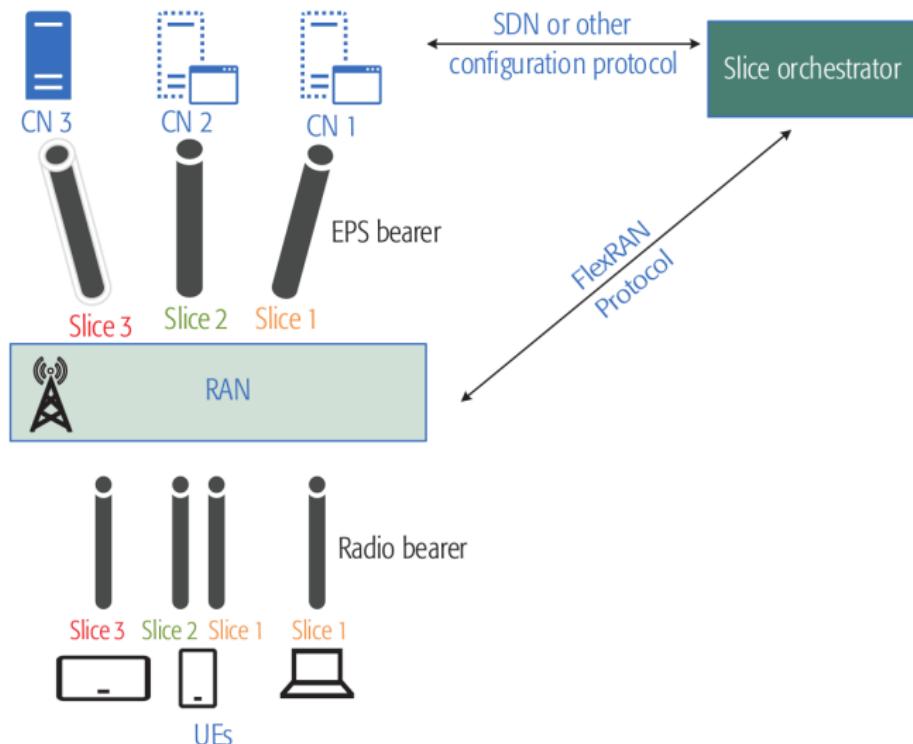


Figure 13: Network slicing [7].

Contribution

Contributions

→ Use cases (Application Requirements)

- Smart building: Voice, Images, Text.

→ Environments

- Rural/Urban
- Static/Mobile
- Temperature

→ Scenarios

- Application protocol (MQTT, COAP, XMPP)
- Network protocol (Star, Mesh)
- MAC protocol (LoraWan, Sigfox, ...)

→ Input:

- Service QoS metrics requirements
- MAC configuration (SF, CR, BW, ...)
- Network QoS metrics

→ Algorithms:

- MADM
 - * Ranking methods
 - * Ranking & weighted methods
 - Game theory
 - * Users vs users
 - * Users vs networks
 - * Networks vs network
 - Fuzzy logic
 - * as a score method
 - * another theory
 - Utility function
 - * 1
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- ### → Outputs:
- Ranked networks

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Thank you !

References

- [3] V. Prasanna Venkatesan, C. Punitha Devi, and M. Sivarajanji. " Design of a Smart Gateway Solution Based on the Exploration of Specific Challenges in IoT ". In: *2017 International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC)*. 2017 International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) (I-SMAC). 00004. Palladam, Tamilnadu, India: IEEE, Feb. 2017, pp. 22–31.
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