

IoT in Electric Power Industry

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INTRODUCTION

Owing to great development in the field of sensory devices and big improvements in energy efficiency of electronics and wireless communication devices today there is a wide range of cost-efficient devices for the use in all aspects of our modern lives, such as environmental monitoring, infrastructure management, industry, medicine and health, building and home automation, transport, etc.

The Internet of Things (IoT) is a term for networks of various equipment (things) for collecting, receiving and sending data through existing internet.

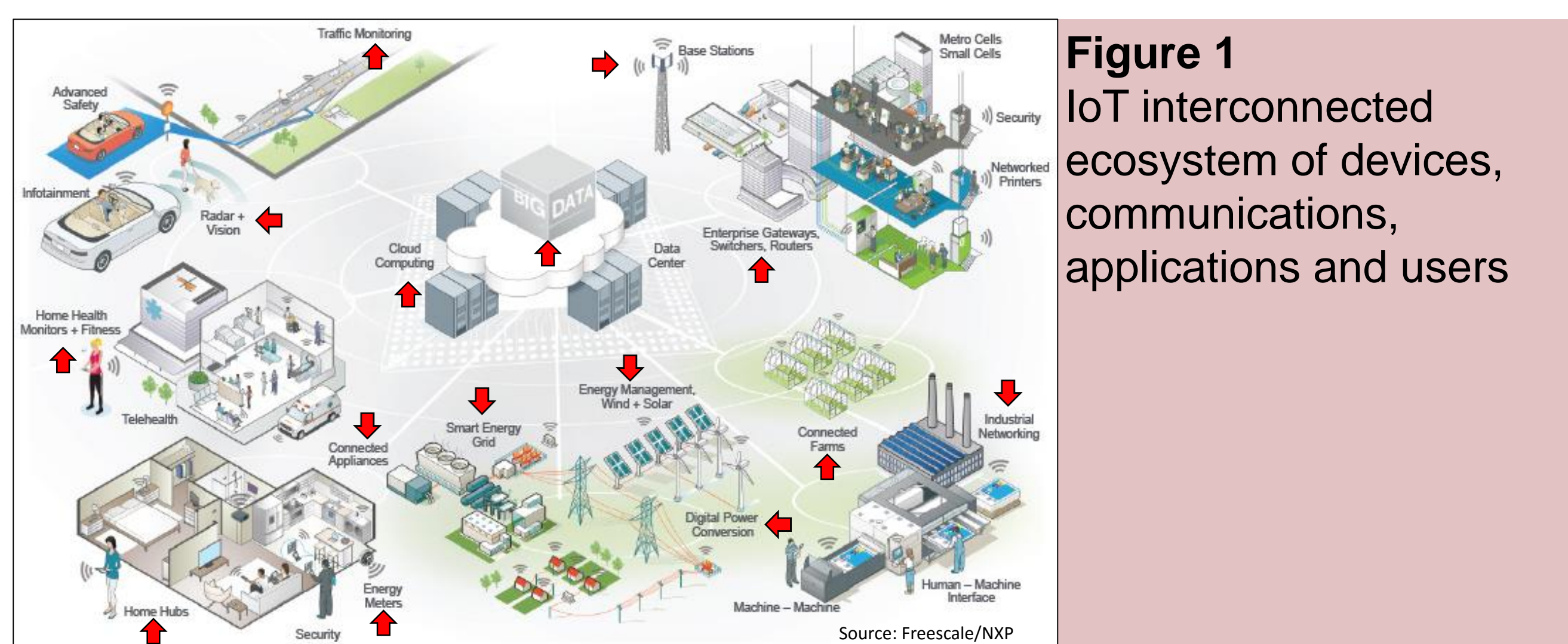
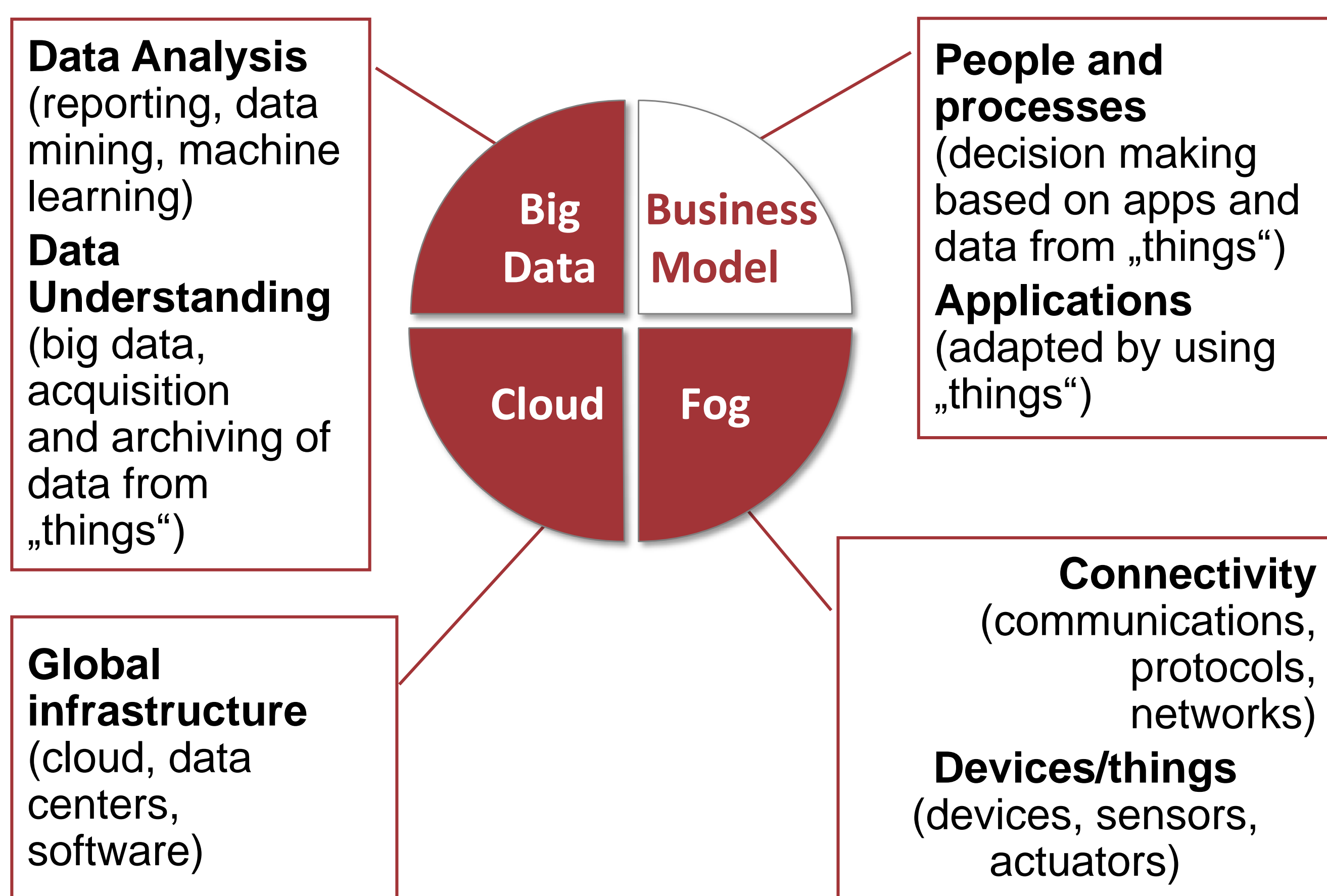


Figure 1
IoT interconnected ecosystem of devices, communications, applications and users

THE IoT ECOSYSTEM



WIRELESS CONNECTIVITY

An example of wireless connectivity technology for IoT network is LoRa as a communication medium. LoRa stands for Low power – Long Range radio. LoRaWAN is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery operated things in regional, national or global network. Figure 2 shows the position of LoRa within wireless connectivity technologies.

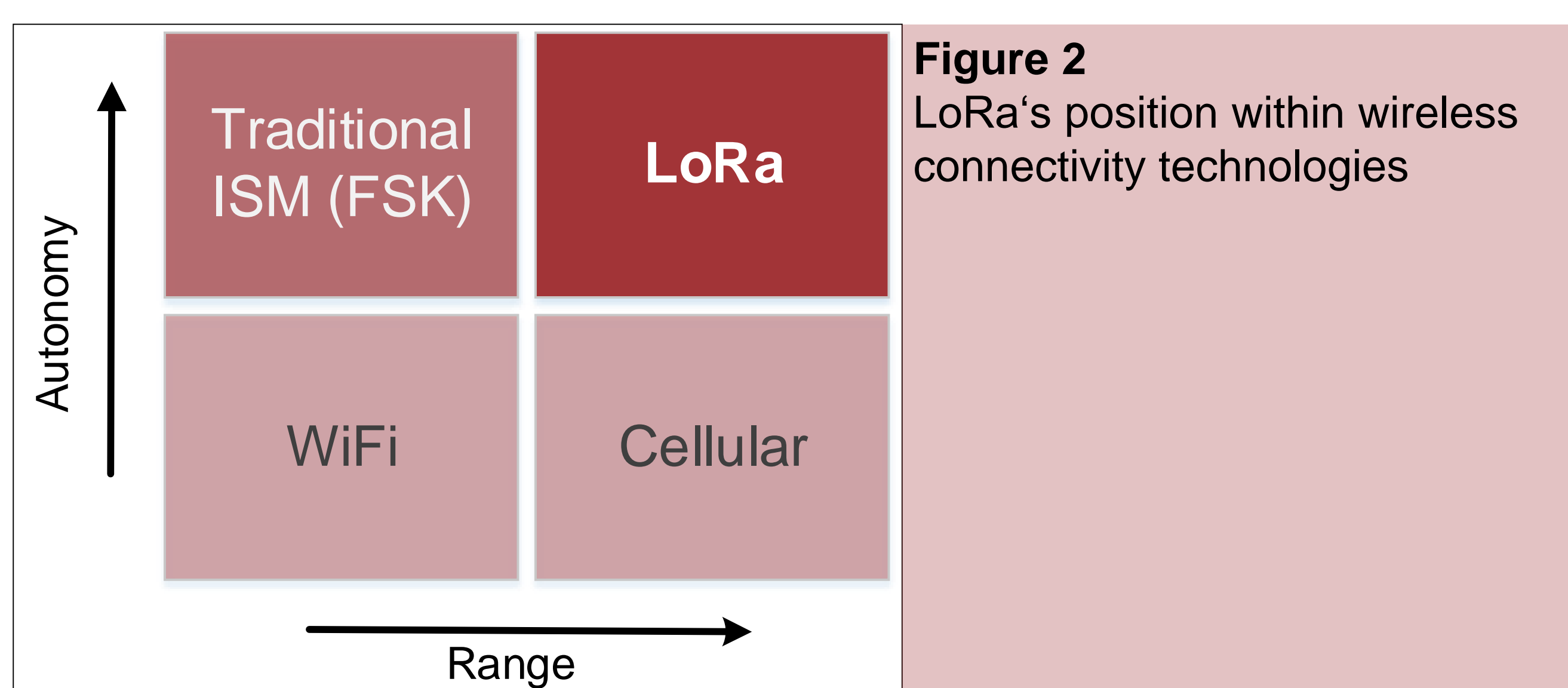


Figure 2
LoRa's position within wireless connectivity technologies

MONITORING IN ELECTRIC POWER INDUSTRY

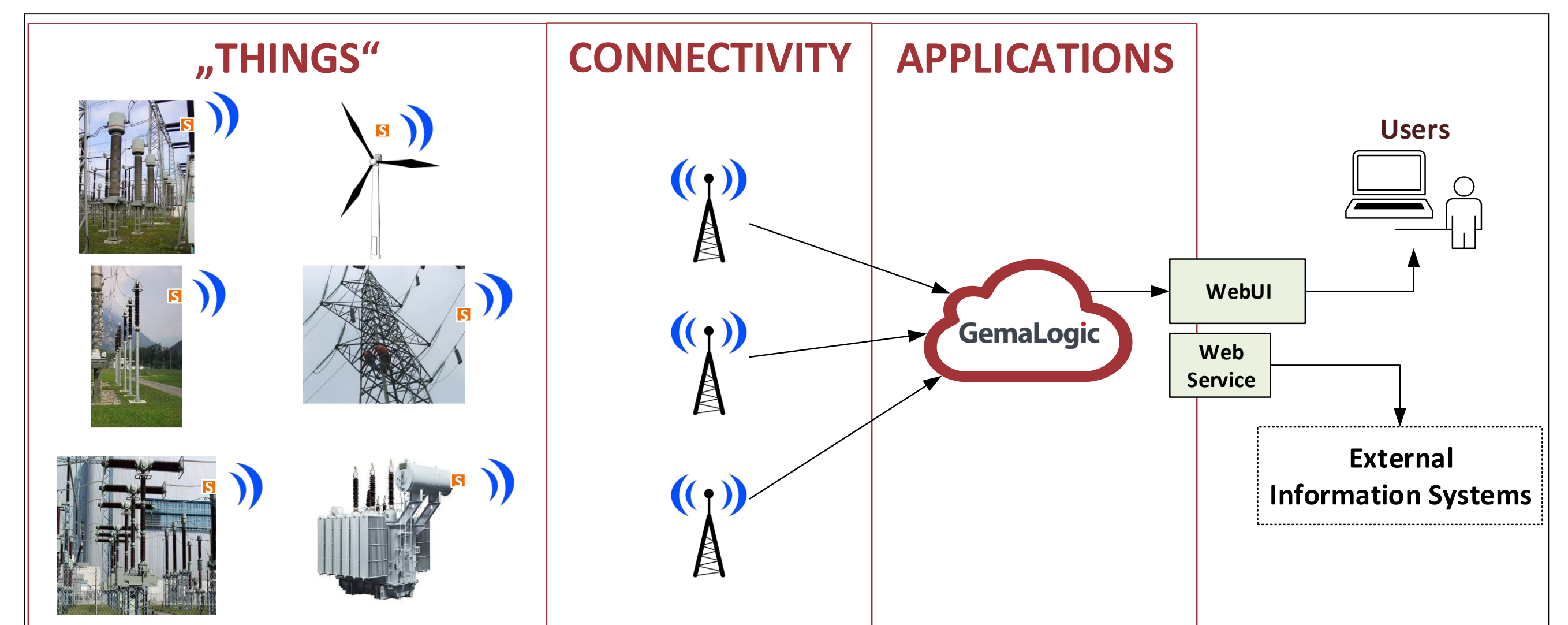


Figure 3
Possible use cases for monitoring equipment with wireless connected sensors

Monitored Parameter	Monitored Equipment						Table 1: Possible use cases for monitoring equipment with wireless connected sensors
	Transformer	Circuit Breaker	Surge Arrester	Cable	Conductor	Instrument Transformer	
Temperature	x	x		x	x	x	
Pressure	x	x				x	
Leakage current			x				
Gas leakage		x					
Partial discharges	x			x		x	
No. of operations		x	x				

EXAMPLE: MONITORING OF SURGE ARRESTERS IN SUBSTATIONS AND ON POWERLINES

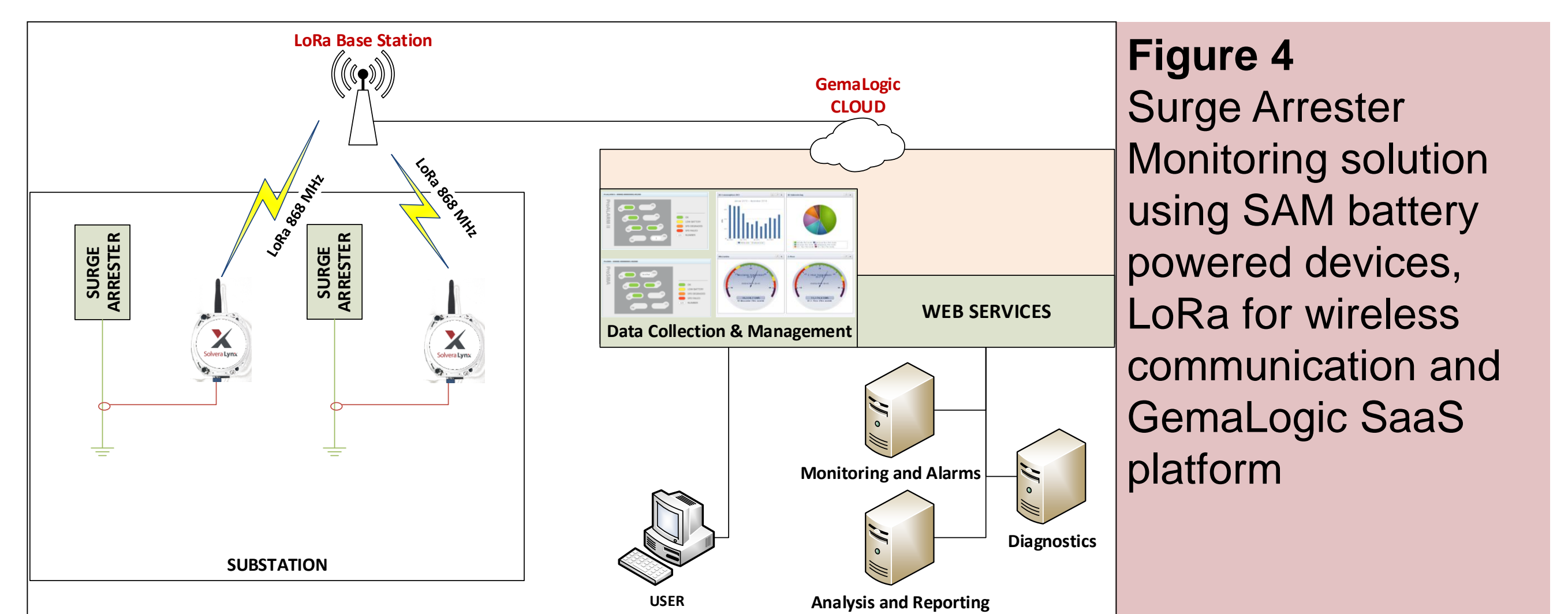


Figure 4
Surge Arrester Monitoring solution using SAM battery powered devices, LoRa for wireless communication and GemaLogic SaaS platform

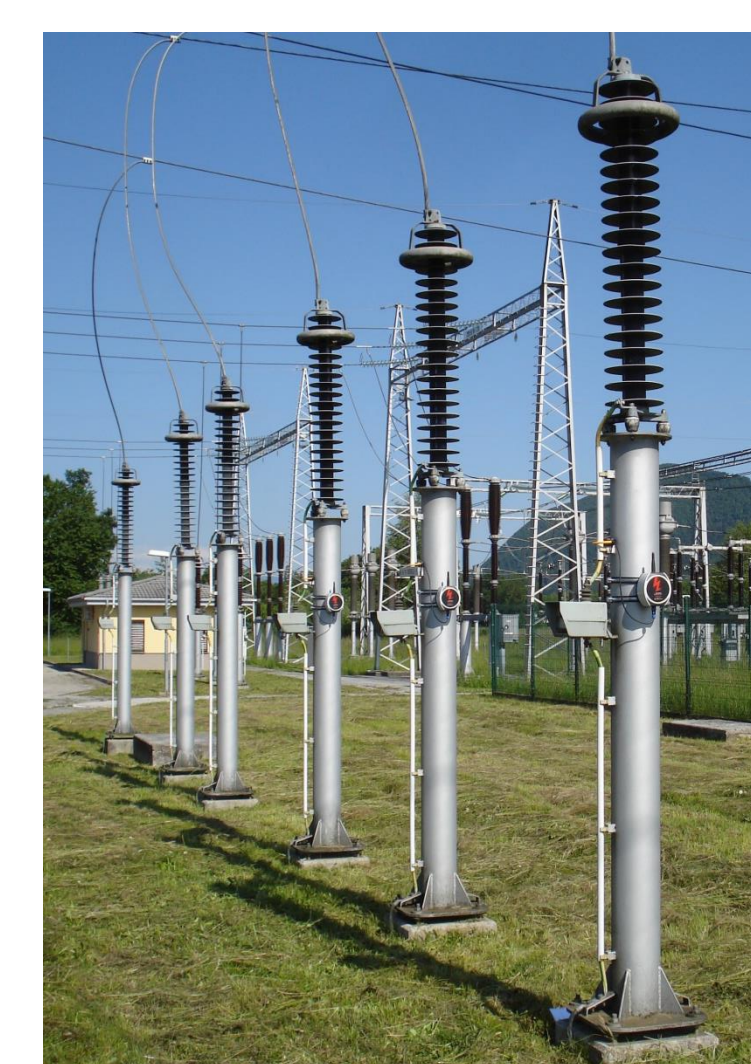


Figure 5
Three Surge Arrester Monitors installed in a Substation

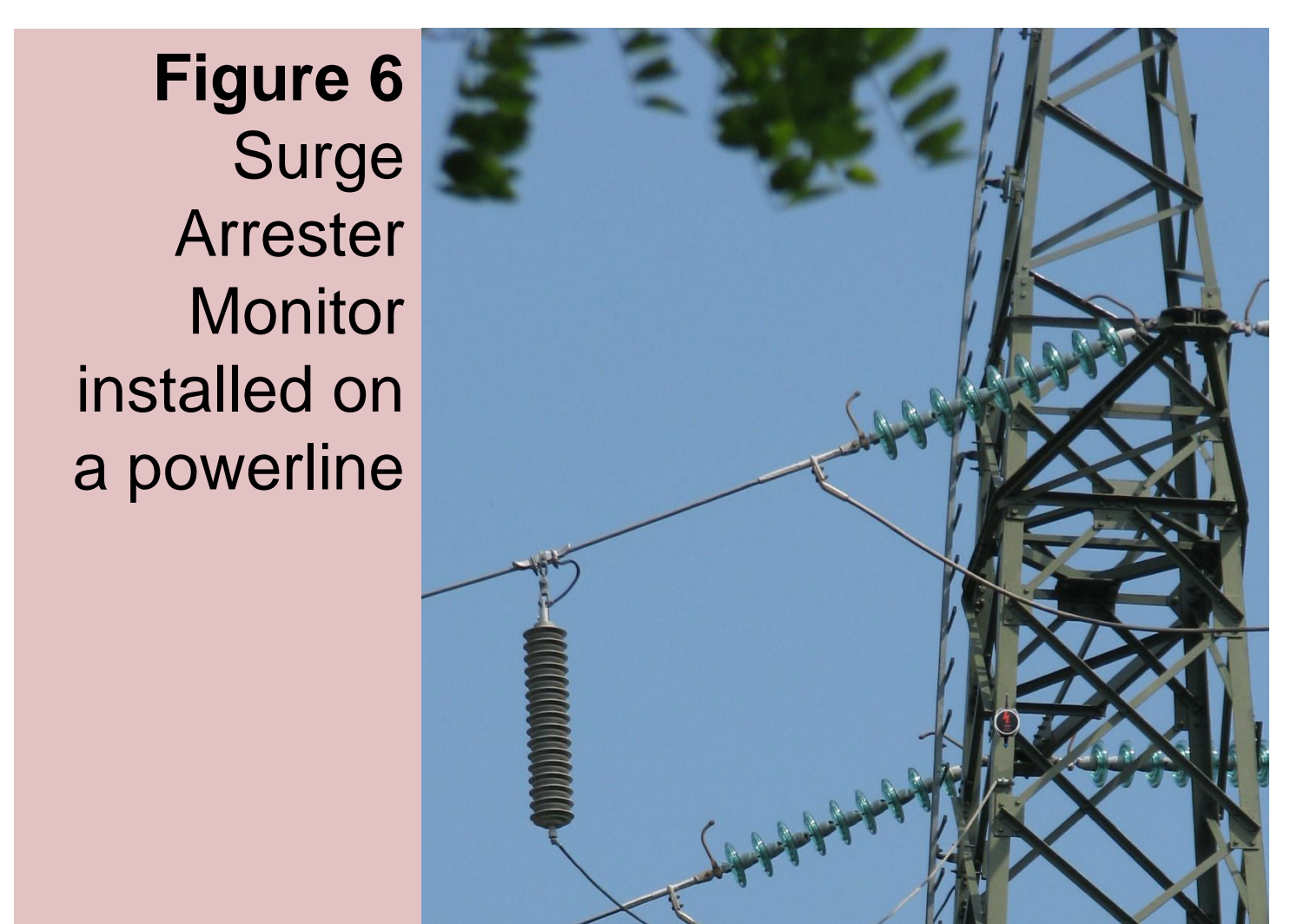


Figure 6
Surge Arrester Monitor installed on a powerline

SUMMARY

Connecting multitude of smart devices to the internet and acquiring new data and information in a cost effective and efficient way provides the ground for exciting new applications and insights that were not possible before. It spurs new business models, from which everyone can benefit – the end users, the providers of services, the providers of equipment and networks.

The data gathered from monitoring devices can be stored and presented in cloud platform and communicated forward to other information systems.