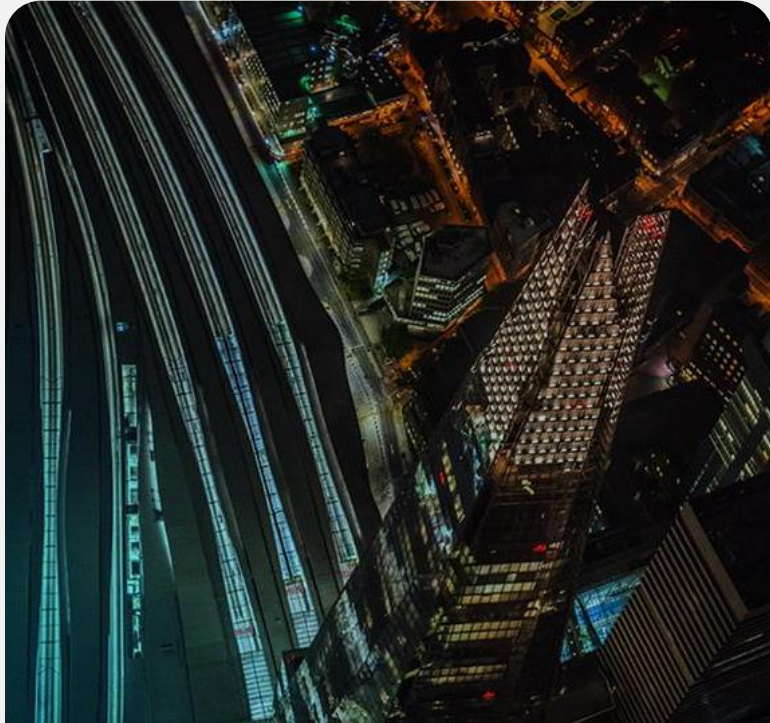


SMC-103: Why Wi-SUN is Ideal for Smart Street Lighting

Sérgio Carvalhosa | September 2021



Today's journey



GETTING TO KNOW US

How a century old company thrives to provide aesthetical and sustainable lighting solutions to the most complex challenges for customers in a variety of markets.



THE JOURNEY TO WI-SUN

How Wi-SUN can play a vital role in the design, management and engineering of long lasting and impactful smart city solutions that help communities thrive while safeguarding the future.



WHAT WE LEARNED

We hope to impart some of the practical lessons we learned through the process of Wi-SUN adoption and provide some insight on how like-minded companies can pave the road to WI-SUN.

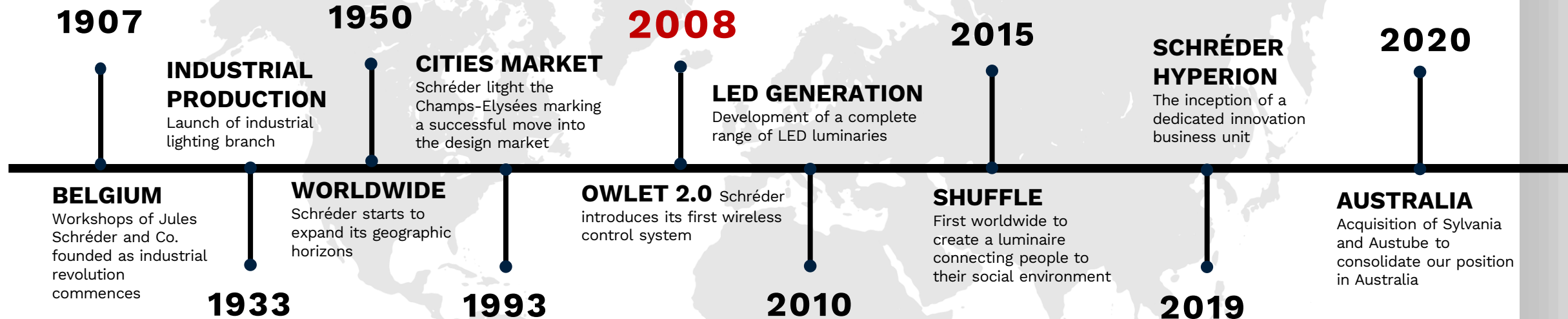
Schröder

The leading independent outdoor lighting solution provider worldwide

Experts in lightability™

113

Years of experience



5

Continents

+70

Countries

2,600

Experts across the Globe

8

R&D Centers

Introduction to Streetlighting

Public lighting is an indisputable part of every city.

- It plays a vital role in citizen and road safety, bringing people out to fully enjoy their cities
- Urban and residential streets must create public realms that let people interact with each other and the environment.



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but there is more...



beyond lighting



Developing the future of smart cities from Lisbon to the world

Schröder
HYPERION

Schröder Hyperion Smart City Platforms

Smart Lighting for Smart Spaces

Schröder
HYPERION



Shuffle

Connecting your urban infrastructure to people, through a modular smart pole



Owlet

The controller that connects your lights and urban infrastructure



EXEDRA The platform to provide insight and management of your smartcity

Schröder Hyperion Smart City Software Platform

After working with cities around the world for the past decades we learned a few things.

Cities want to...

1

Improve sustainability
and monitor savings

2

Deploy simple,
robust and resilient
solutions

3

Install open and
interoperable systems
that don't lock them in

4

Be able to adapt
system architecture
to their local
constraints

5

Be future proof
regarding the
technology they
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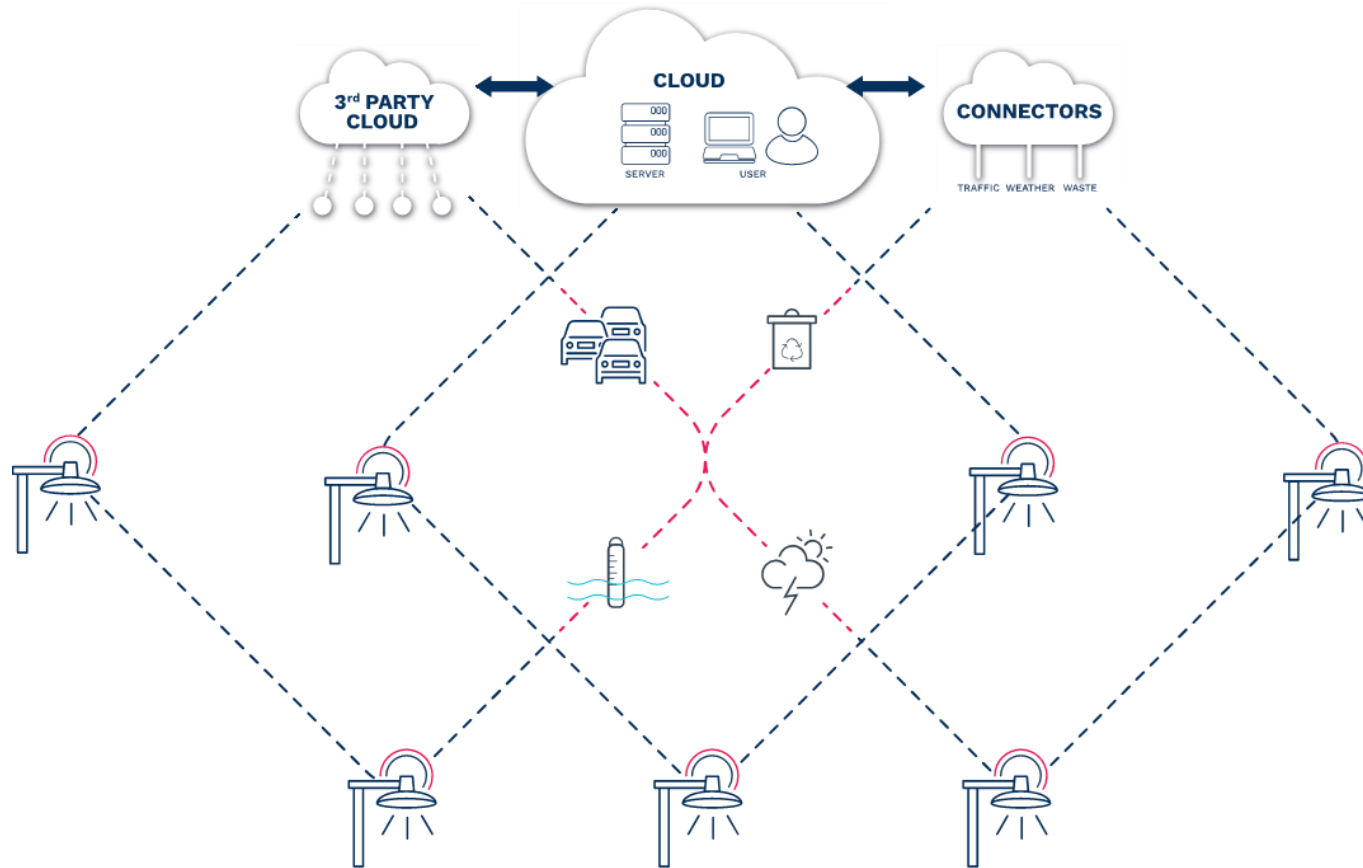
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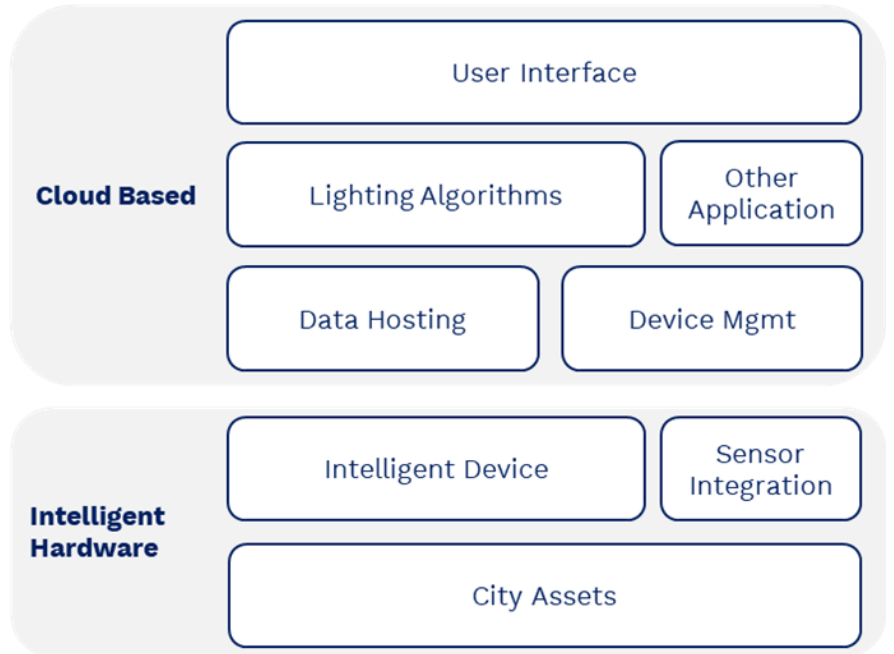
Systems need to be built from the ground up embodying these needs and values, this starts with the technology choices we make..

... particularly on how devices communicate

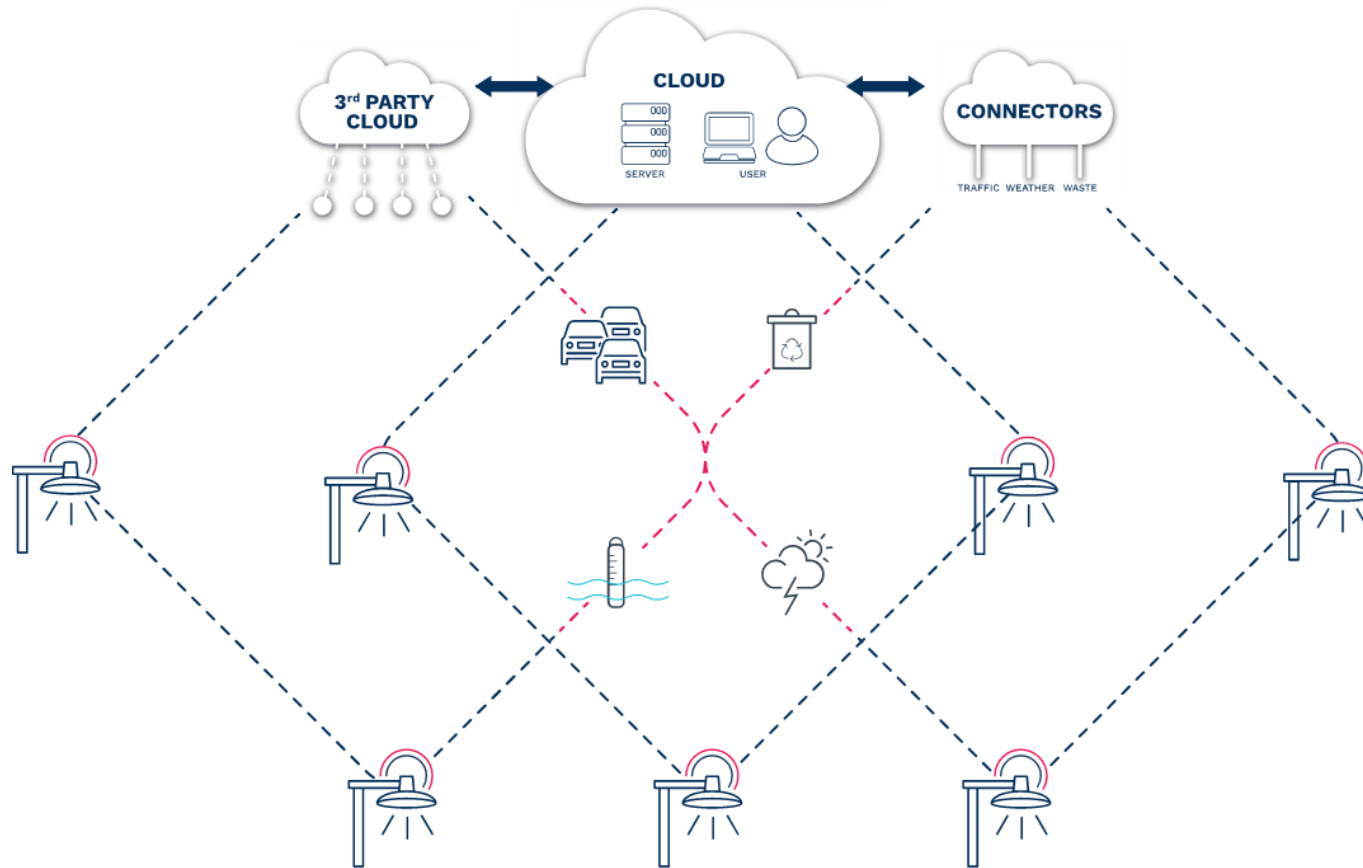
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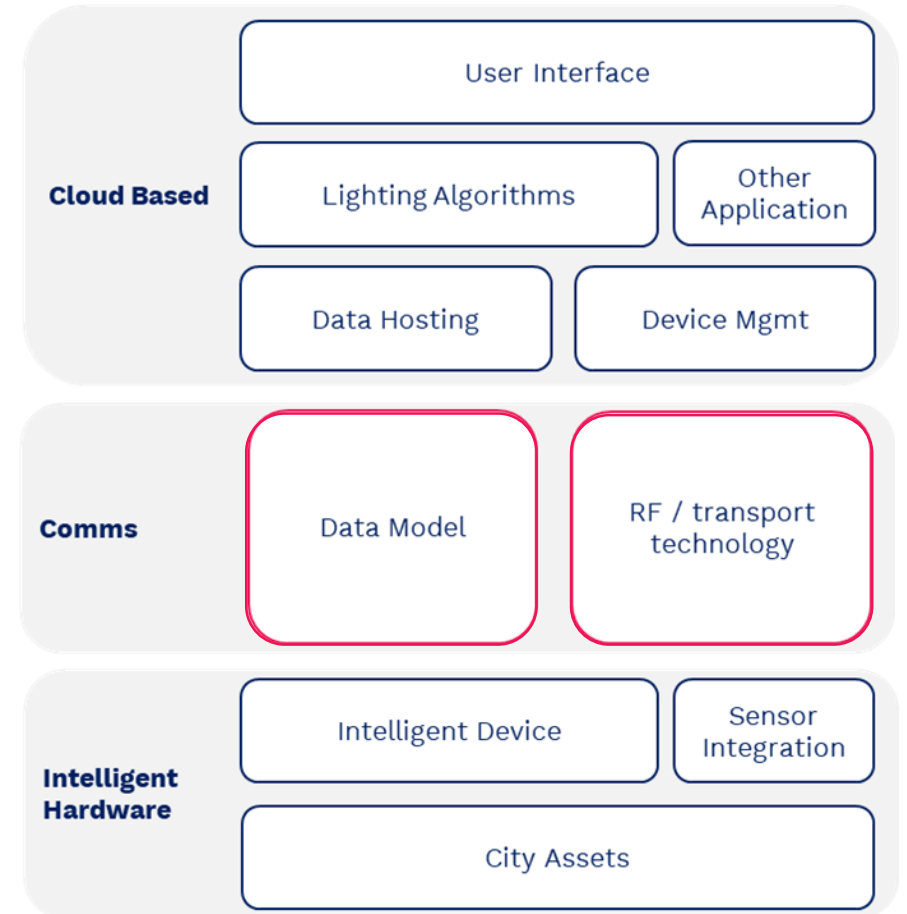
Break vertical silos in Smartcity solutions by normalizing communications



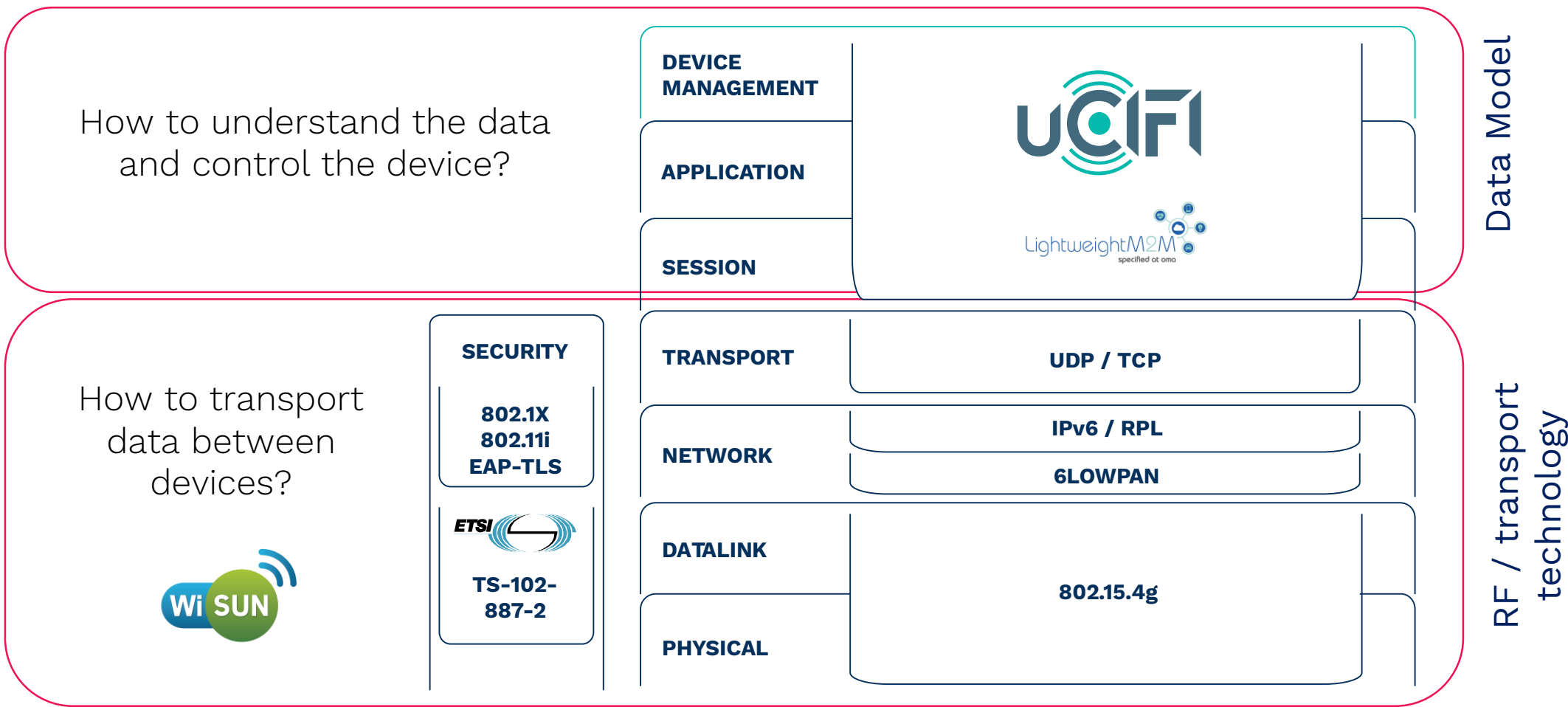
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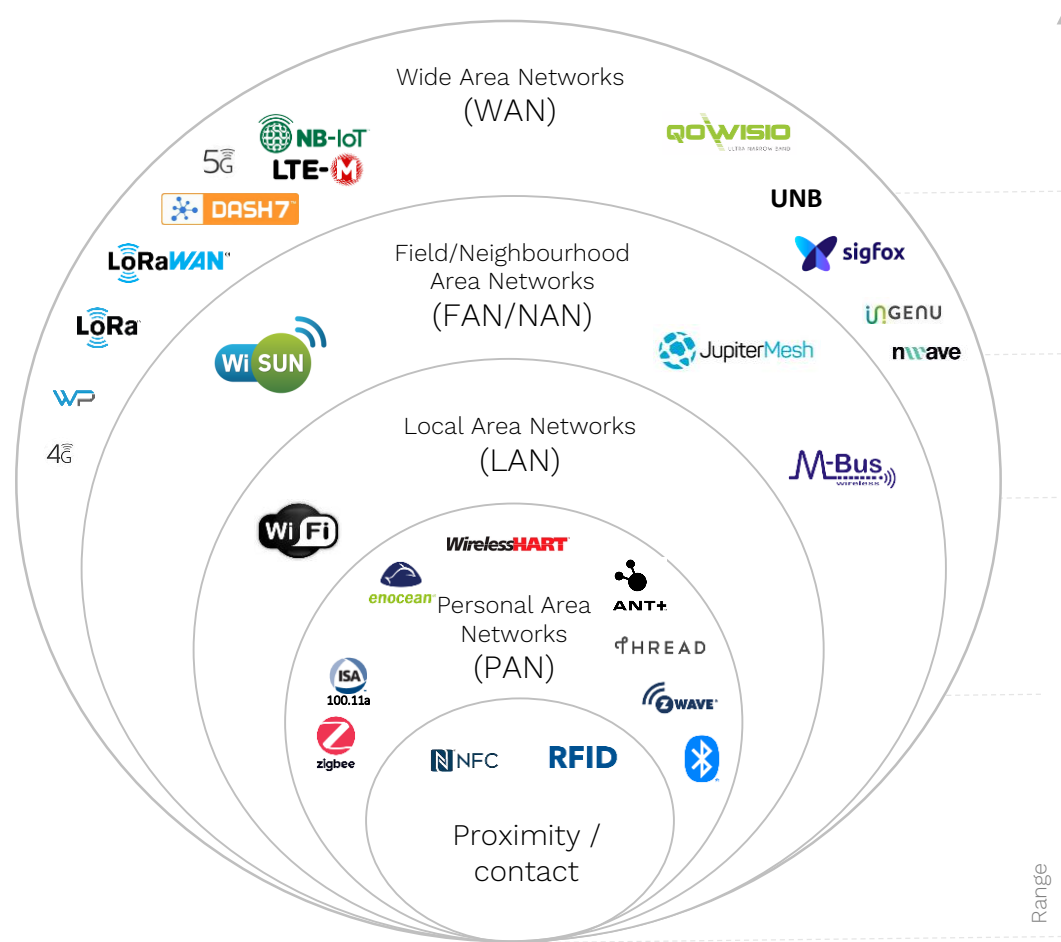


Cities want to...Install open and interoperable systems that don't lock them in



How to transport data between devices?

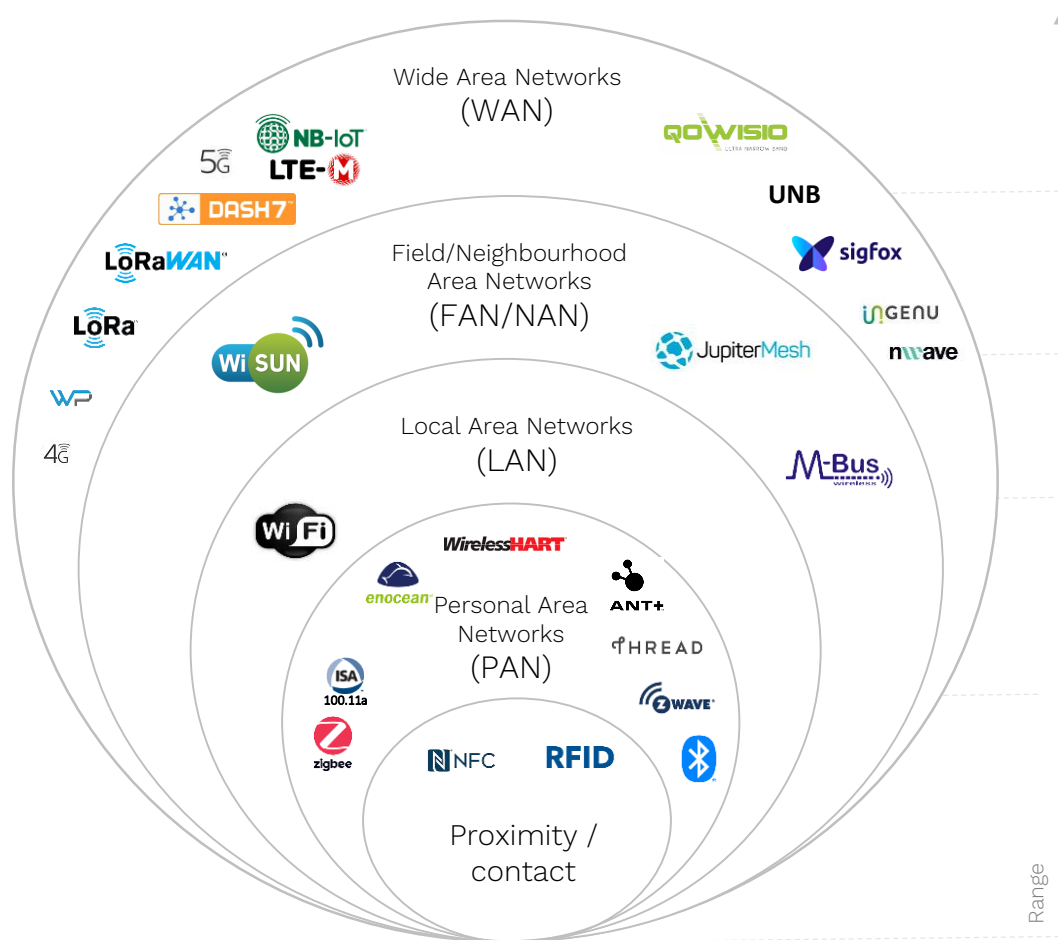
Looking to the market..



Communication Technologies

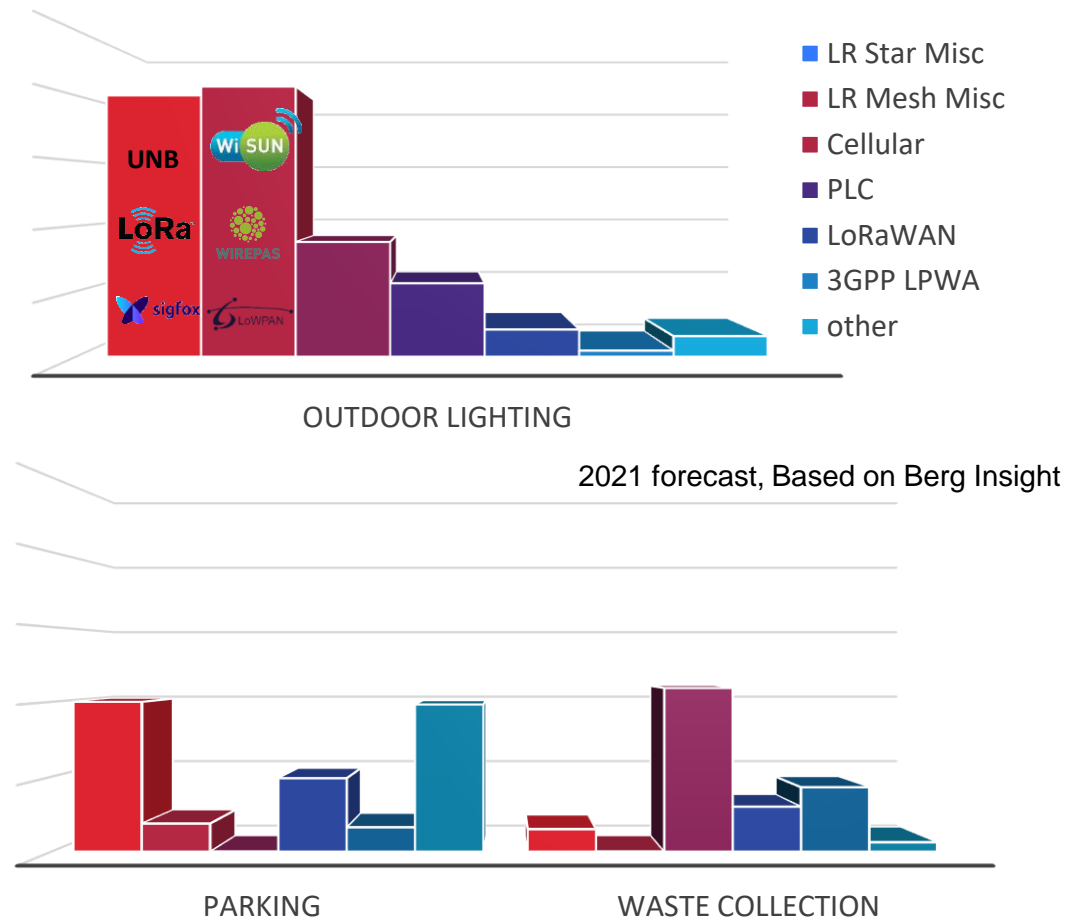
How to transport data between devices?

Looking to the market..



Communication Technologies

A Tale of Market fragmentation



How to transport data between devices?

Start by knowing where you stand..

Understanding the Smartcity ecosystem

LARGE
Installations

An aerial night photograph of a city roundabout. The roundabout has a central green space with a white circular path and a small building in the center. The surrounding area is densely packed with buildings and streets, illuminated by city lights. A white circle is drawn around the central green space, highlighting it as a 'LARGE Installation'.

How to transport data between devices?

Start by knowing where you stand..

Understanding the Smartcity ecosystem

LARGE
Installations

Dynamic Physical
environments

How to transport data between devices?

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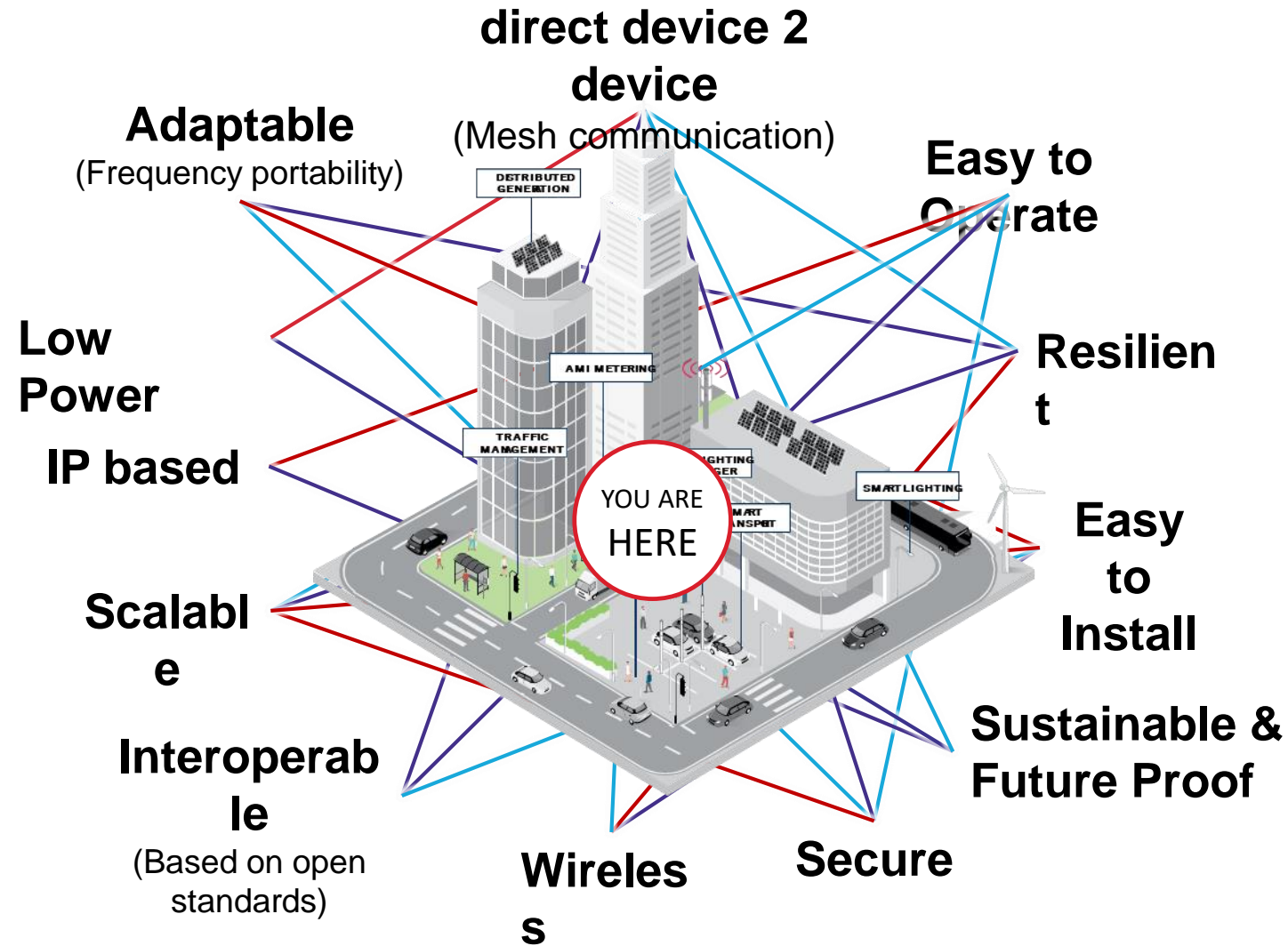
Dynamic Physical
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Complex multi-
stakeholder
ecosystems

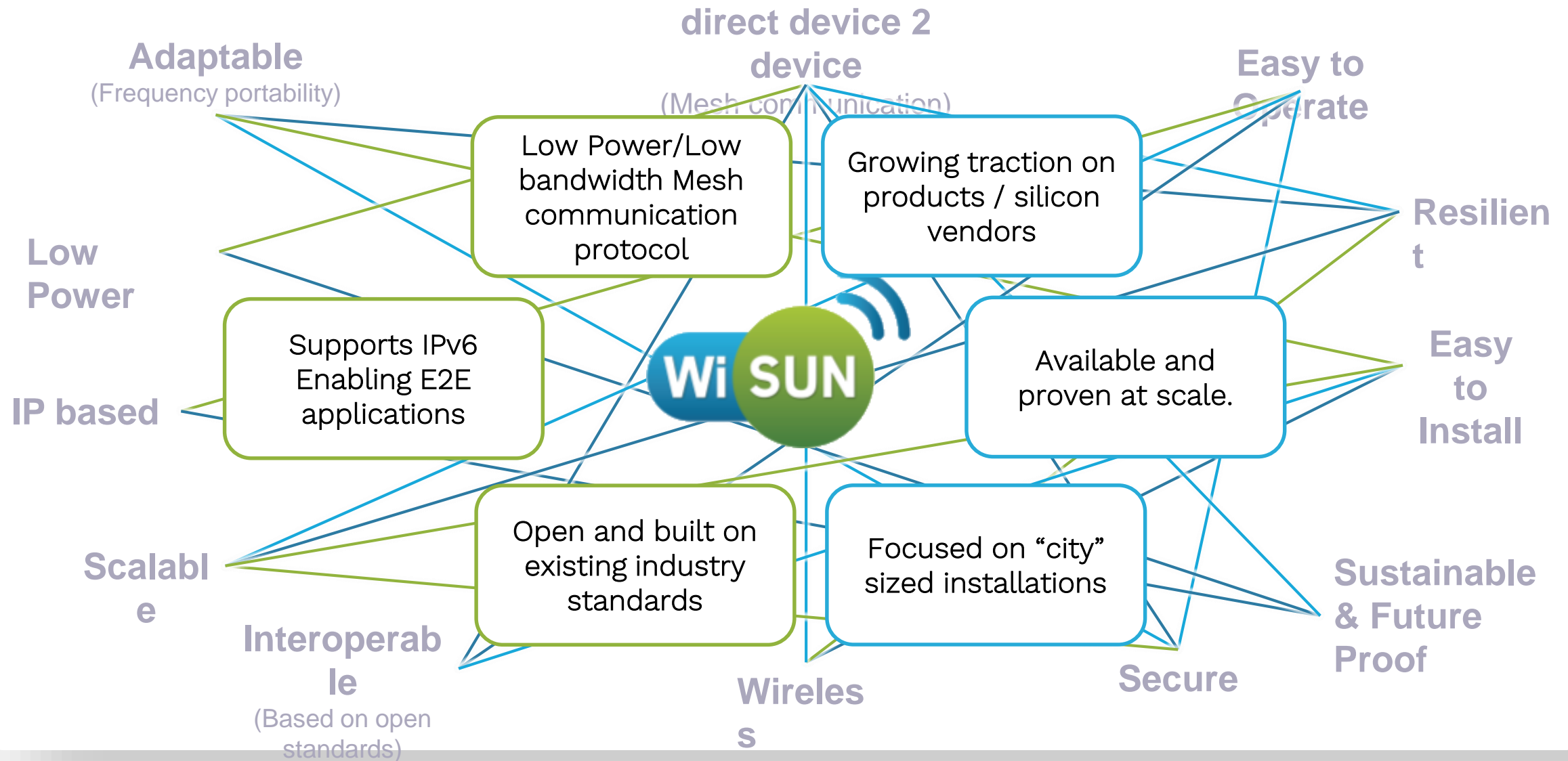
Advanced
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YOU ARE
HERE

Requirements for Smartcity networks: The Road to Wi-SUN



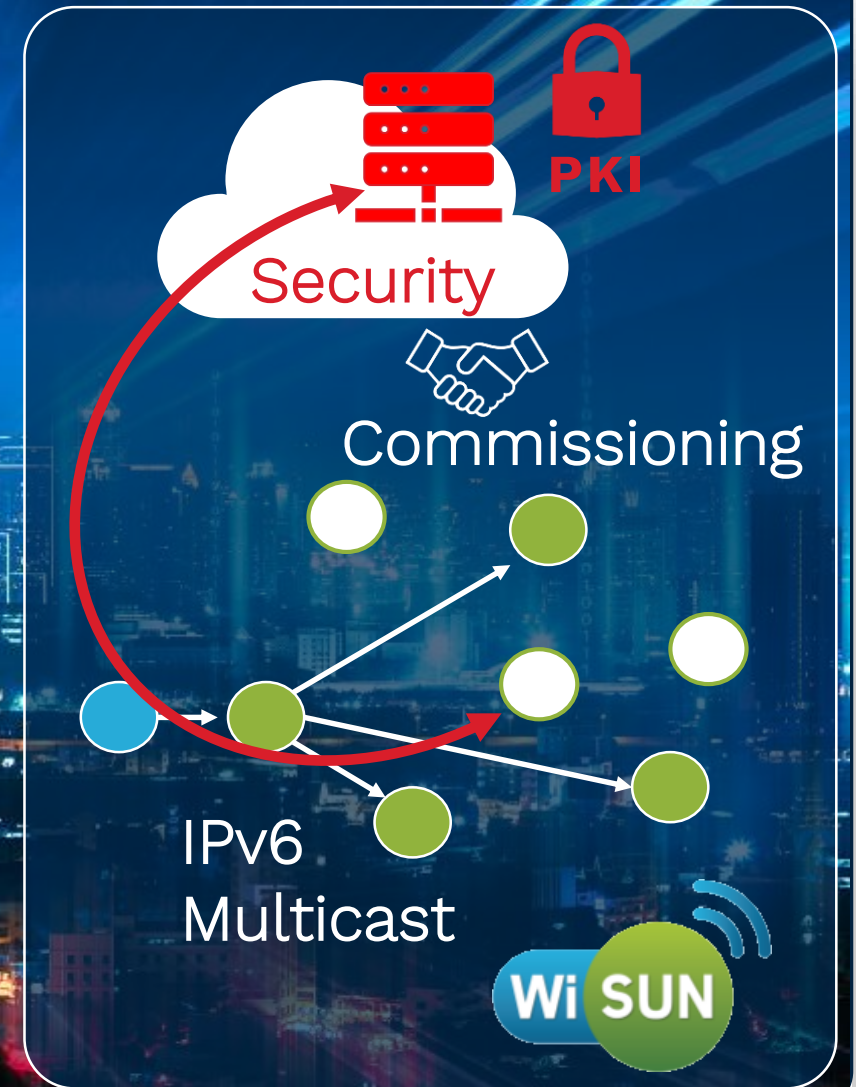
Requirements for Smartcity networks: The Road to Wi-SUN



Requirements for Smartcity networks: The Road to Wi-SUN

Looking under the hood...

Market presence	7 years
Applications	FAN and HAN Smart Utility Networks, Smart Grid, Smart Metering
Typical range in industry use-cases	~ 1 Km
Frequency	200 MHz < Freq < 2.4GHz
Max BW	200 MHz
Modulation	FSK , OFDM,
Data Rates	~ 250 kbs
Latency	~ 20 ms per hop
MTU	2047 bytes
IP support	6LowPAN, built-in support of IPv6 Multicast
Security	Specifying the use of x.509 certificate-based, public-key infrastructure to authenticate devices, as well as Advanced Encryption Standard (AES) encryption and message integrity check
Interoperability with 3rd party devices	For certified devices alignment on some operation modes and channel plan required
Stack Size at GW/BR	~ 100 KB RAM , 500 KB flash
Scalability	Industry deployments typically scale to >500 devices
Cost	Reproducible with SoC or TX supporting 802.15.4g. Very specialized knowledge may result in less availability of solutions and higher cost



The Road to Wi-SUN FAN: Developing



WI-SUN ADOPTER

Joined alliance
Access to formal specs

The Road to Wi-SUN FAN: Developing



TARGET PLATFORM

Support for Wi-SUN PHY

- 802.15.4g
- FSK Modulation

Support for Wi-SUN MAC

- 802.15.4e
- Clock Precision

Select Dev Partner

Repurpose known SoC

Silicon Labs multiprotocol

EFR32xG13

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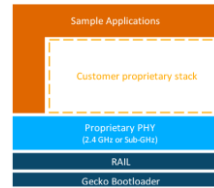
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PHY OPTIONS

Select target frequencies

and operating modes

RAIL Configuration of PHY

Profiles

The Road to Wi-SUN FAN: Developing



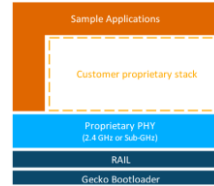
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Support for Wi-SUN MAC

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 - Clock Precision
- Select Dev Partner
Repurpose known SoC
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EFR32xG13



CERTIFICATE MGMT

Develop systems and process to handle the generation, installation and revocation of IDevID certificates

WI-SUN ADOPTER

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Access to formal specs



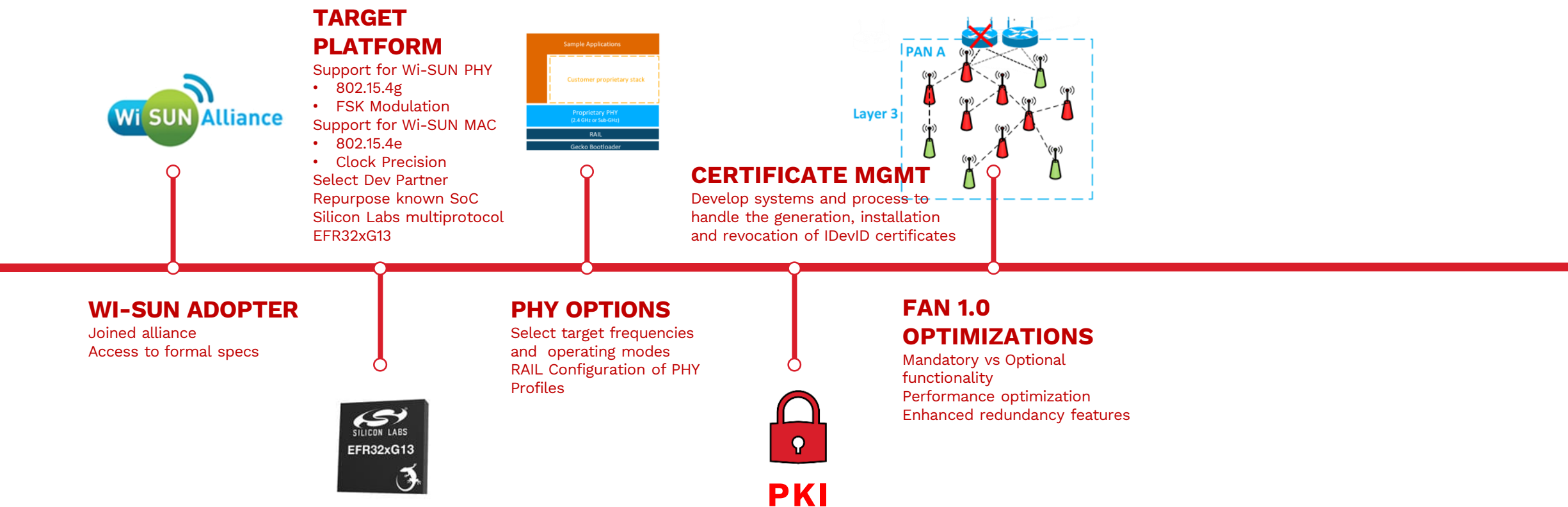
PHY OPTIONS

Select target frequencies and operating modes
RAIL Configuration of PHY Profiles

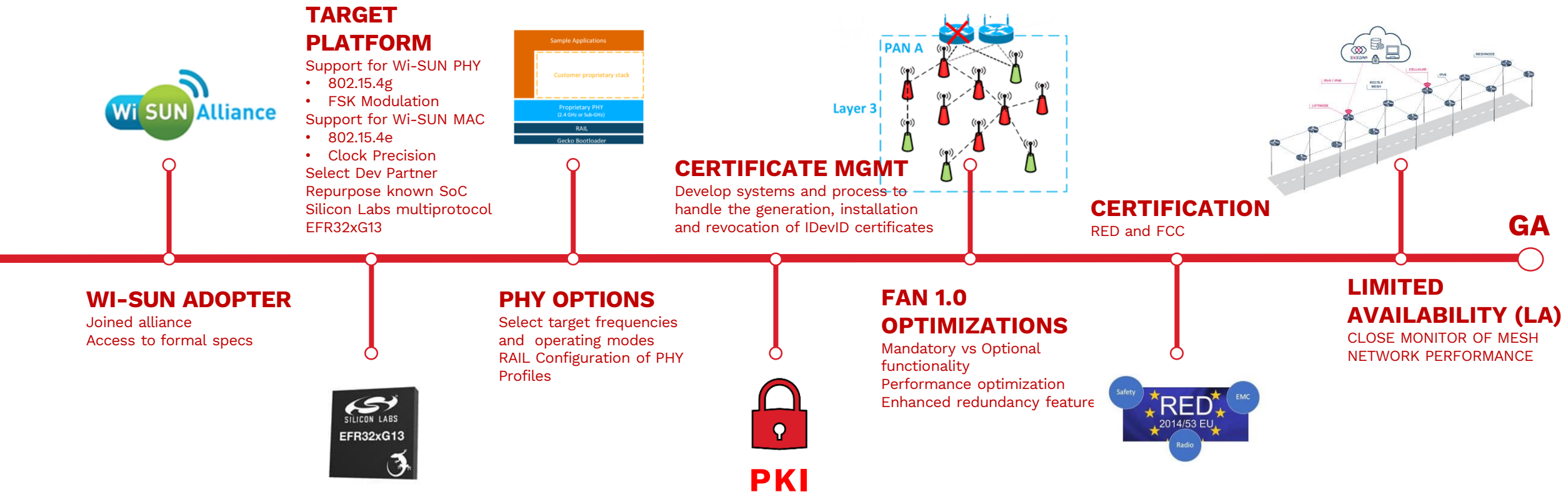


PKI

The Road to Wi-SUN FAN: Developing



The Road to Wi-SUN FAN: Developing





Our Finds

CONSISTENT PERFORMANCE

UP TO 100 KBITPS LOS ~ 1KM RANGE, OPTIMISED SETUP TIME

ROBUST ERROR CORRECTION

AT THE COST OF APPROXIMATELY ½ DATA RATE



ENTERPRISE GRADE SECURITY

BENEFITS FROM X.509 CERTIFICATES, EAP-TLS, BUILT-IN KEY ROTATION

GROWING INDUSTRY TRACTION

+ ADOPTION ON PRODUCT AND SILICON, + STACKS
(COMMERCIAL & OPEN SOURCED)

FREQUENCY PORTABILITY

WI-SUN PHY PORTABLE TO A WIDE NUMBER OF REGIONAL FREQ.
EXISTING REGULATION ON 2.4 GHZ IS FAVOURABLE TO WI-SUN
FUNCTIONALITIES



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The Road ahead

DEVELOPMENT AND ADOPTION OF FAN 1.1

- LOW POWER OPERATION (UPWARDS OF 20 YEAR NODE LIFETIME).
- RADIO CAPABILITY IMPROVEMENTS.
- FSK & OFDM PHY ADDITIONS FOR SUPPORTED REGIONS.
- “GEAR SHIFTING”



IMPROVE RESILIENCE

- RESILIENCE TO LOSS OF BORDER ROUTER
- LOSS OF ROOT
- OPTIMIZED INTER PAN COMMUNICATION
- QUALITY OF SERVICE

EXTENDING CERTIFICATION

- INCLUSION OF 2.4 GHZ & ADVANCED FAN FUNCTIONALITY

Setting Wi-SUN as the enabler of a new generation of Schröder Products



Interoperability is a marathon not a sprint..

..but it is time we all start running.

Come run with us!

Schröder
HYPERION





works with
BY SILICON LABS

VIRTUAL CONFERENCE

September 14–15, 2021

<https://workswith.silabs.com/>

- Wi-SUN sessions

Session ID	Session Name
WSN-101	Introduction to Wi-SUN, It's markets and the Alliance
SMC -102	Smart City Network Management in the Cloud Using Pelion
SMC-103	Why Wi-SUN is Ideal for Smart Street Lighting?
WSN-300	Building Large Scale Smart City Networks with Wi-SUN

- Also don't miss

Session ID	Session Name
SMC-101	Introducing the Smart City
LPW -101	What options do I have for LPWAN Applications
APP-203	Energy Saving Tips for Battery Powered Metering
LOC-102	Energy Reduction & Utility Grid Stabilization with Demand Response



Multiprotocol



Proprietary
100s of Technologies

THREAD



Thank you

