



NB-IoTTM

Protocol for Wireless Sensors Network

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SUMMARY



I. General features

II. Physical layer

III. MAC layer

IV. Security

V. Power

I. GENERAL FEATURES

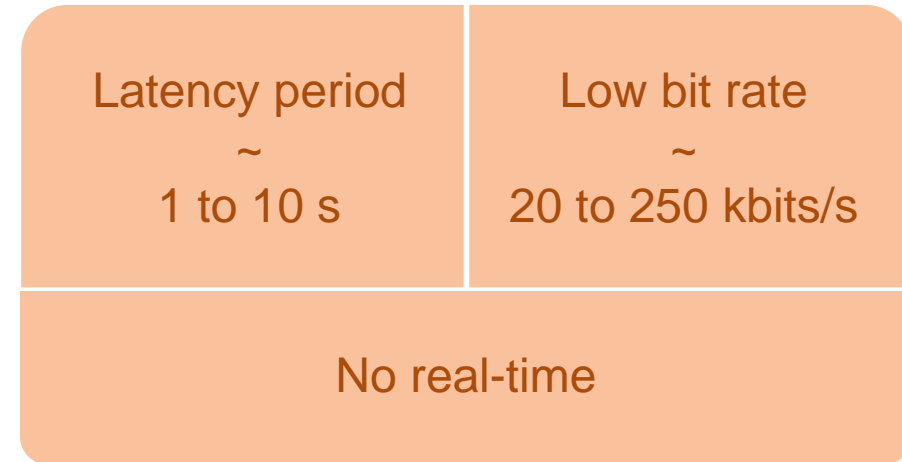
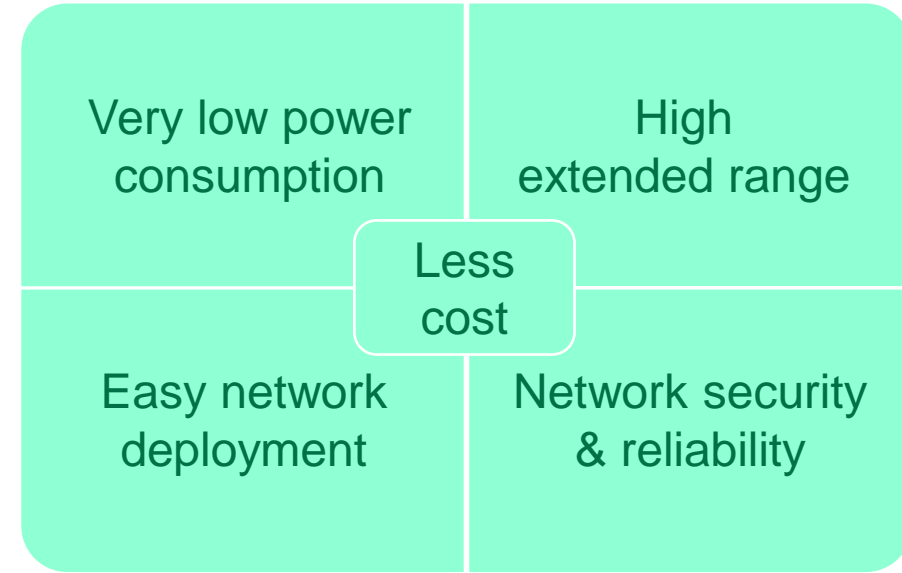
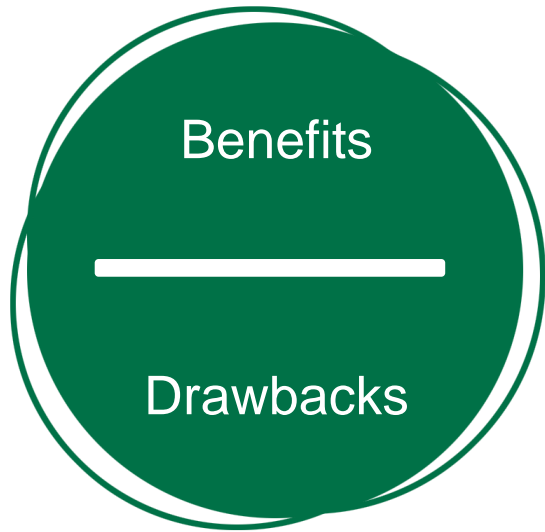
NB-IOT
=
NarrowBand
Internet of
Things

Developed by 3GPP (3rd generation
partnership project)

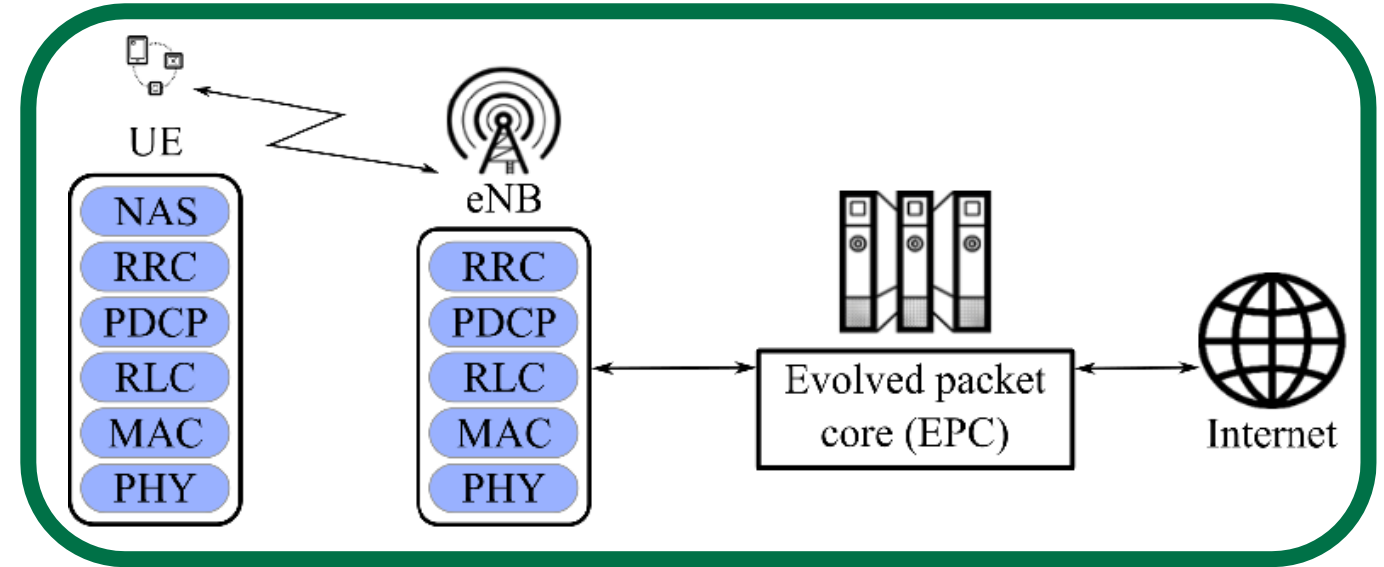
Low-power wide-area network
(LPWAN)

Compatible with 4G and 5G ready

- Wireless protocol specialized:
- in connecting IoT devices on
established mobile networks
 - handling small amounts of 2-way
data



I. GENERAL FEATURES



Overview of a NB-IoT network

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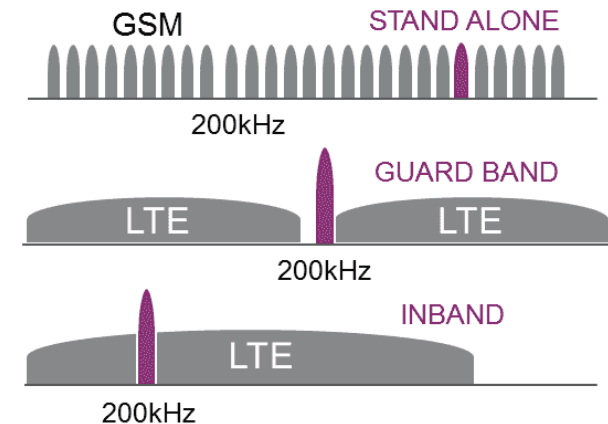
II. PHYSICAL LAYER

NB-IoT uses a
single narrow
band of
200kHz (or
180 kHz to be
precise)

For example, it can be transposed on the
LTE or on the GSM NE bandwidth as
long as there is at least 200kHz of
available bandwidth



NB-IoT

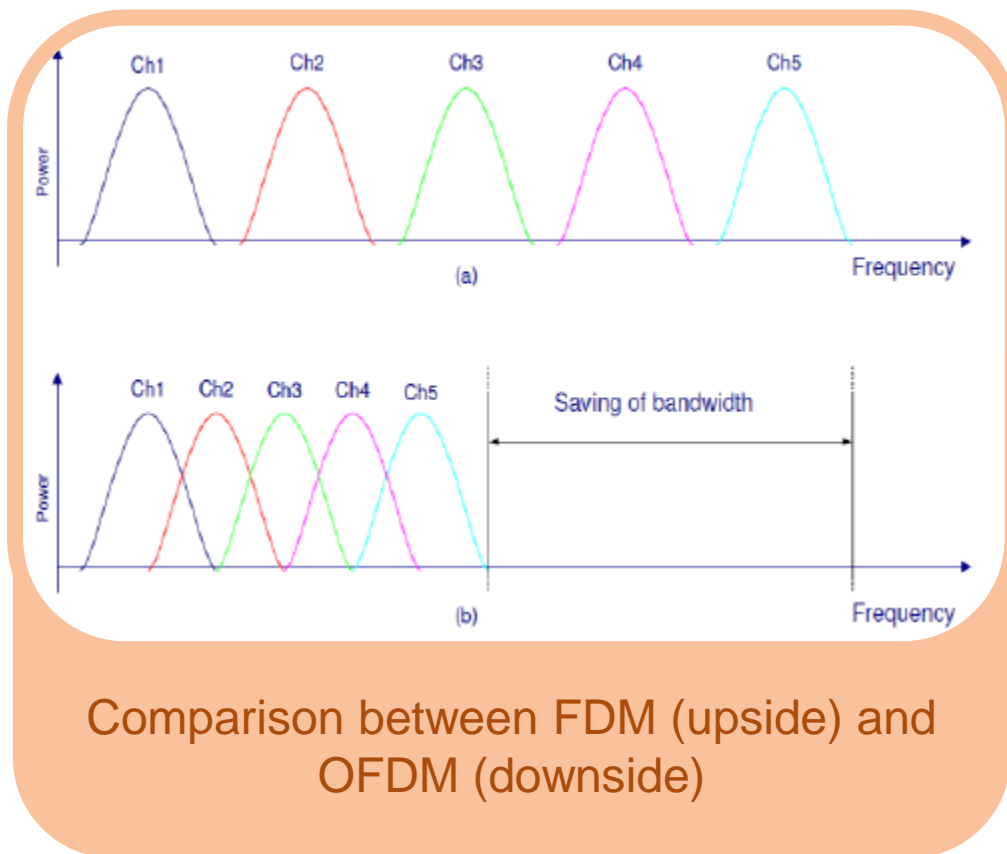


The physical layer
is the interface
between the MAC
layer and the
Radio Frequency
transceiver

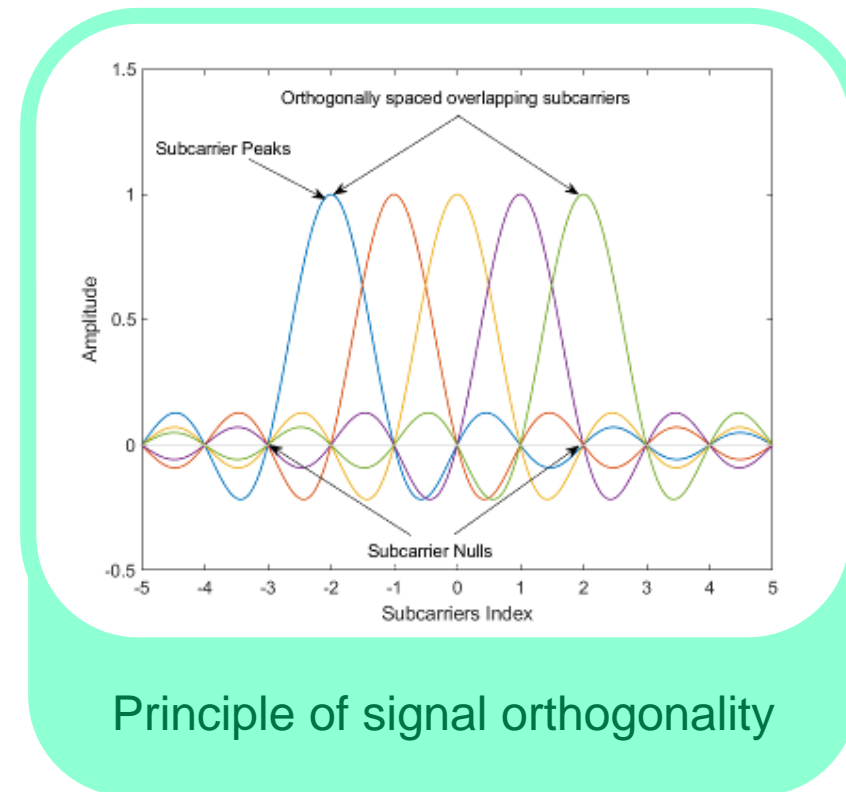
II. PHYSICAL LAYER

Main functions:

- Supports Half Duplex Transmission
- Adapts the MAC layer format for the medium used
- Enables exchange of data between eNB and UE
- Performs modulation and demodulation (OFDM)



Comparison between FDM (upside) and
OFDM (downside)



Principle of signal orthogonality

II. PHYSICAL LAYER

III. MAC LAYER

The Medium Access Control layer controls the hardware in charge of the interaction between the wireless transmission medium.

It is responsible for the messages between User Equipment (UE) and the network.



It performs the
following
functions:

III. MAC LAYER

Mapping of logical
channels

Multiplexing of MAC
SDUs

Error protection

Priority handling

Arbitration and
prioritization of access

IV. SECURITY

NB-IoT is a cellular network that inherits the security mechanisms of mobile infrastructures.

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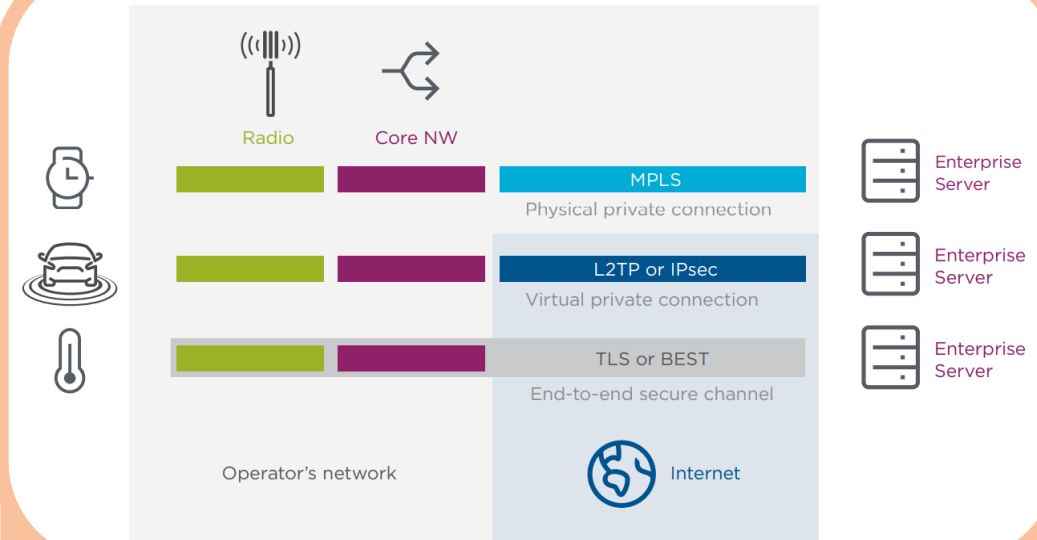
Secure communication channels

Manage communications

DATA OVER NAS (DoNAS)

Non-IP Data Delivery (NIDD)

Secure communication channels



Mobile operator's public infrastructure
between IoT devices and Enterprise Server

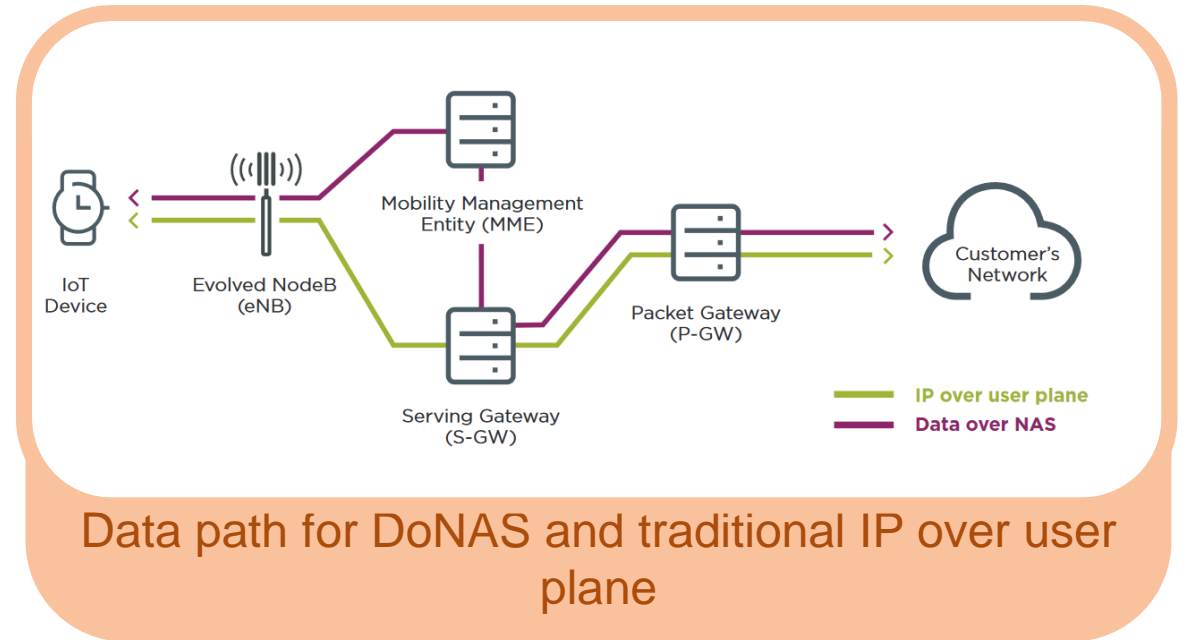
IV. SECURITY

Manage
communications

IoT devices or applications need to be connected and communicate only with a set of servers. It is a good security practice to restrict these communication from the device to these specific servers. Thus, these devices will be unable to communicate with any other destination, limiting any potential threats.

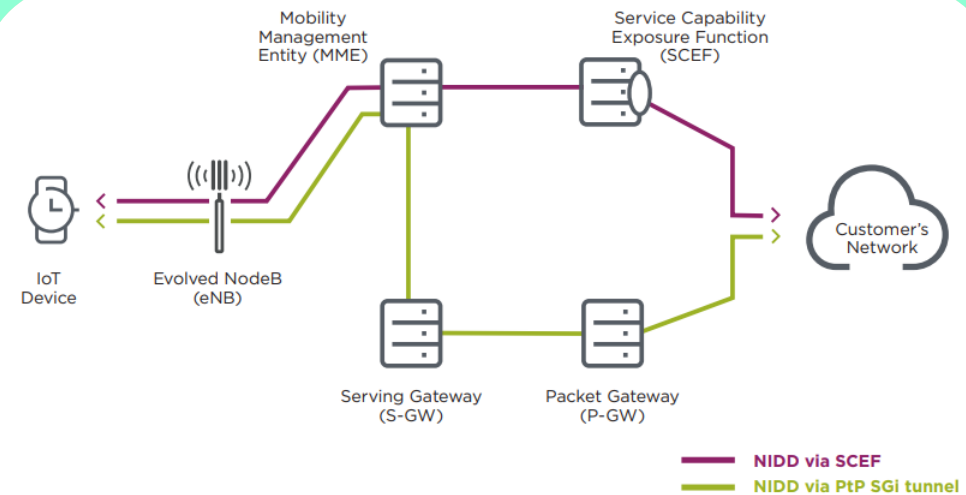
IV. SECURITY

DATA OVER NAS (DoNAS)



IV. SECURITY

Non-IP Data Delivery (NIDD)



No-IP Data Delivery (NIDD) by the Point-to-Point Serving Gateway interface (PtP SGi) and Service Capability Exposure Function (SCEF)

IV. SECURITY

V. POWER CONSUMPTION

When the
transmitted power
TX
= 23 dBm

Power consumption
~
5.64 to 7.74
mW/bytes

So up to
968 Mw/bit

As of today, there is not enough
information.
Tests are yet to be made.

QUESTIONS?

