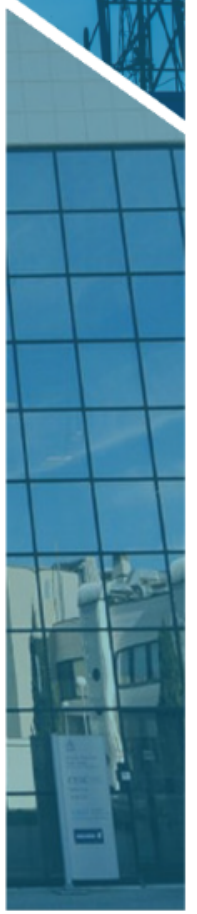
RTPORT: the 5G-based Model-Driven Real Time Module for General Cargo Management

Smart Containers, Intelligent Cargo and Digital Infrastructure



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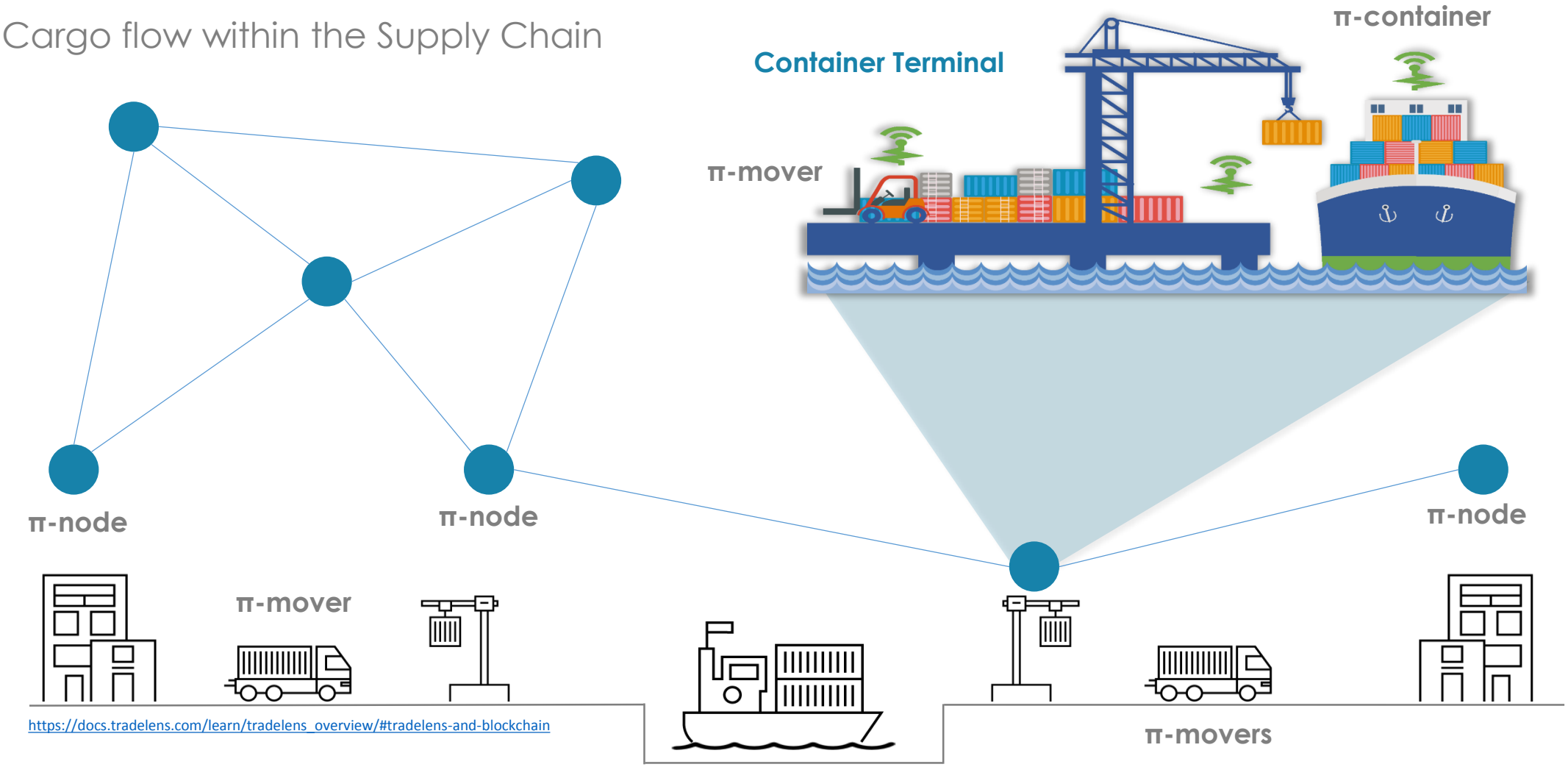
Physical Internet Principle

Cargo flow within the Supply Chain



https://docs.tradelens.com/learn/tradelens_overview/#tradelens-and-blockchain

COREALIS EU H2020 Project

Capacity with a p**O**sitive envi**R**onm**E**ntal and societ**AL** footpr**I**nt: port**S** in the future era

Objectives

- Embrace circular economy
- Reduce environmental footprint
- Improve operational efficiency
- Enable the port to become an innovation hub

Living Labs

Antwerp, HaminaKotka, Livorno, Piraeus, Valencia

Problem Statement

A large port typically has multiple terminals that together can handle many cargo types; however, individual terminals are usually designed to move a single cargo type.

Different cargo types require different vessels, terminal configurations, and handling equipment.

Container Terminal

Containers

General Cargo

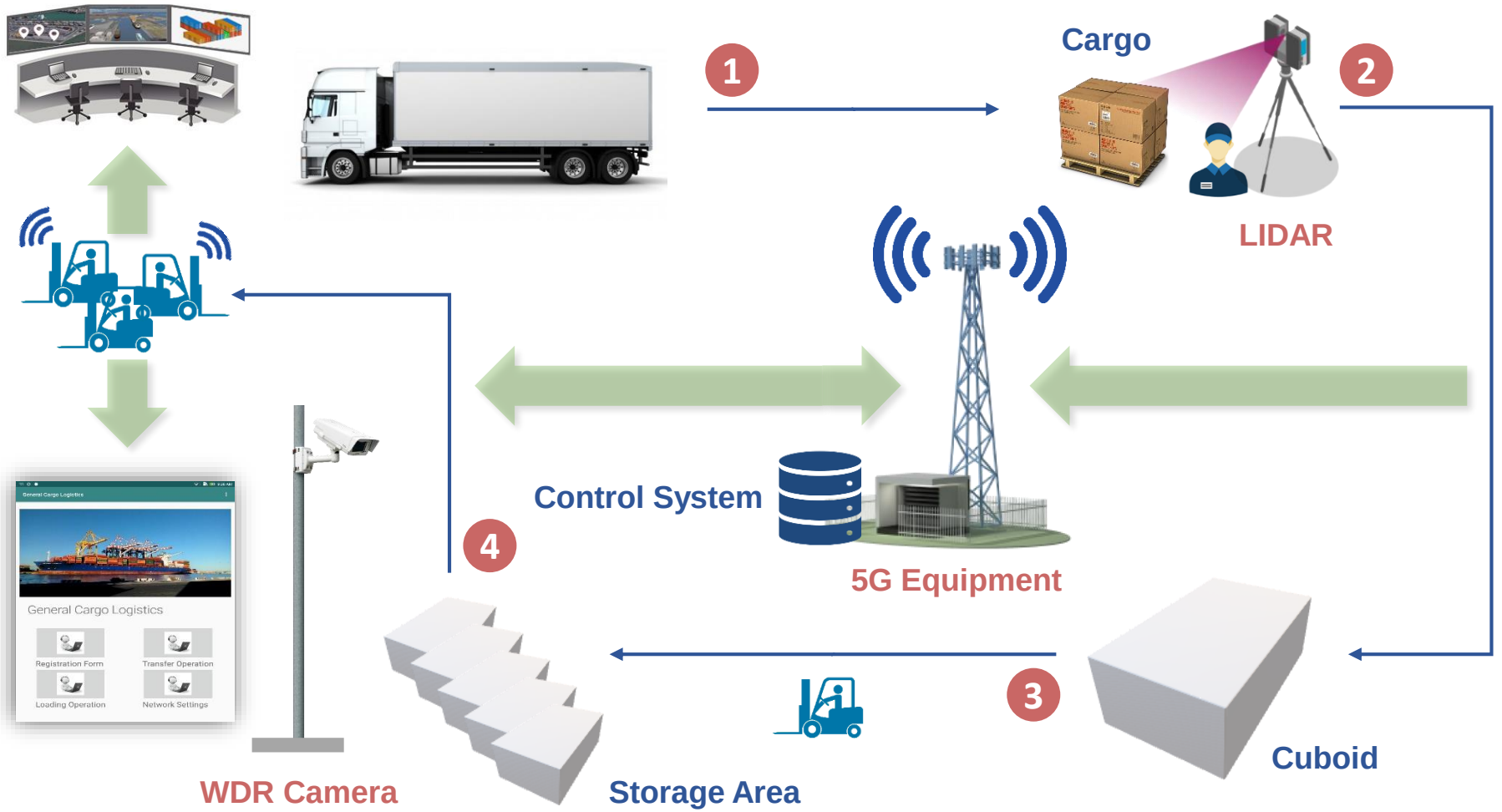
Others

Commercial solutions for the optimization of the management and handling operations.

Non standard dimensions, inefficient/hard handling, human mistakes, low automation.

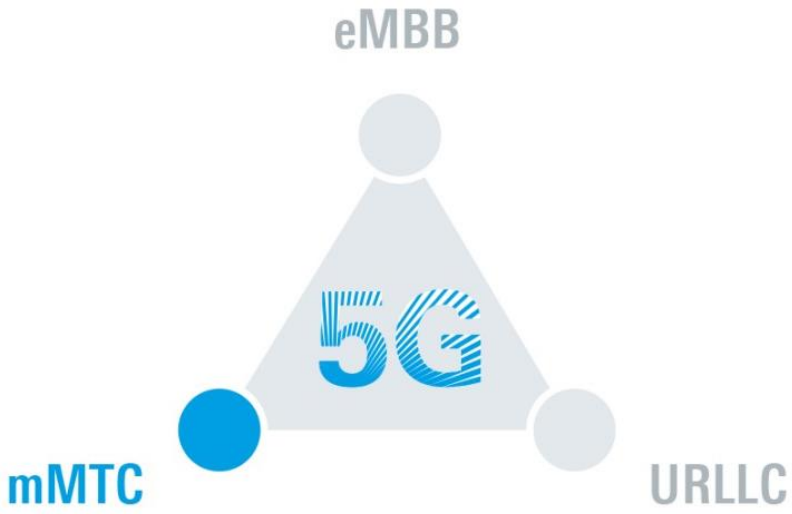
Other management systems.

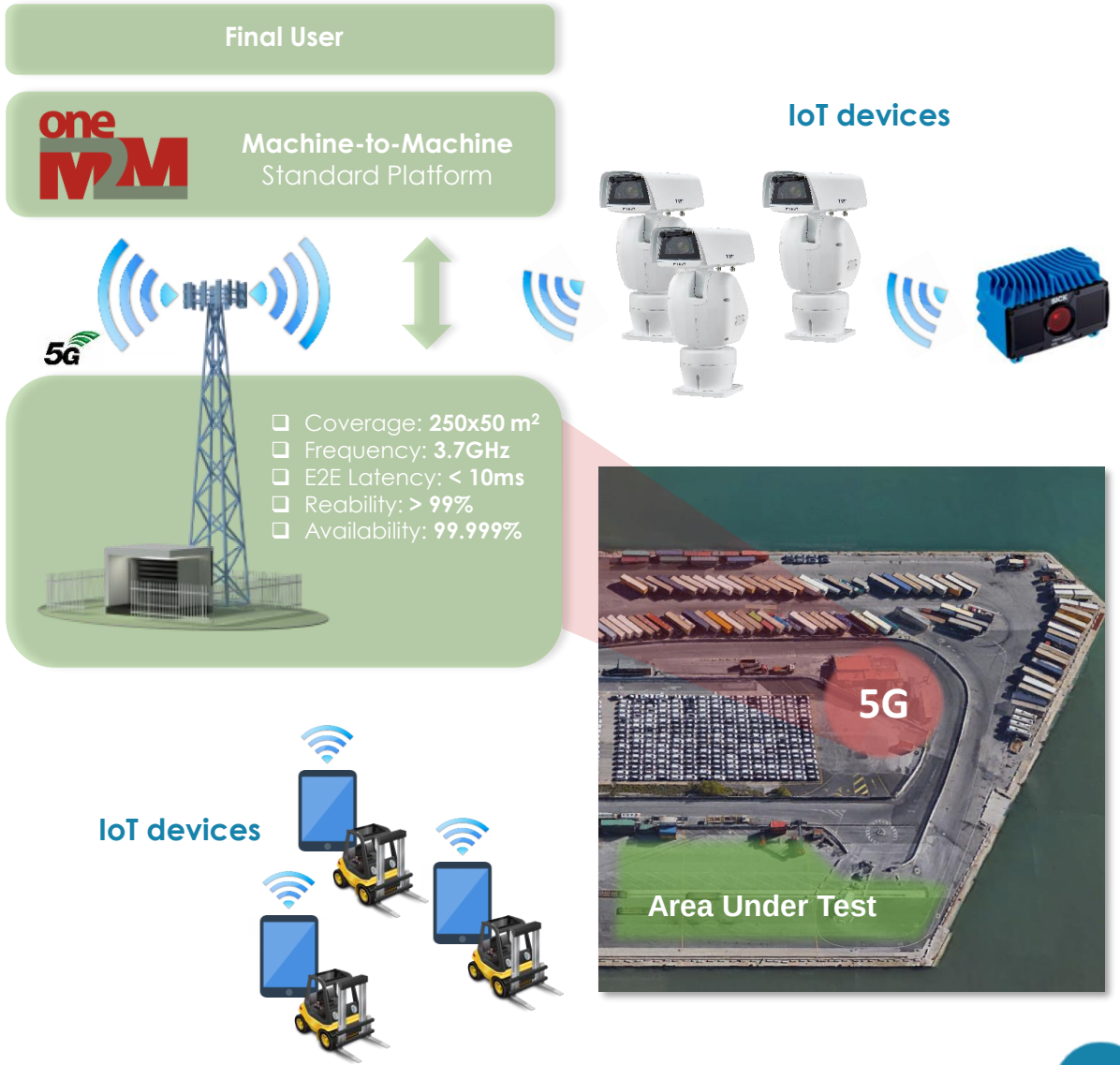
RTPORT: 5G-based Management System



5G technology as an added value

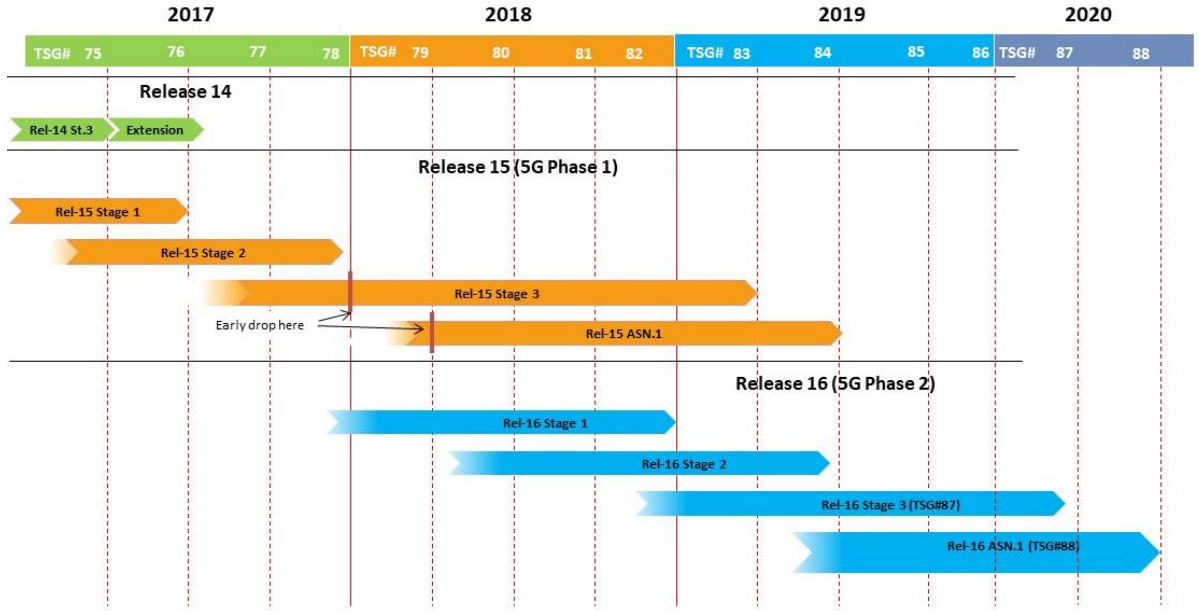
RTPORT aims to instantiate a pervasive 5G network demonstrating how the interconnection of IoT devices, through machine-to-machine standards, is in line with the ITU IMT-2020 technical requirements (mMTC).





Transferability Considerations

- RTPORT's functionalities are strictly related to the availability of the proper radio technology;
- RTPORT can be used with the 4G radio technology as well, when lower user requirements are requested, but with lower performances;
- The usage of the RTPORT module depends on the context (different scenarios from the Container Terminal);
- RTPORT follows the 3GPP standardization plan for 5G and will reach TRL 5 (technology validated in relevant environment).



3GPP

Overlapped Solution

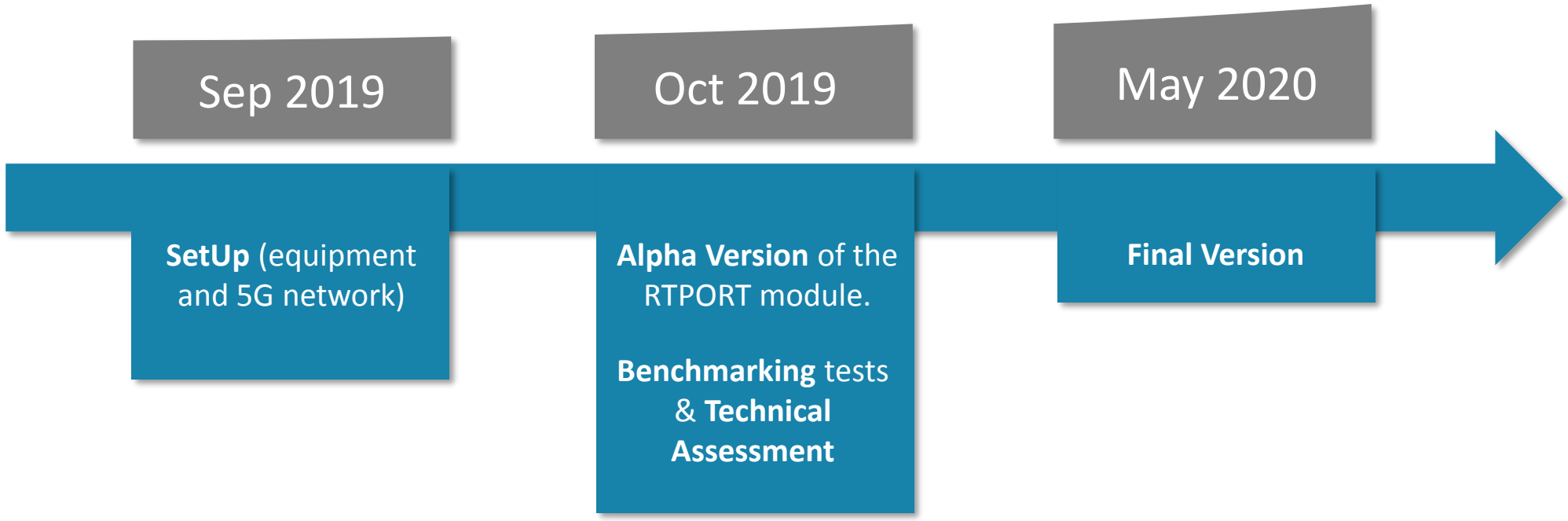
4G LTE

Distinct radio unit and antenna.
Frequency Range: 1710 – 2600 MHz

5G NR

radio unit integrated with antenna.
Frequency Range: 3700MHz

Next Steps


Sep 2019
Oct 2019
May 2020
SetUp (equipment and 5G network)
Alpha Version of the RTPORT module.
Benchmarking tests & Technical Assessment
Final Version

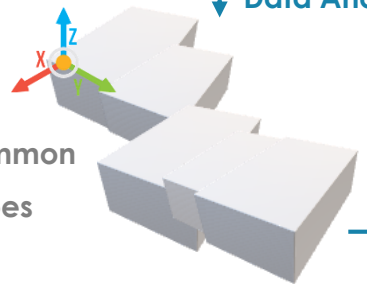
Impacts on the Physical Internet

Mega Vessels Era

Port-to-Port shipment

Data Sharing Platform

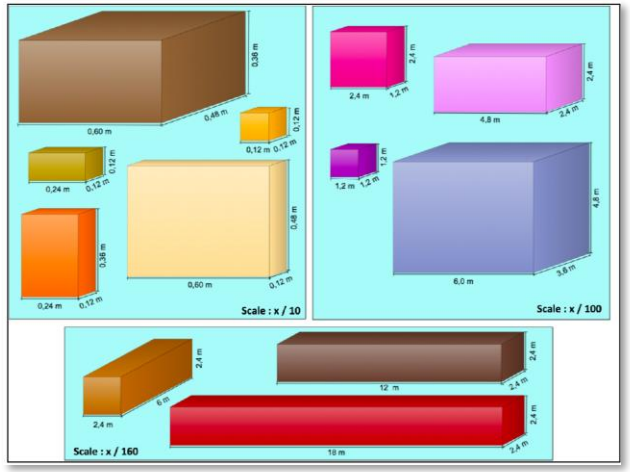
Data Analytics



Most Common Cargoes

Custom Modular Container

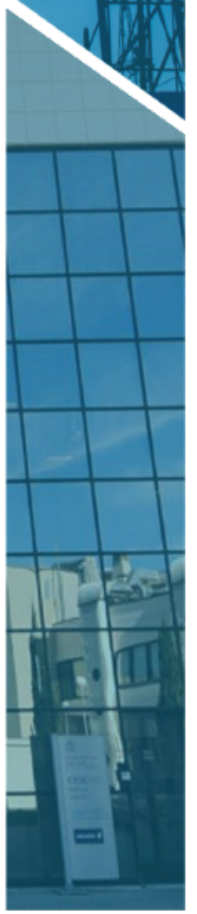
π-containers



Conclusions

- The general cargo management issues should be well addressed in order to enable the Physical Internet paradigm, regardless of RTPORT;
- 5G is an enabling technology, not the innovation in itself;
- RTPORT is a solution, not The Solution; it covers aspects related to the yard management; on the other side it could be easily improved and extended to the stowage management as well; moreover, it's integration with the Port Community System, could improve the whole efficiency of the intra-terminal operations related to the general cargo management;
- RTPORT goes in the Physical Internet direction in terms of: automation of the processess, interconnection of the ICT systems, integration of the intelligent edge bassed technologies in supply chain, proper data collection systems, cloud based collaboration platforms, etc;
- The Step Beyond is just a proposal, with several limitations that should be further understood.

THANK YOU FOR YOUR ATTENTION



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