WORKSHOP GARR 2026

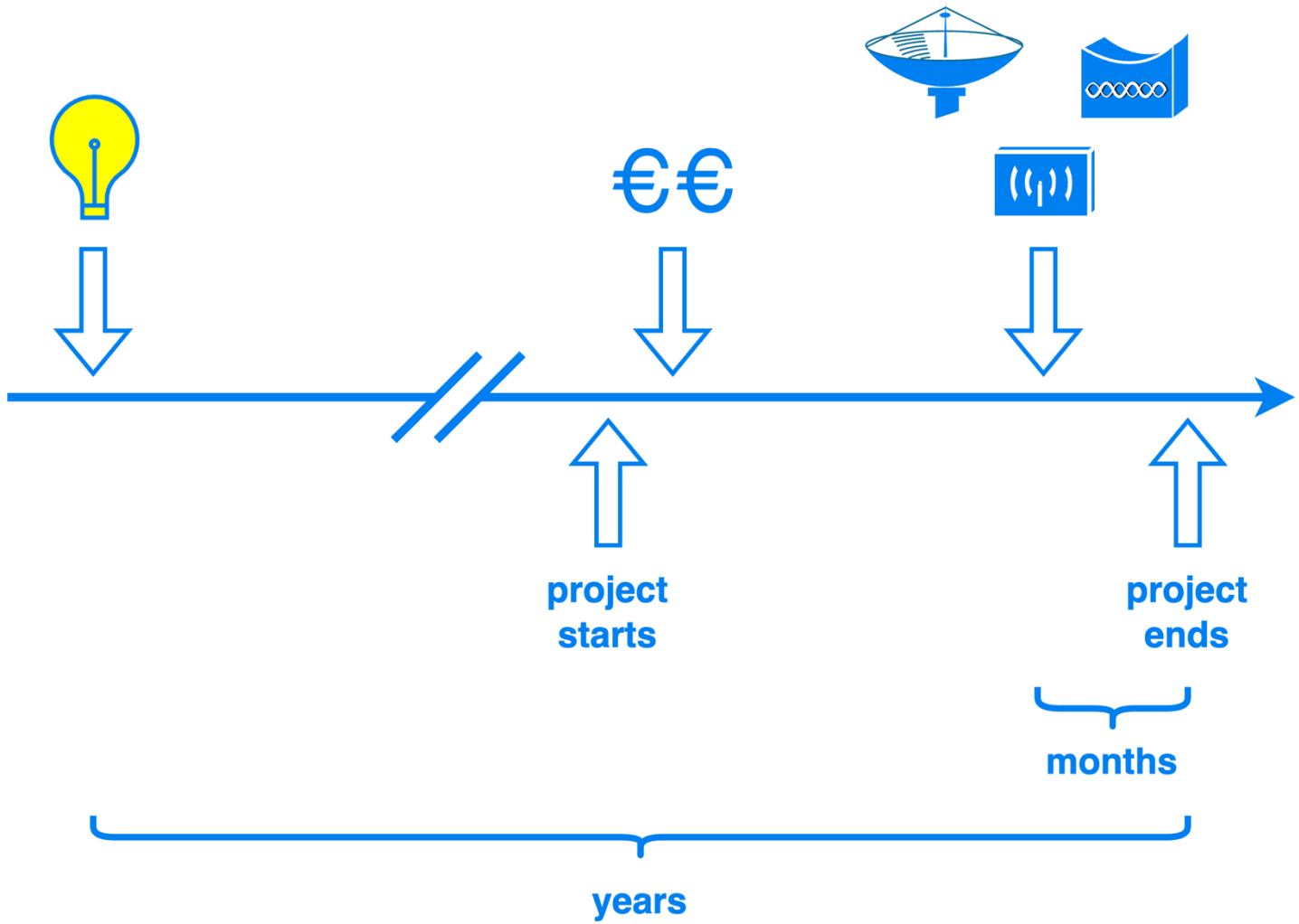
NET MAKERS

Ricerca sperimentale nei PNRR: l'esperienza in RESTART/PESCO

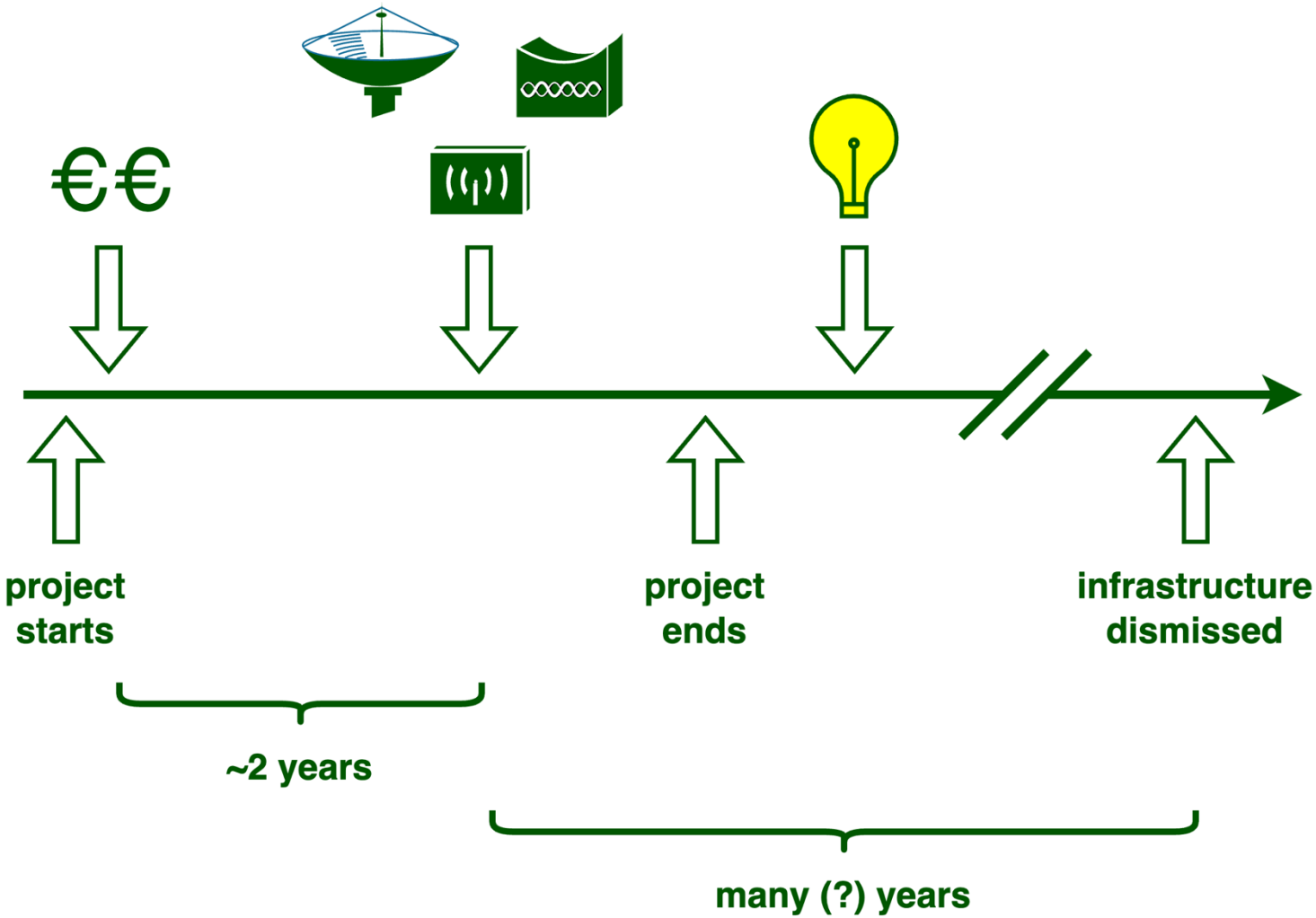
Claudio Cicconetti

CNR-IIT

The cycle of experimental research



The cycle of experimental research – The NRPP way



Finanziato dall'Unione europea NextGenerationEU | Ministero dell'Università e della Ricerca | Italiadomani PIANO NAZIONALE DI RIPRESA E RESILIENZA | RESTART

COHERENT
SUPER
Netwin
RIGOLETTO
MINDS DREAM
6GWINET
FUN-Media

PESCO
IN
SEXTET
ITA NTN
SRE
ISaCAGE
Net4Future

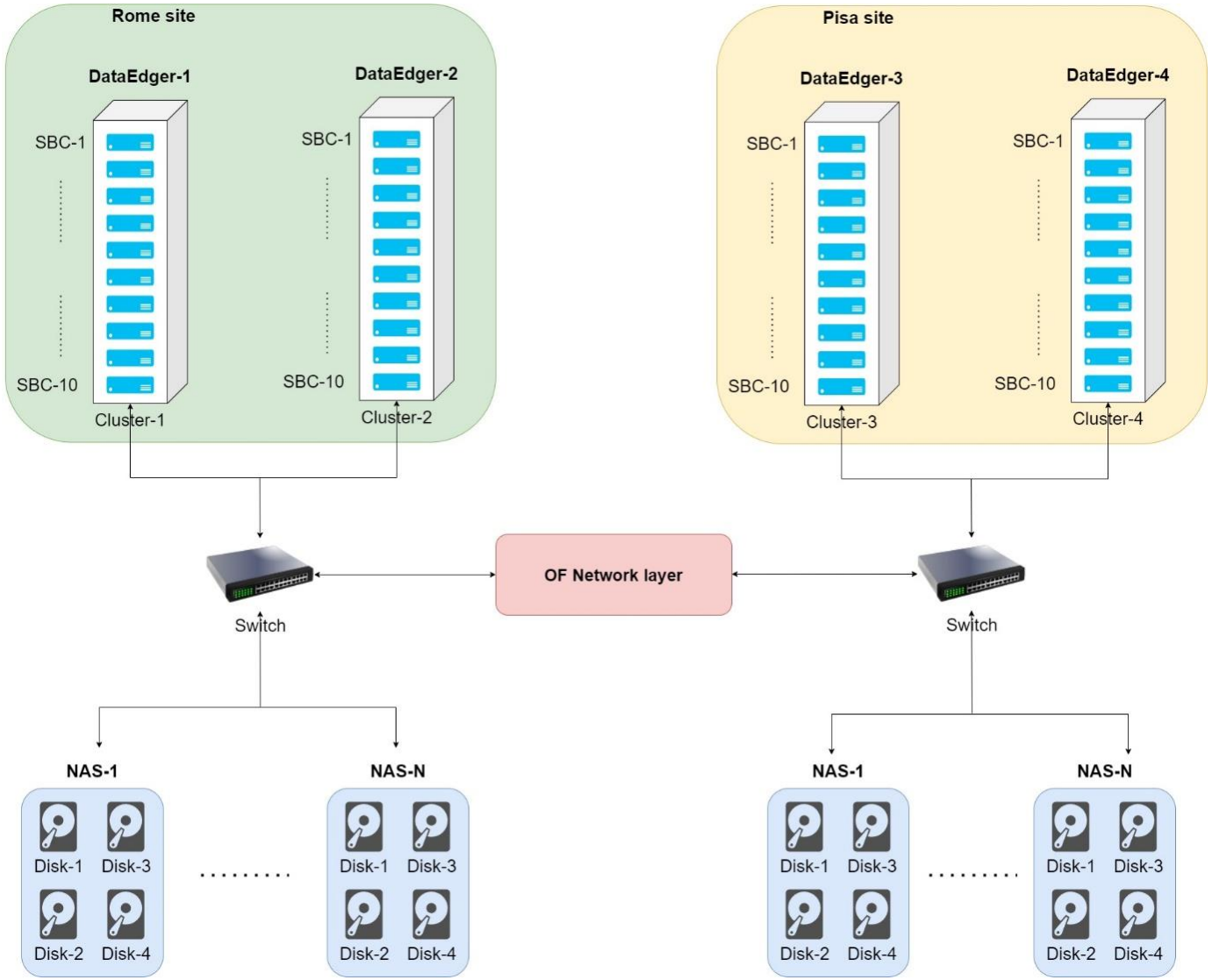
WatchEDGE
LEGGERO
ADAPTO
R4R
GrapHICs
ELENE
HePIC
T-NEXT
MOSS

INCHNET
SENSING NET
TeleSmEg
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AquaSmartt
ARCADIA
LIAISON

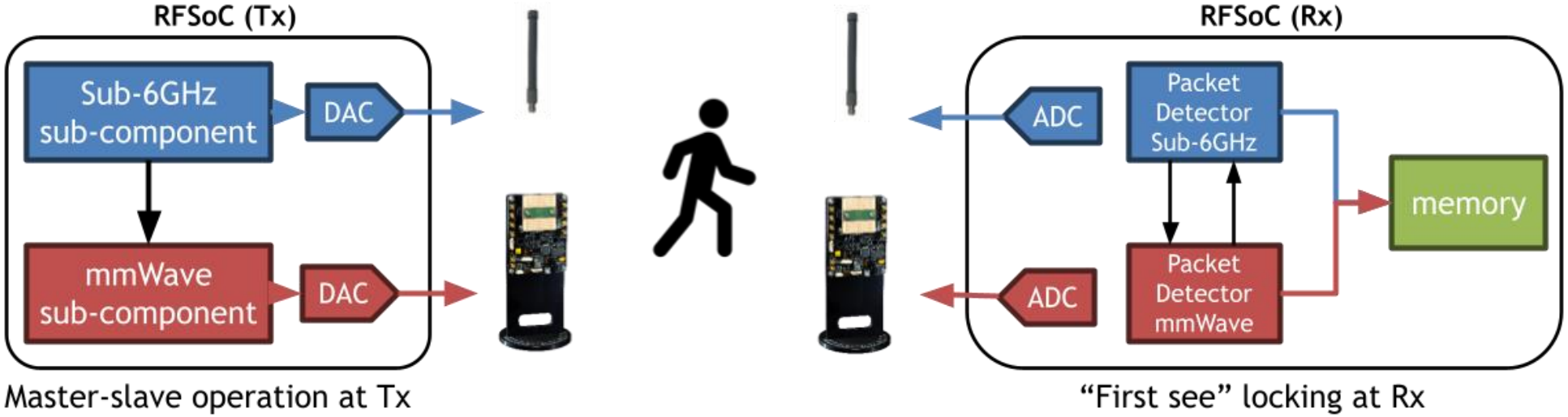
RESTART/PESCO PoCs

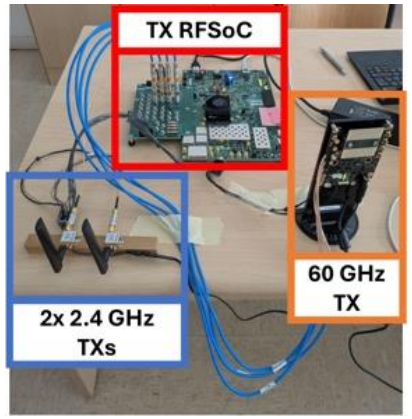
1. Data Edgers (OpenFiber)
2. ISAC (UniPD)
3. MIMO radar (CNIT)
4. UAV-GPR (UniCampania/SmartME)
5. CNR-IIT
    - VR
    - EDGE
    - Post-5G
    - Vehicular
    - QKD

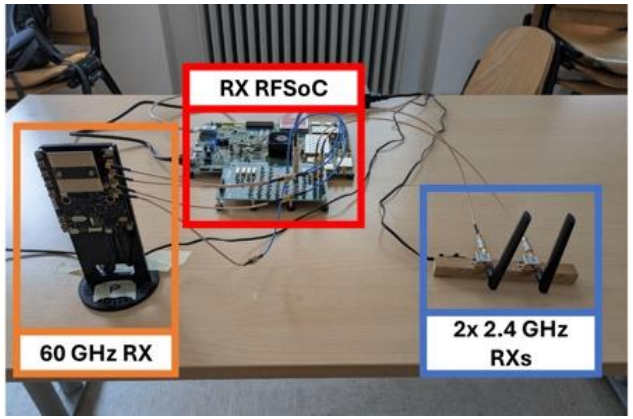
Data Edgers (OpenFiber)



ISAC (UniPD)

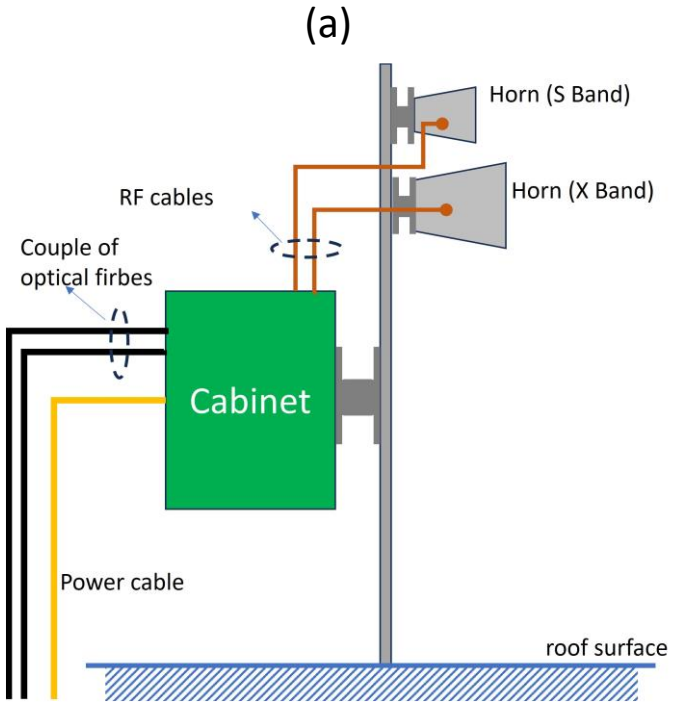

RFSoC (Tx)
Sub-6GHz sub-component
DAC
mmWave sub-component
DAC
RFSoC (Rx)
ADC
Packet Detector Sub-6GHz
memory
ADC
Packet Detector mmWave
Master-slave operation at Tx
"First see" locking at Rx


TX RFSoC
60 GHz TX
2x 2.4 GHz TXs

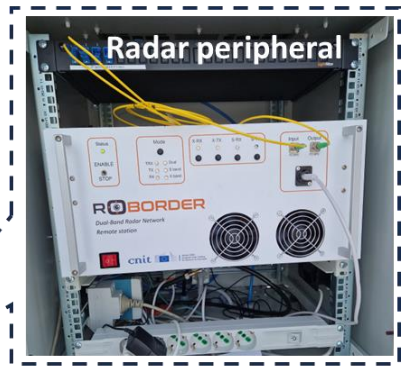

RX RFSoC
60 GHz RX
2x 2.4 GHz RXs

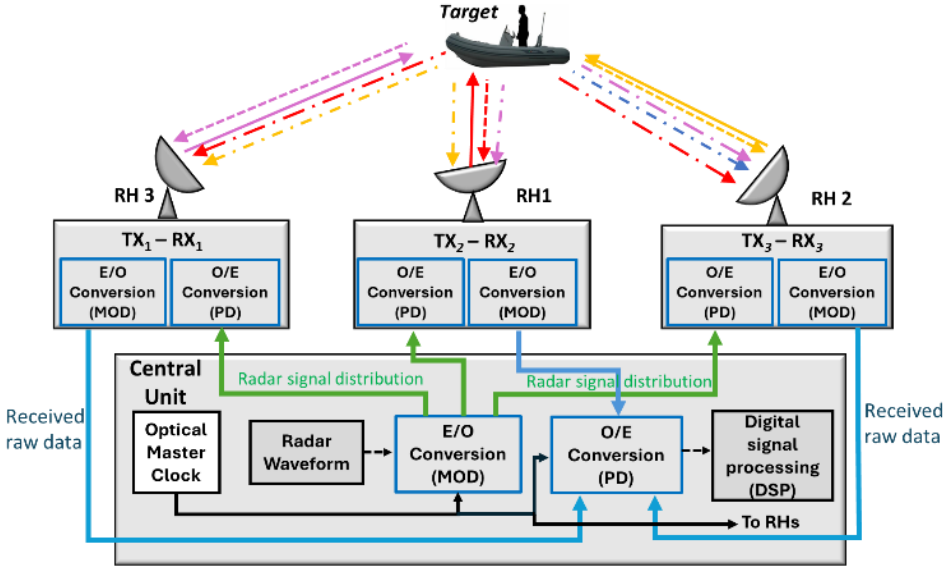

TX node
RX node

MIMO radar (CNIT)



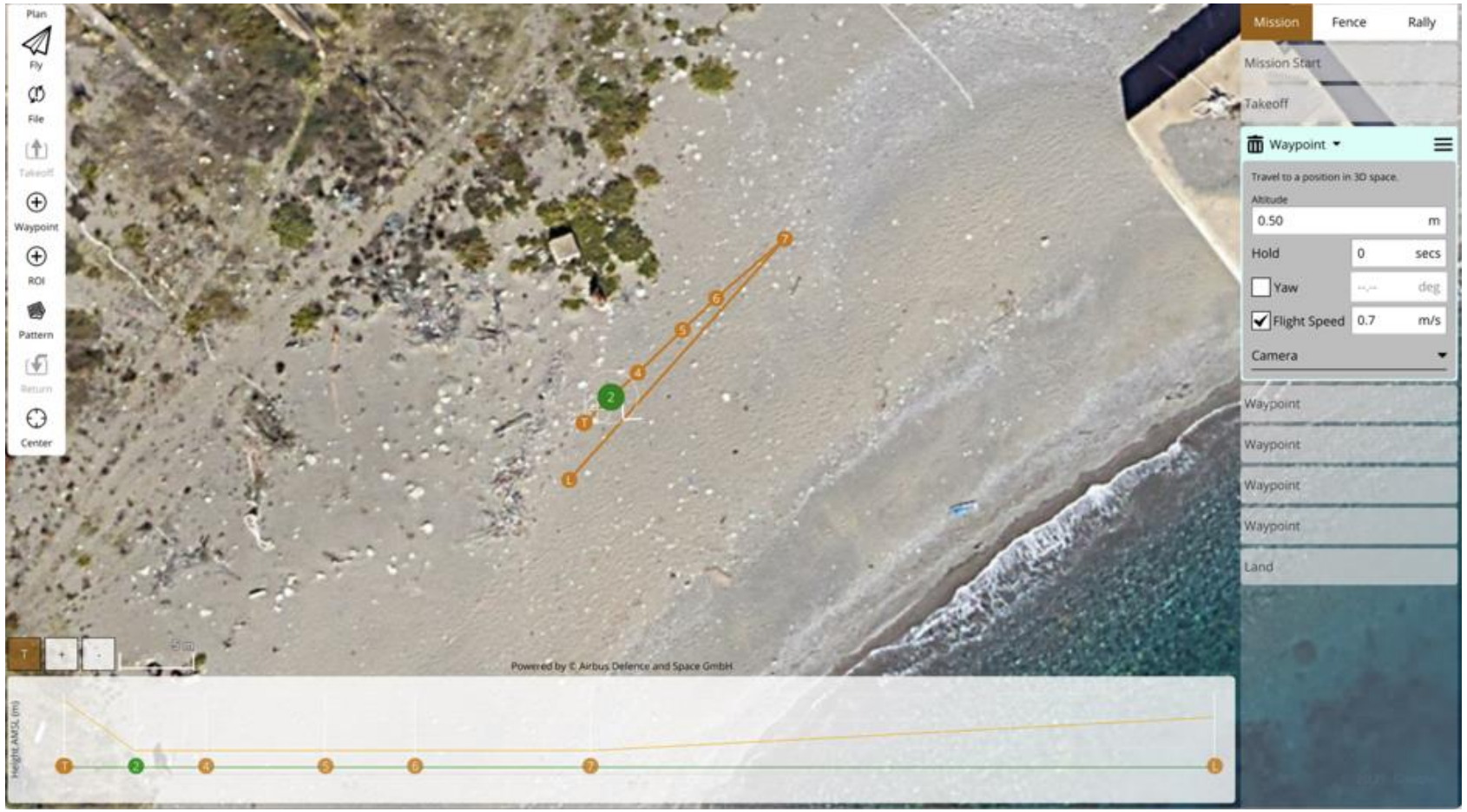




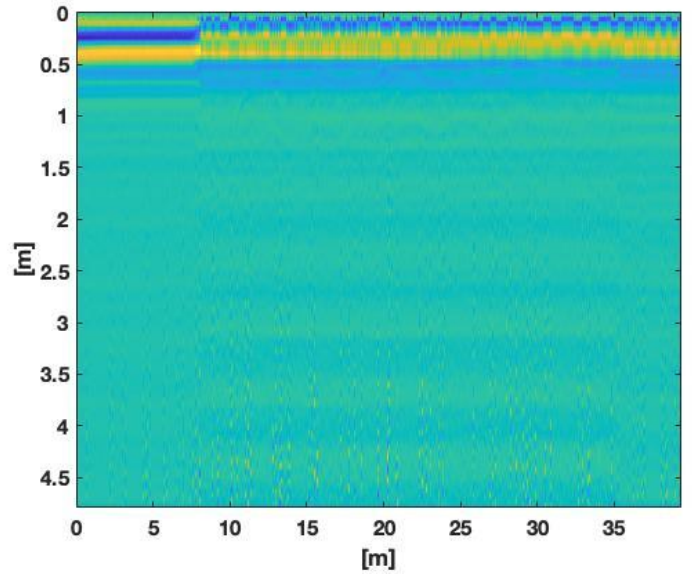




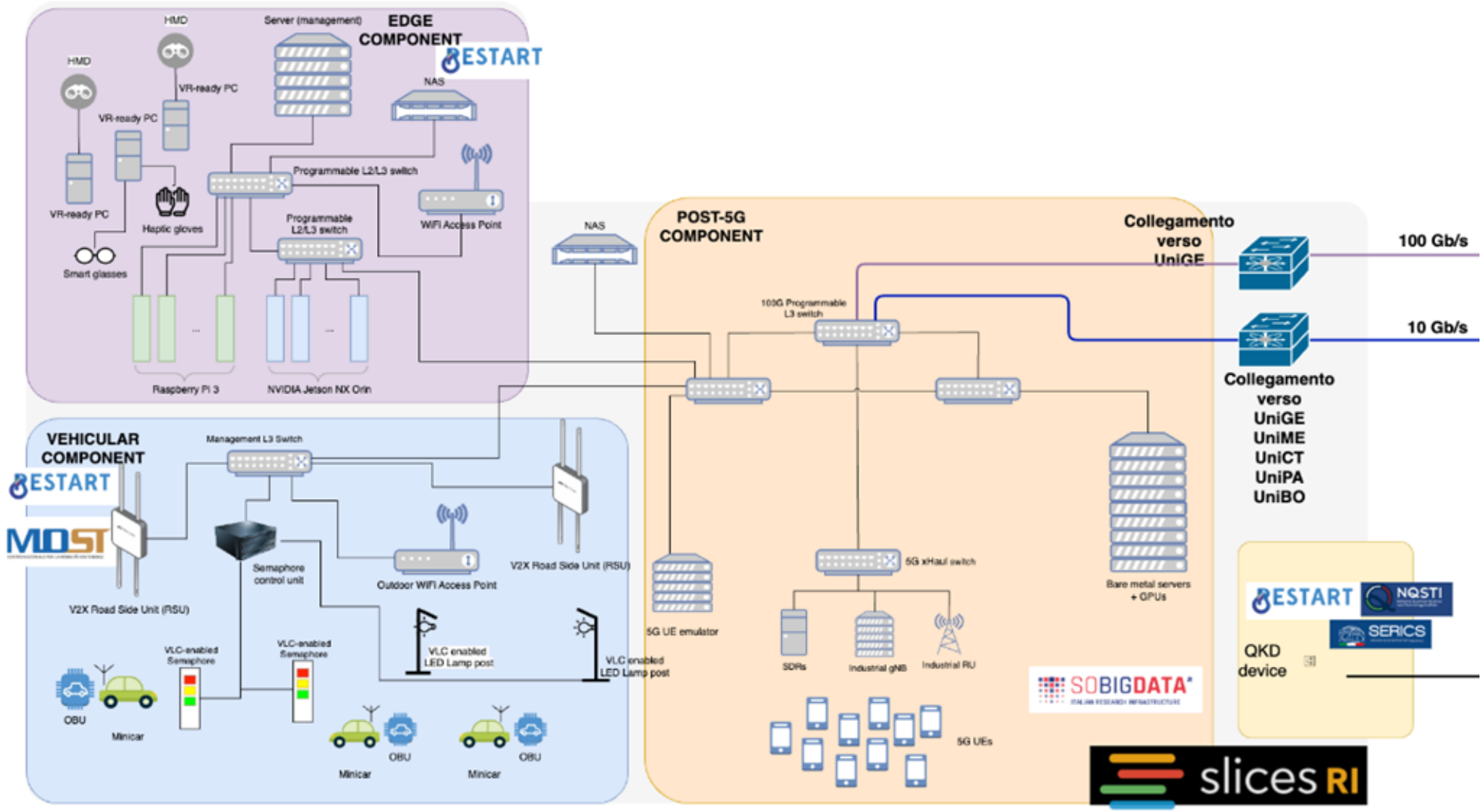
UAV-GPR (UniCampania/SmartME)



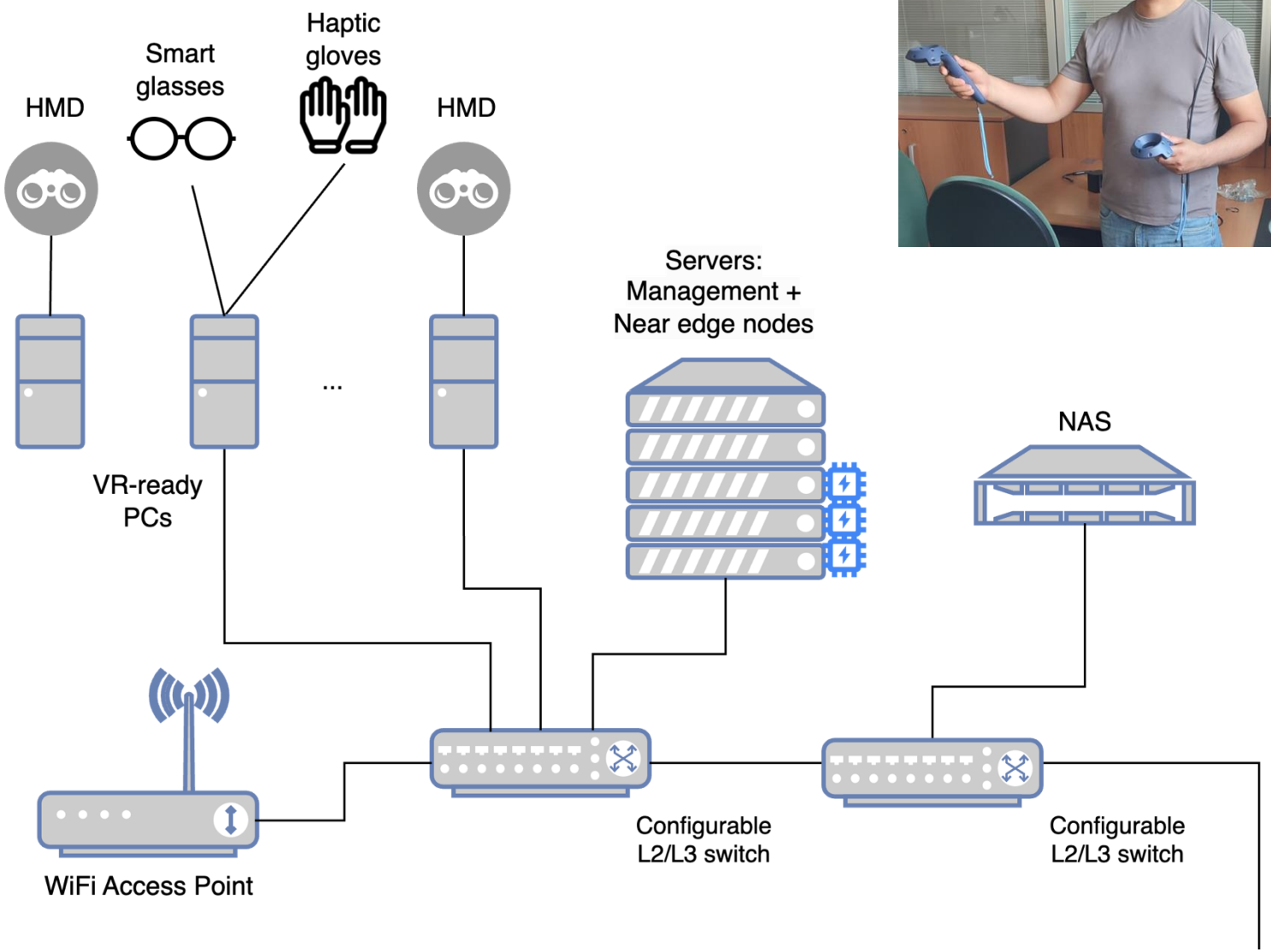


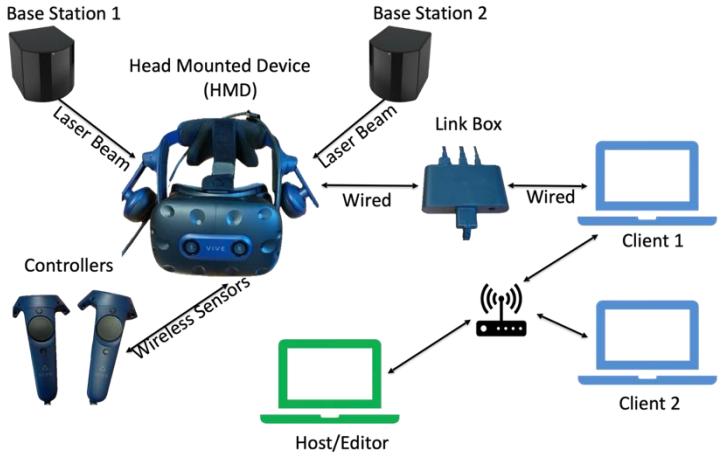


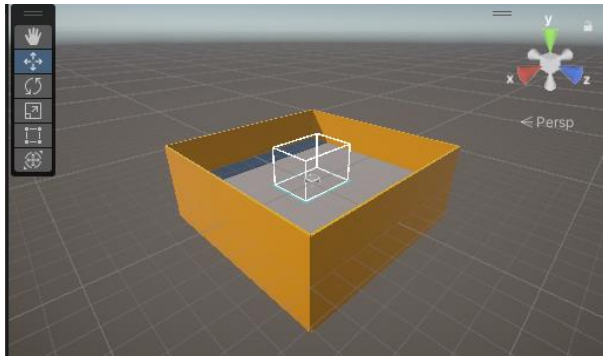
CNR-IIT

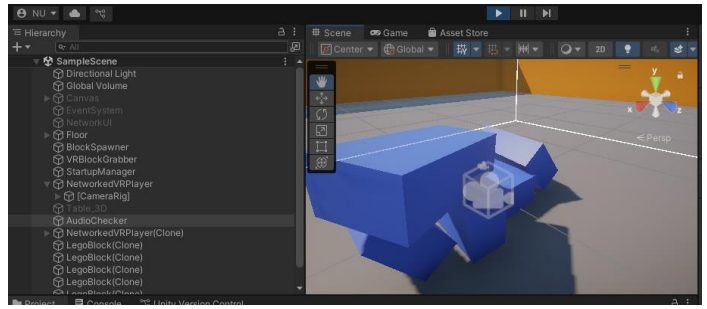

EDGE COMPONENT
HMD
Server (management)
VR-ready PC
NAS
Programmable L2/L3 switch
WiFi Access Point
Haptic gloves
Smart glasses
Raspberry Pi 3
NVIDIA Jetson NX Orin
POST-5G COMPONENT
Collegamento verso UniGE
100 Gb/s
10 Gb/s
100G Programmable L3 switch
Collegamento verso UniGE UniME UniCT UniPA UniBO
VEHICULAR COMPONENT
Management L3 Switch
Semaphore control unit
Outdoor WiFi Access Point
V2X Road Side Unit (RSU)
VLC-enabled Semaphore
VLC enabled LED Lamp post
OBU
Minicar
5G UE emulator
5G xHaul switch
SDRs
Industrial gNB
Industrial RU
Bare metal servers + GPUs
5G UEs
QKD device
RESTART
MOST
NQSTI
SERICS
SOBIGDATA
slices RI

CNR-IIT – VR


HMD
Smart glasses
Haptic gloves
HMD
...
VR-ready PCs
Servers: Management + Near edge nodes
NAS
WiFi Access Point
Configurable L2/L3 switch
Configurable L2/L3 switch

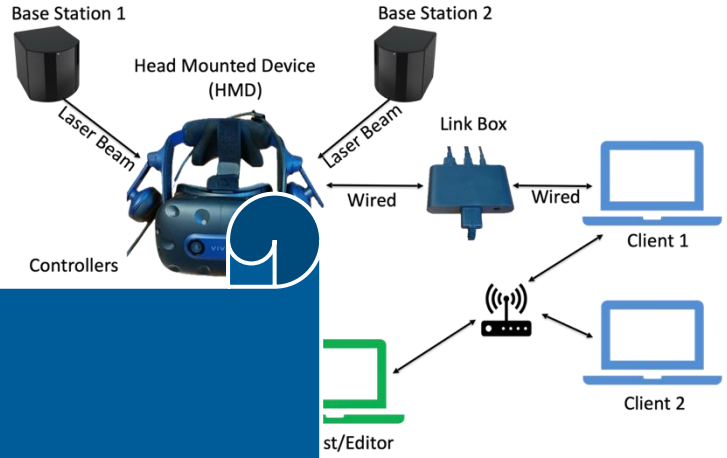

Base Station 1
Base Station 2
Head Mounted Device (HMD)
Laser Beam
Laser Beam
Link Box
Wired
Wired
Client 1
Controllers
Wireless Sensors
Client 2
Host/Editor


Persp



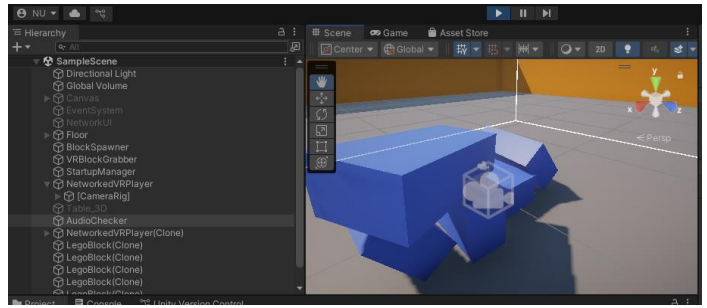
CNR-IIT – VR



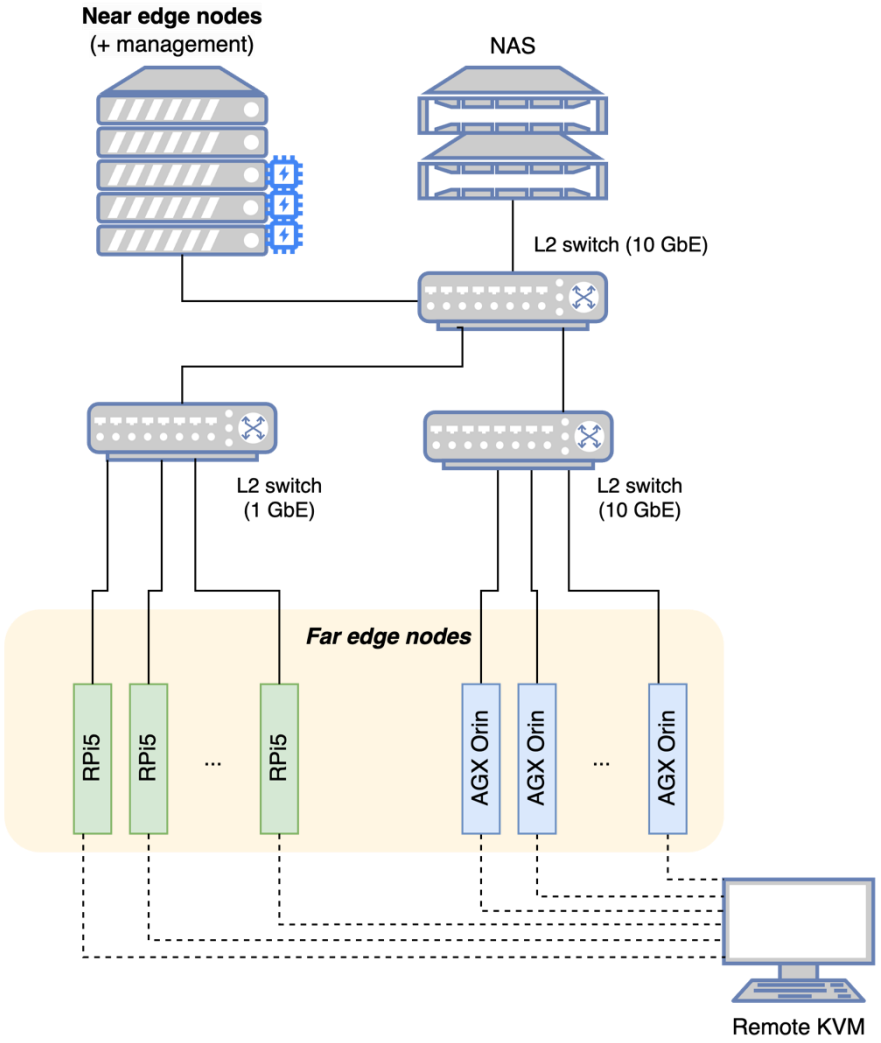


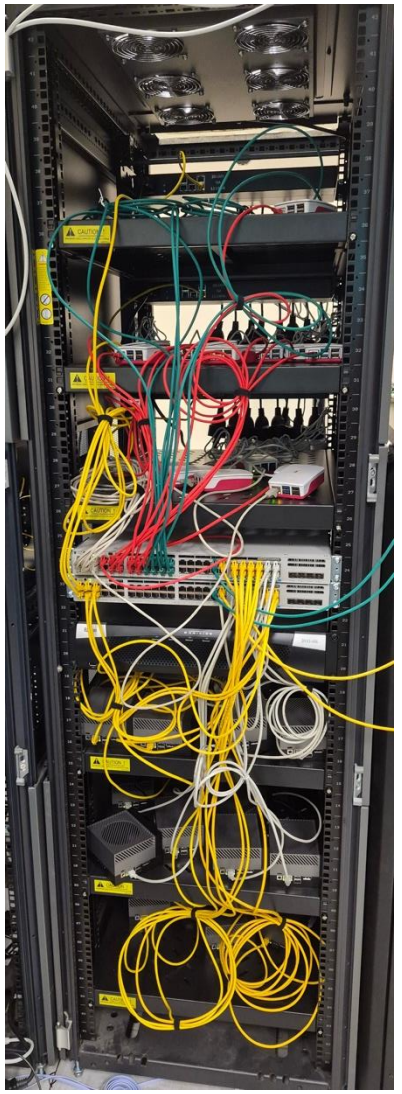
CONSUMER ELECTRONICS…
MAY CONSUME YOU





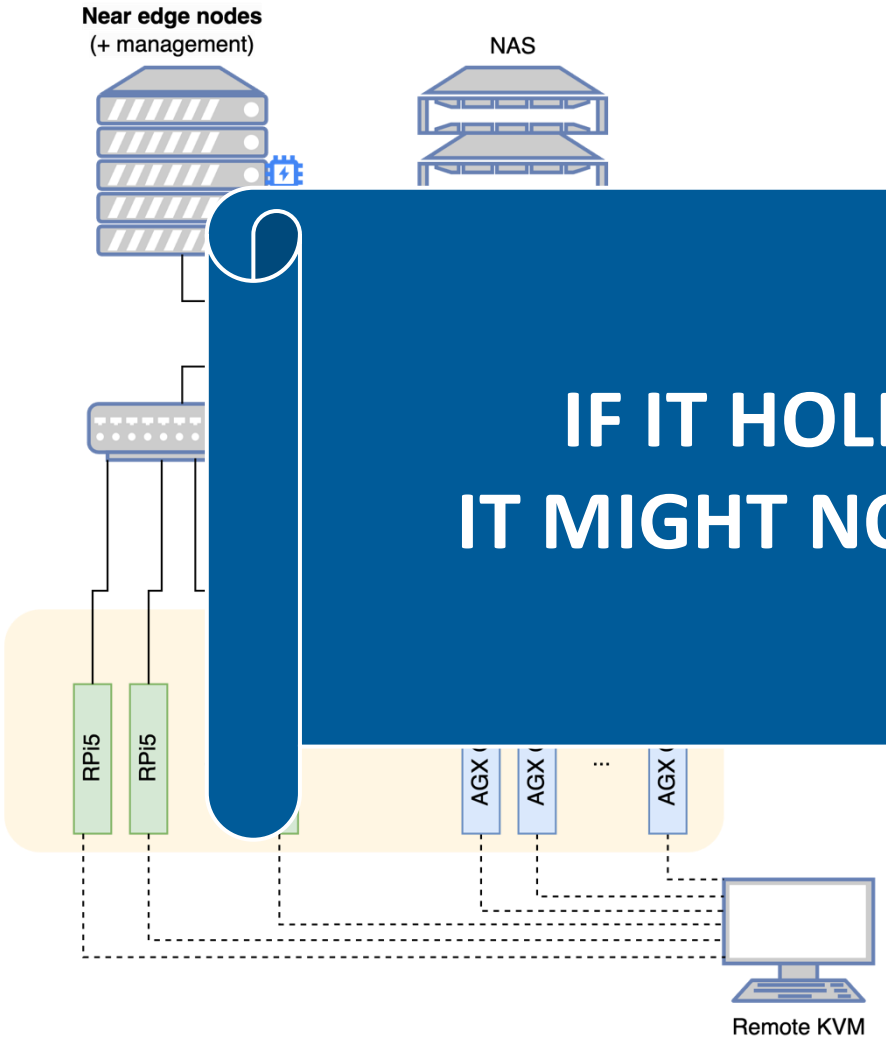
CNR-IIT – EDGE


Near edge nodes
(+ management)
NAS
L2 switch (10 GbE)
L2 switch
(1 GbE)
L2 switch
(10 GbE)
Far edge nodes
RPi5
RPi5
...
RPi5
AGX Orin
AGX Orin
...
AGX Orin
Remote KVM



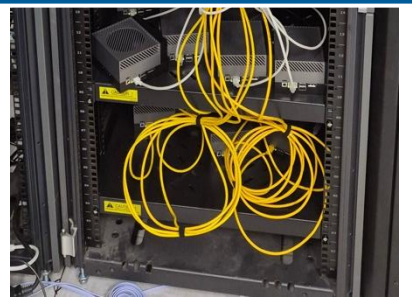


CNR-IIT – EDGE



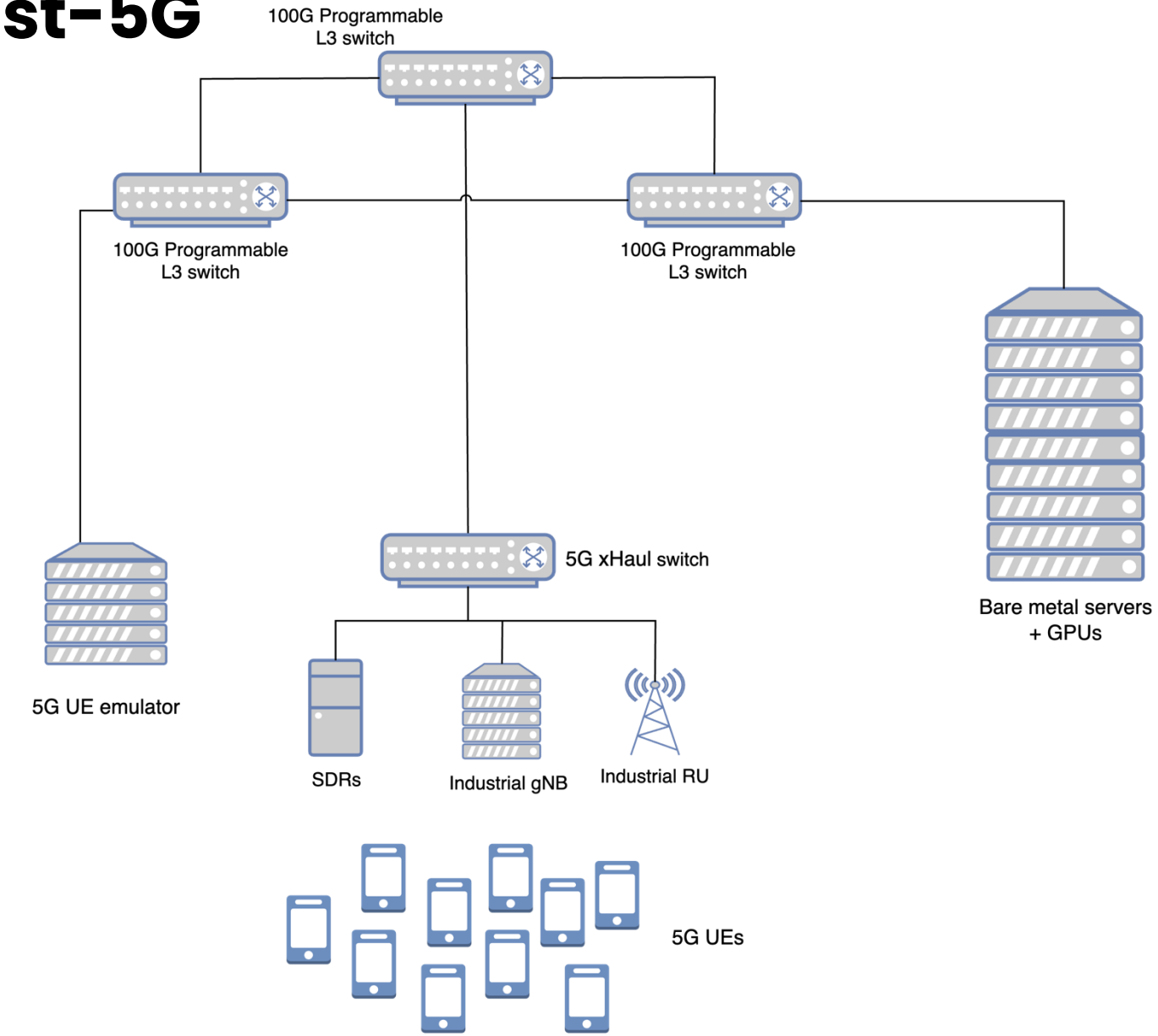
IF IT HOLDS FOR N THEN…
IT MIGHT NOT HOLD FOR 10 x N



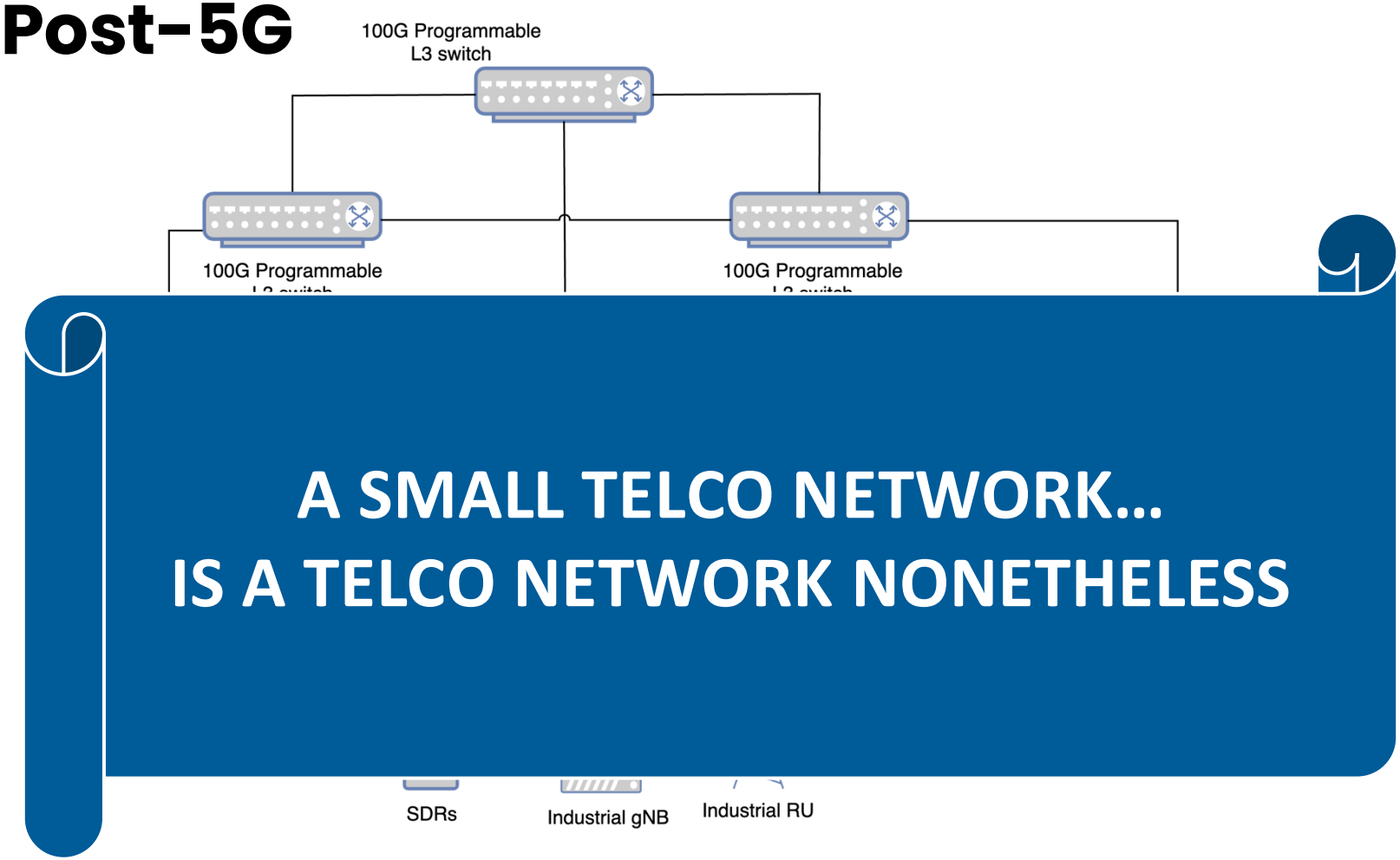




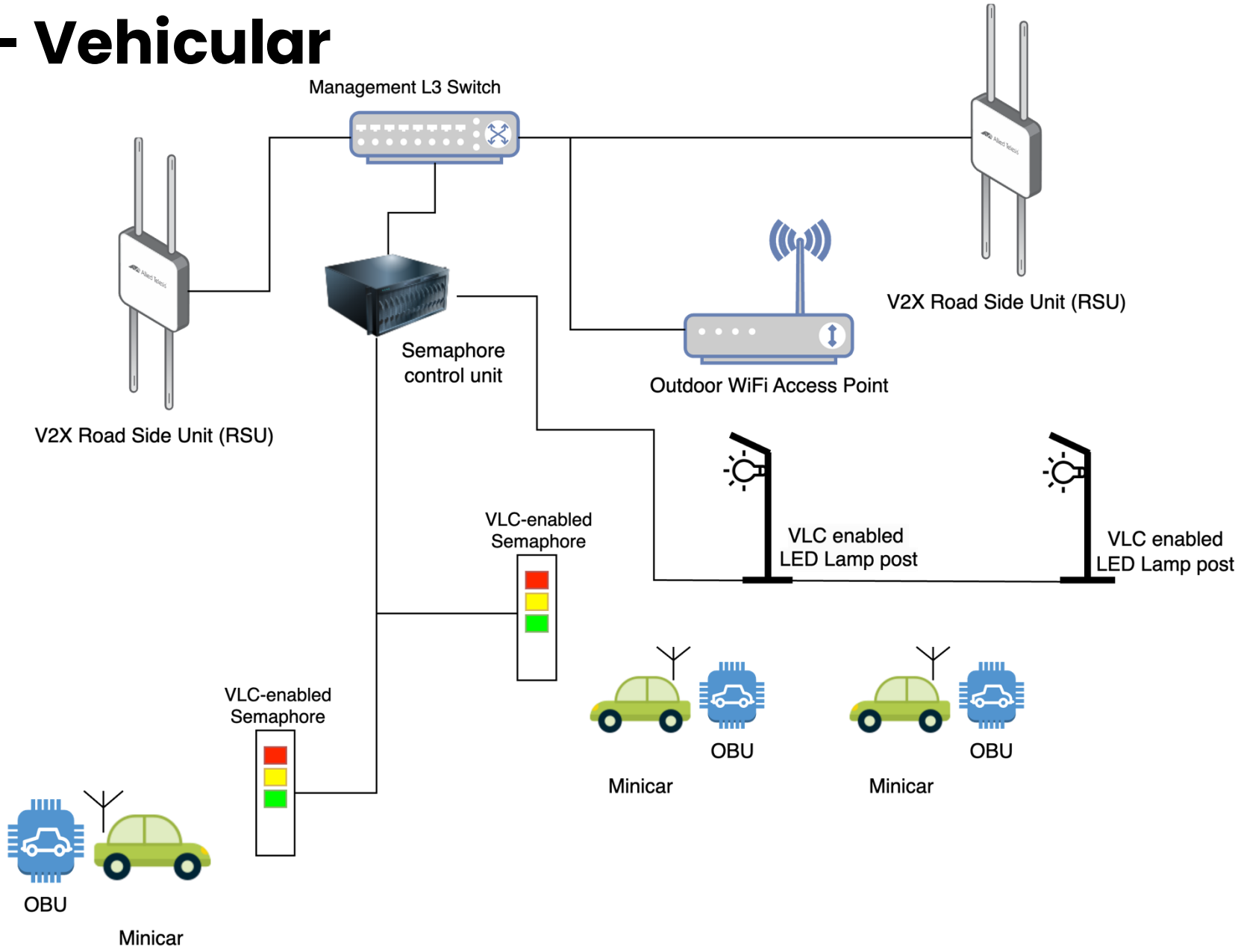
CNR-IIT – Post-5G



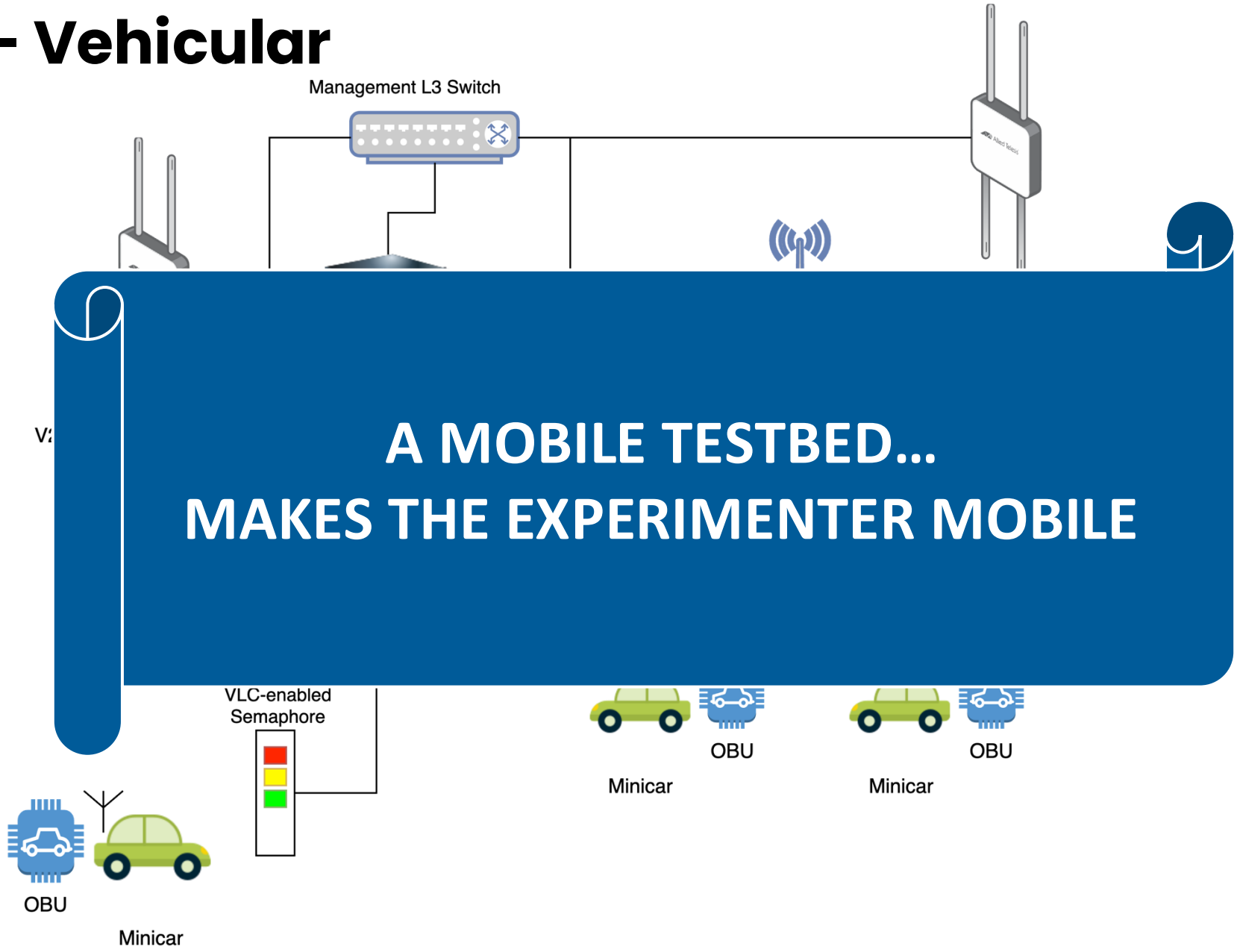
CNR-IIT – Post-5G



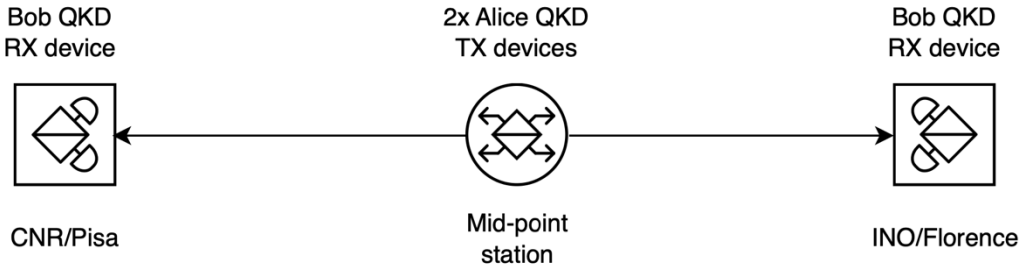
CNR-IIT – Vehicular

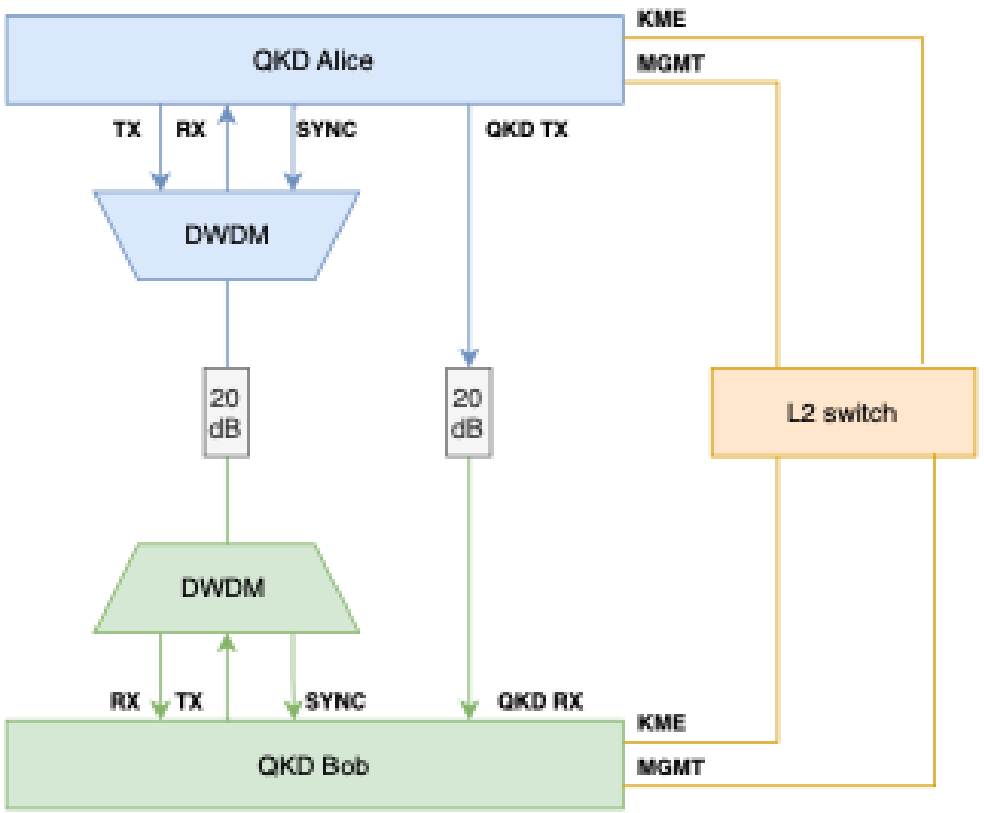


CNR-IIT – Vehicular



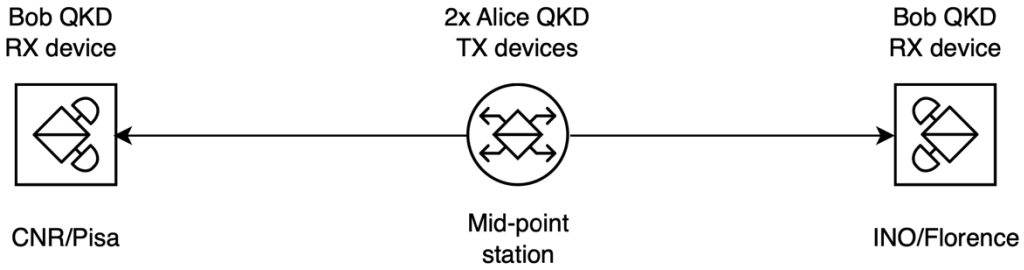
CNR-IIT – QKD

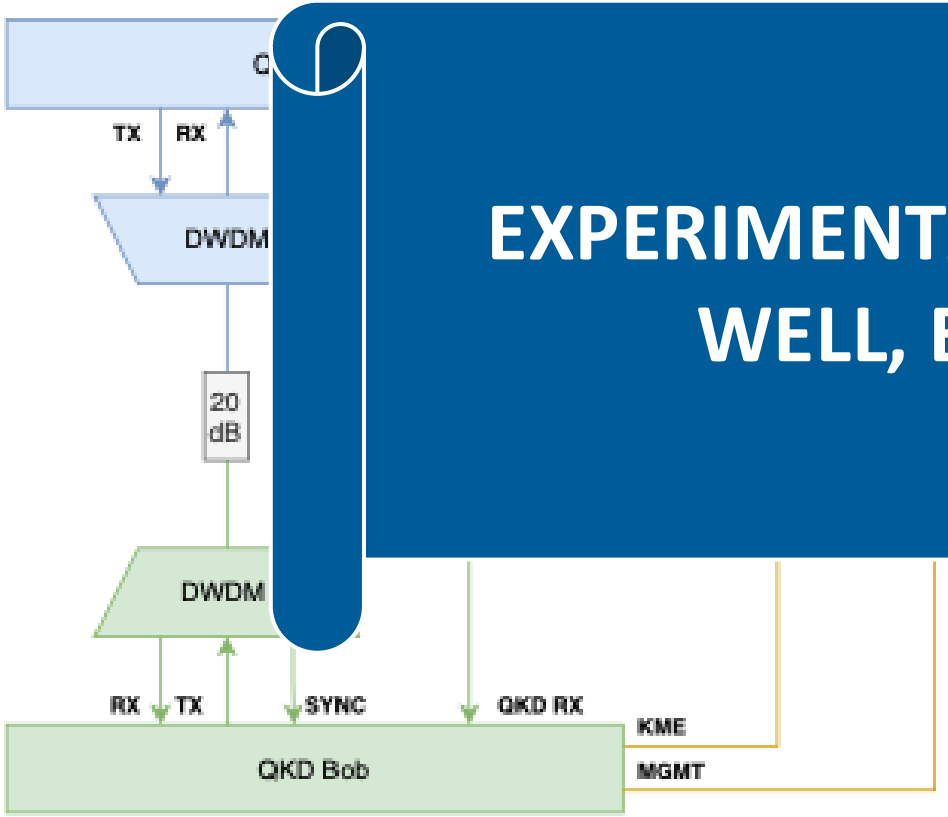

Bob QKD
RX device
2x Alice QKD
TX devices
Bob QKD
RX device
CNR/Pisa
Mid-point
station
INO/Florence


QKD Alice
KME
MGMT
TX
RX
SYNC
QKD TX
DWDM
20
dB
20
dB
L2 switch
DWDM
RX
TX
SYNC
QKD RX
KME
MGMT
QKD Bob



CNR-IIT – QKD





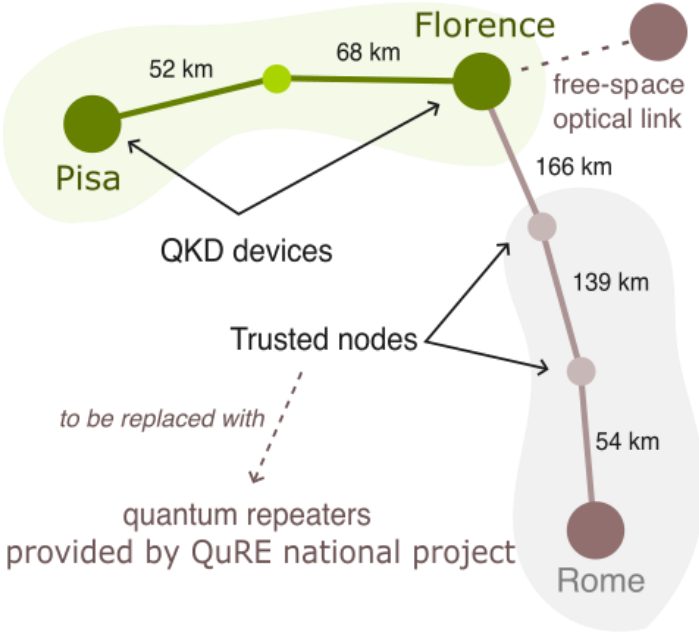
EXPERIMENTAL TECHNOLOGY IS…
WELL, EXPERIMENTAL



What next?

- VR
- EDGE
- Post-5G
- Vehicular
- QKD

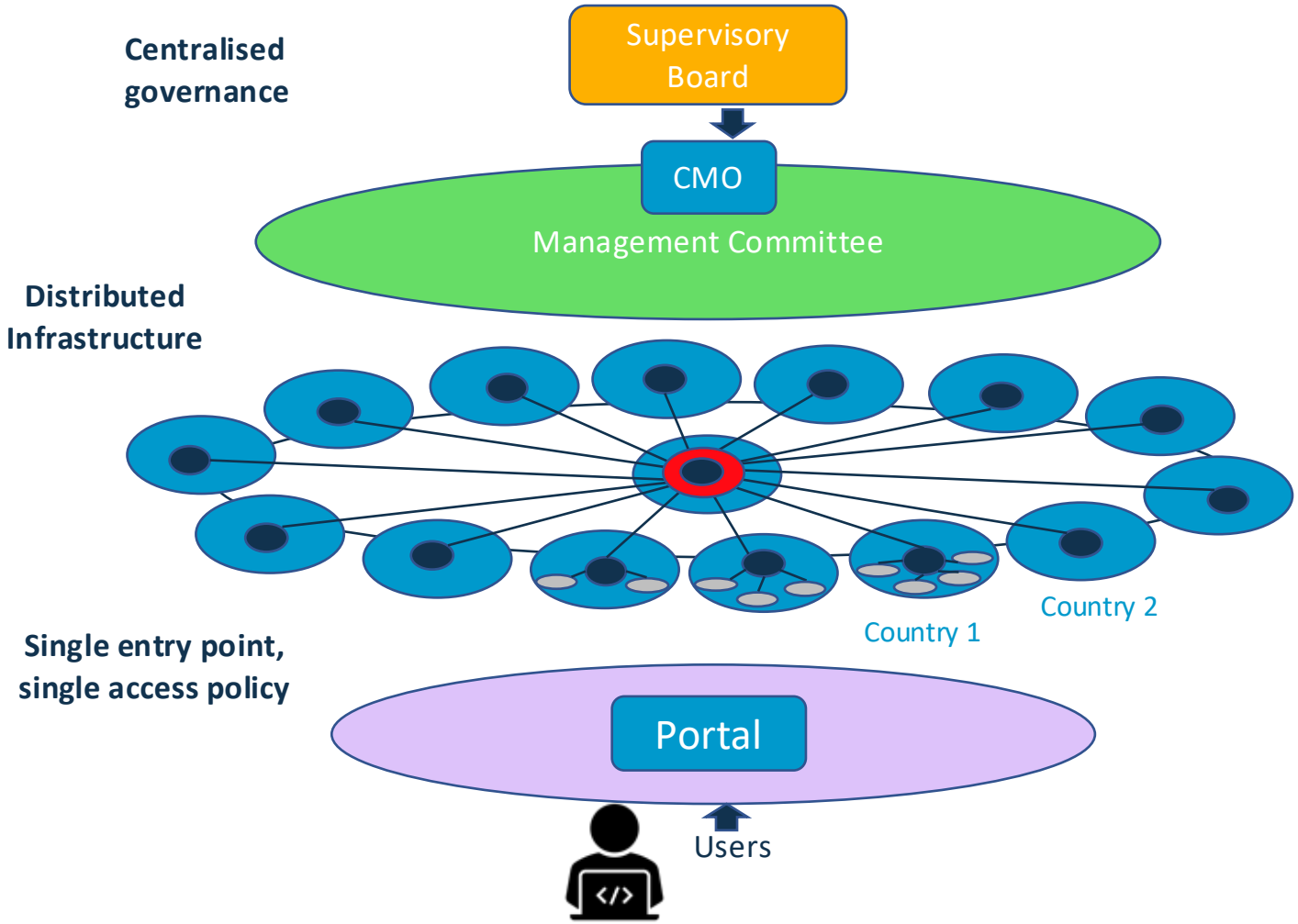
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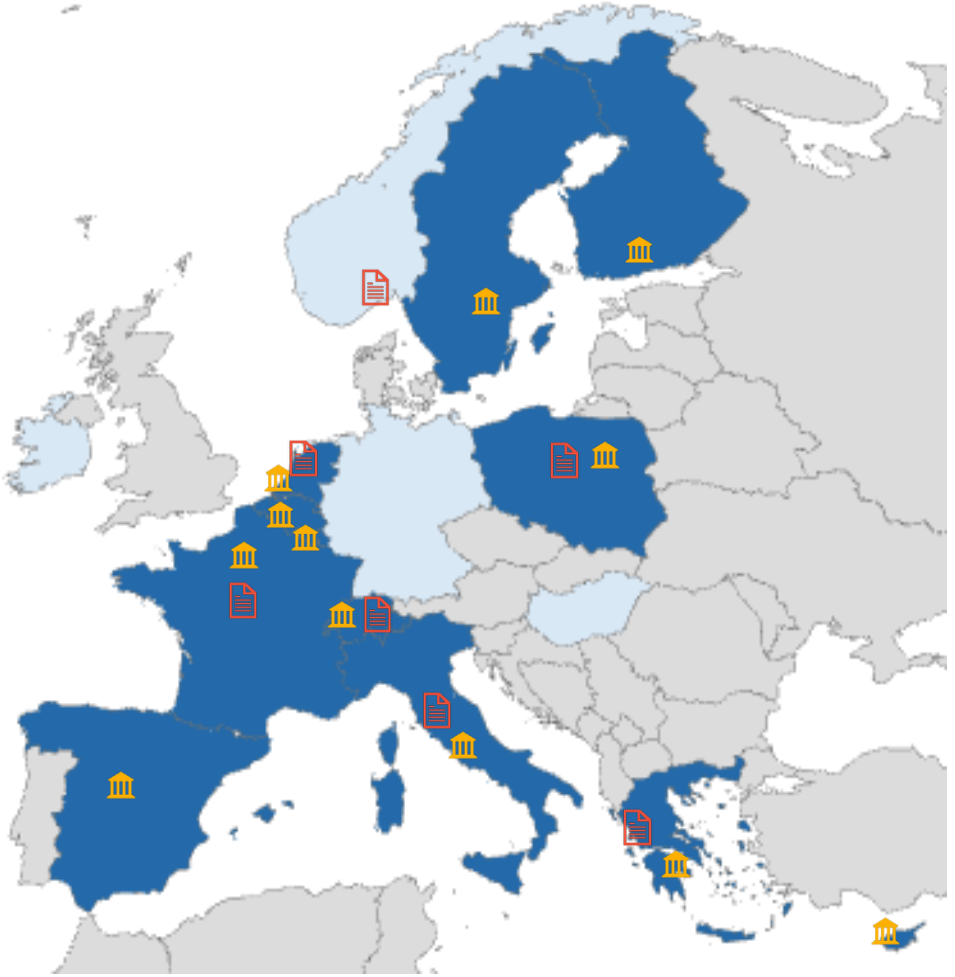


QUANTUM INTERNET ALLIANCE

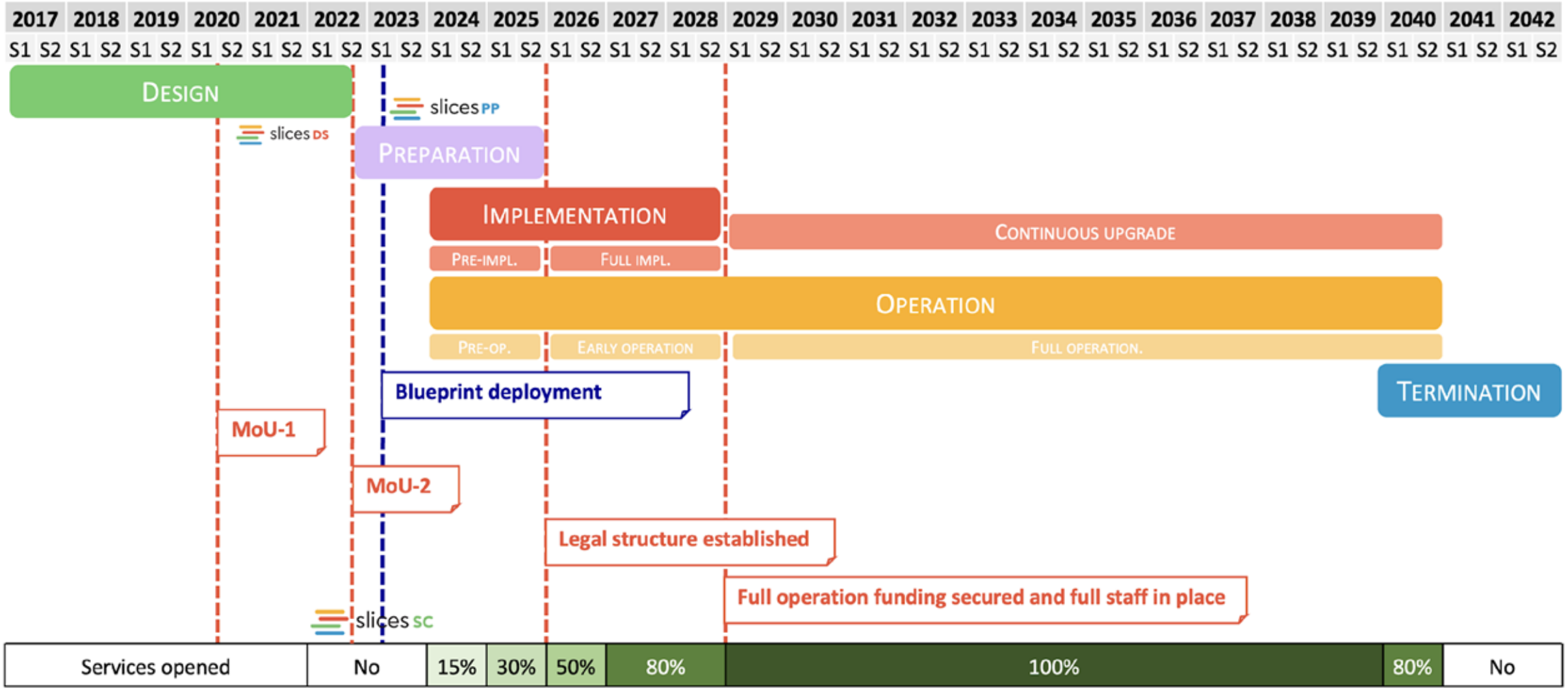
Long-term continuation: SLICES







Long-term continuation: SLICES



Long-term continuation: QIA & QI²



Pilot Facilities

Closing the Innovation Gap

Transform EU quantum labs into market-ready solutions through real-world deployment



Open Access Facilities

Driving the Ecosystem

Accelerate breakthrough innovation and drive standards adoption through shared quantum infrastructure across EU member states

Ecosystem Coordination: Position EU as the global quantum internet leader by driving ecosystem development

Long-term continuation: QIA & QI²



Out of the lab!	Pilots in operation	Continental distances
Partnerships with early-adopters	Early-adopter pilots	Build QInet, Commercial Pilots
Real-world deployment	Full open access launched	Standarization & plug and play open access facilities
Metropolitan Distances	Intermediate Distances	Long-distances



Summary


NRPP CHANGED ME
FOR THE BETTER
FOR THE BETTER, RIGHT?
imgflip.com

Summary – The real one





Thanks for your attention

https://quantum-lab.iit.cnr.it/

claudio.cicconetti@iit.cnr.it

WORKSHOP GARR 2026

NET MAKERS