athonet

Private 5G Networks

& Network Applications as Application Functions

Nicola di Pietro

Cagliari (Italy), 26 January 2023

Smart5Grid

About athonet

Athonet is a software house active in the field of mobile core networks

- Headquarters: Bolzano Vicentino (VI), Italy
- Subsidiaries: France, UK, USA, Indonesia

We develop fully virtualized mobile core networks and several related solutions both for public and private networks

Why 5G?

Source: elenabsl, shutterstock.com

Designed around services

Business-to-business technological revolution

"Infrastructural:" not only a support but an actual enabler to new production systems and services

New customers other than traditional mobile network operators, i.e., the vertical industries

Some vertical sectors:
Automotive
Utilities
City management
Healthcare
Smart manufacturing
Government and public safety

5G Target Performance

innovation platform

new technologies

≥ 500 km/h
high speed service

1/10X
energy consumption

1-20 Gb/s
peak data rate

≥10 Tb/s/km^2
data density

reliable coverage

99,999%
reliability

≥ 1 Mio/km^2
devices

<5 ms
end-to-end latency

IoT enabler

transformation of network access habits

The Power of 5G

A multitude of services tailored to the customers' needs

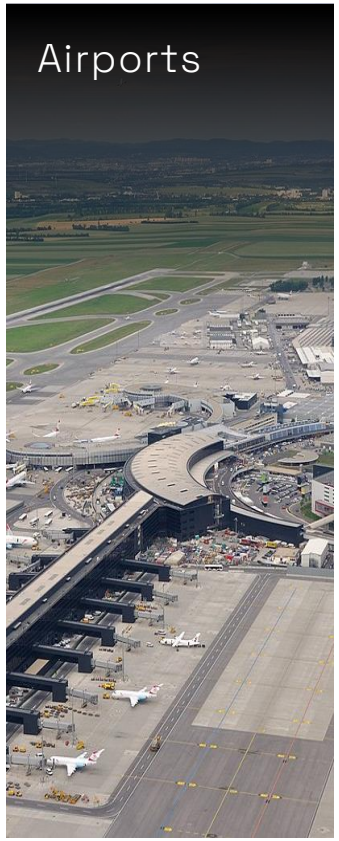
Over the same physical infrastructure

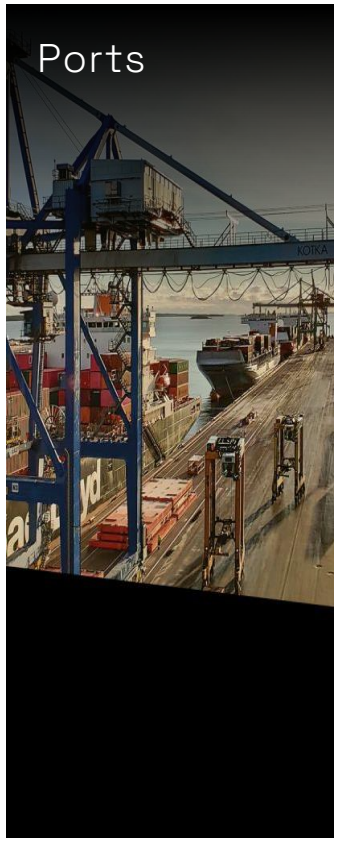
Private 5G: Not Only National Operators

It is becoming common practice for common businesses to have their own 5G.
From nation-wide public networks to a plurality of “small” private, customized networks

NB: based on the availability of frequency for lease to private entities, the mobile network operator’s role remains prominent!

Much More Than Wi-Fi



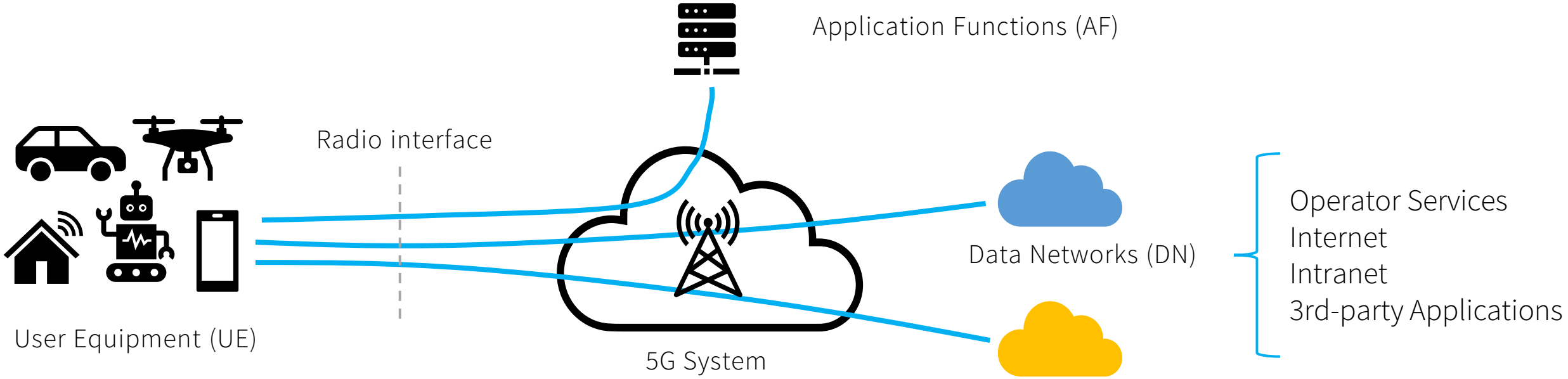


Guaranteed QoS
Latencies
Mobility

Network Control
Customization
Coverage

The 5G System

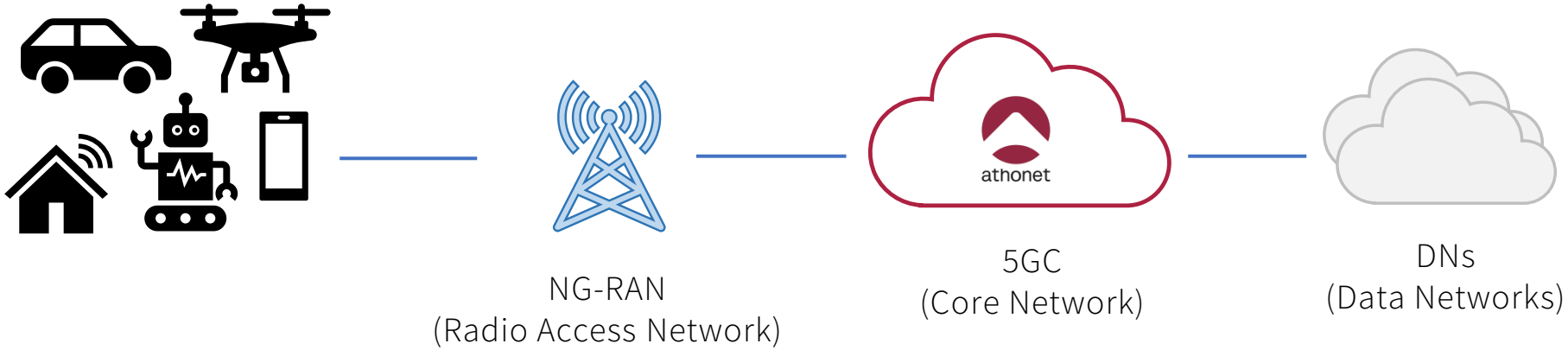
A 5G system provides data connectivity services to transfer data packets between User Equipment and Data Networks or Application Functions over a radio link.



The 5G System

Next-Generation Radio Access Network (RAN)

- Handles the radio interface
- Copes with physical impairments (e.g., fading, interference, power reduction), inter-base-station handovers, and session multiplexing (scheduling)



The 5G Core Network, the “brain” of a mobile network

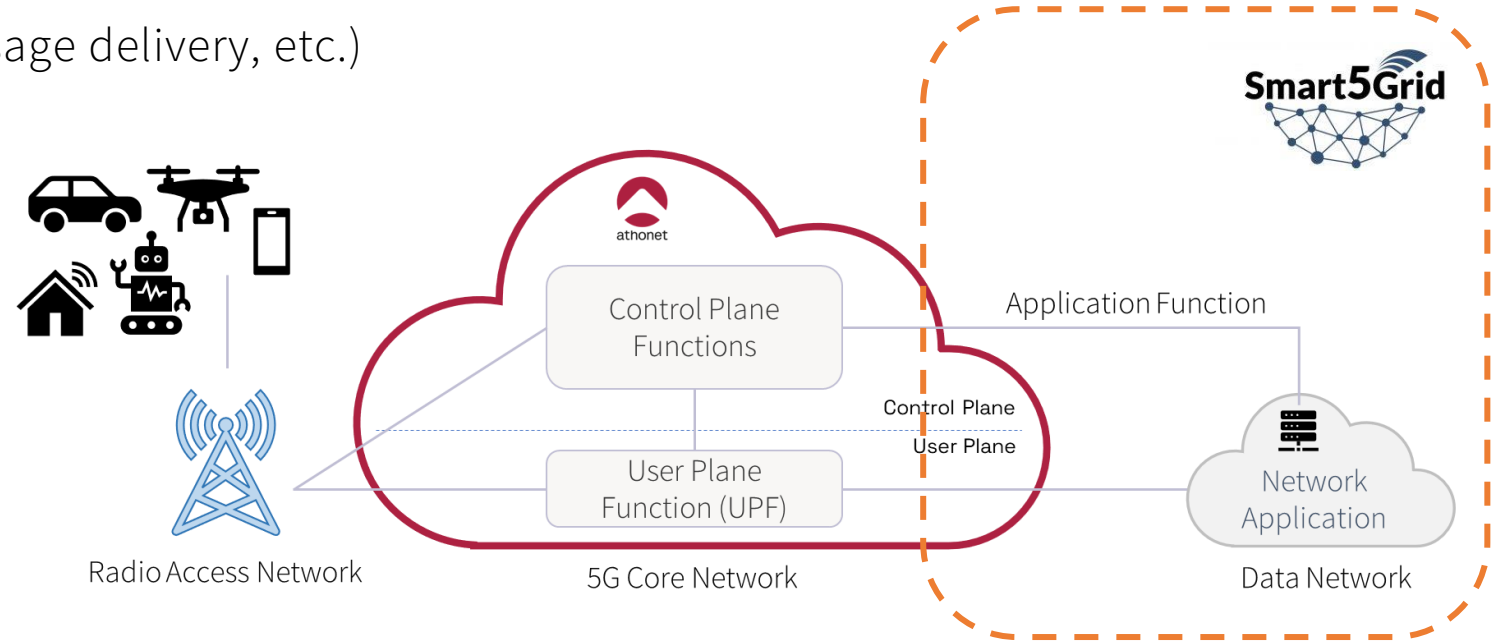
- Interconnects the RAN with “the rest of the world” (Data Networks)
- Takes care of all processes not related to radio access (e.g., mobility management, security, Quality of Service management, IP address allocation, etc.)

The 5G Core Capability Exposure

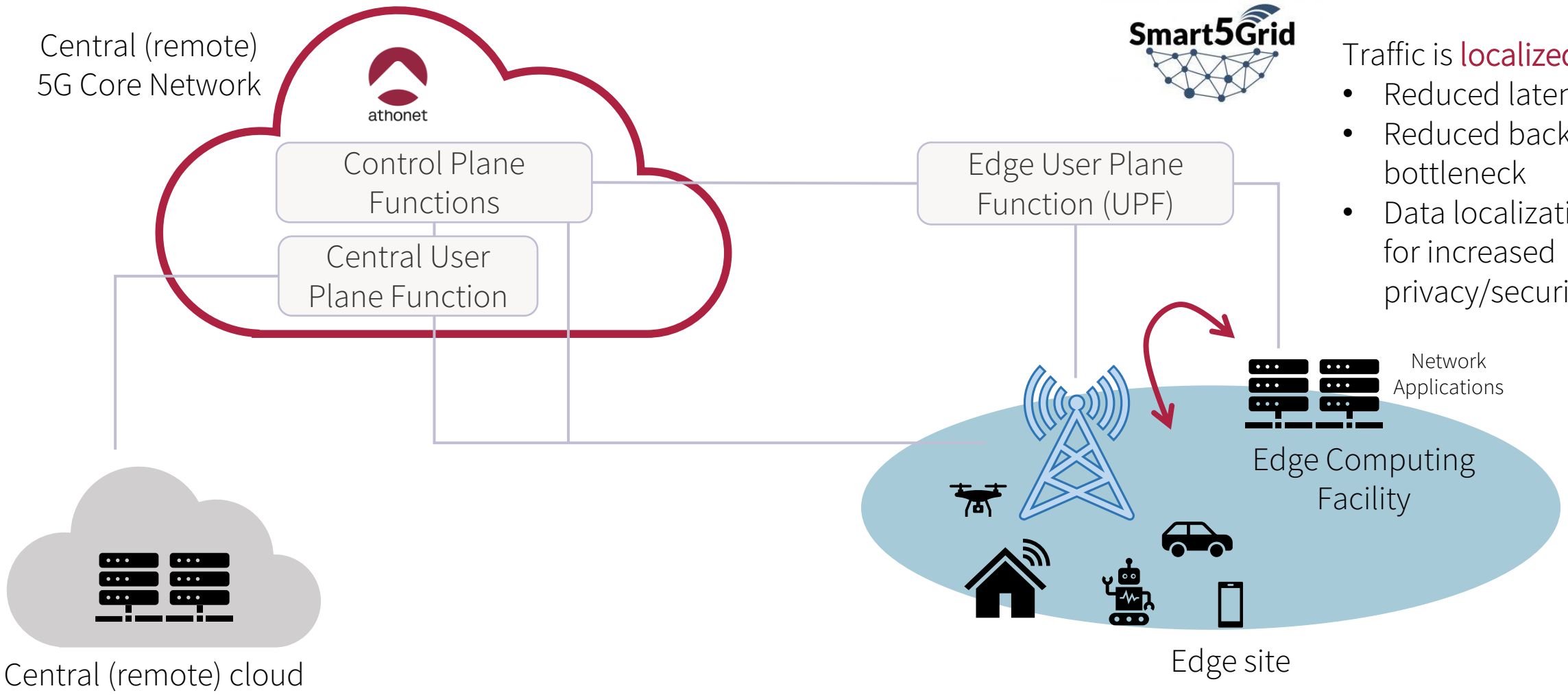
Certain control-plane 5GC functionalities are accessible to third parties (e.g., Network Applications) via "Application Functions" and exposed interfaces.

External Network Applications can:

- Retrieve event notification
  (loss of UE connectivity, UE mobility, message delivery, etc.)
- Trigger UE actions
  (UE activation, feedback message, etc.)
- Retrieve network analytics
- Configure network parameters
  (routing, QoS, etc.)



Hybrid Deployment and Edge Computing



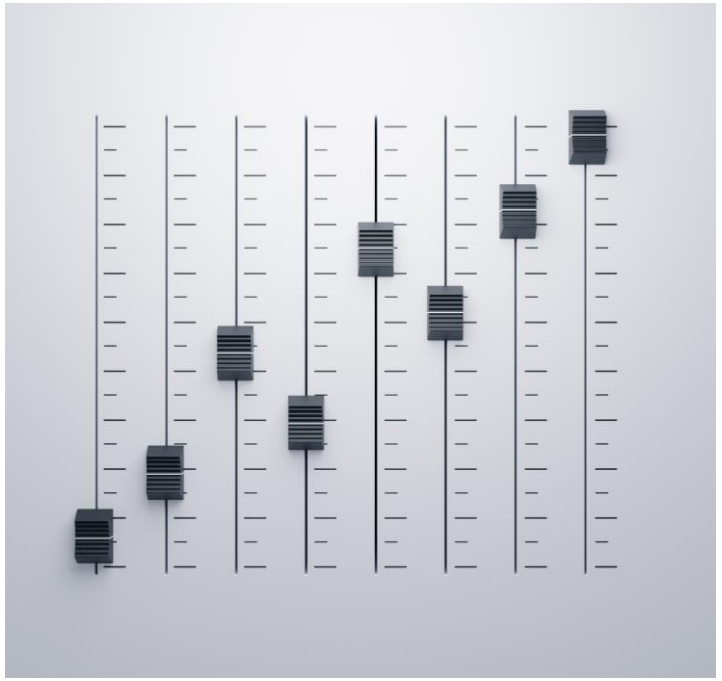
In Conclusion

Private 5G is a reality!

It is becoming common practice for common businesses to have their own 5G

Millions of networks?

Athonet has ~12.500 4G/5G active licenses right now



Capability Exposure!

Network Applications have control capabilities over the 5G network

athonet

Thank you for your attention

Athonet ITALY
VAT IT01067590321
Via Ca' del Luogo 6/8
36050 Bolzano Vicentino
Italy

Athonet FRANCE
VAT FR90853493617
12 Avenue du Maine
75015 Paris
France

Athonet USA
1 Marina Park Drive
Suite 400
Boston MA 02210
United States

Athonet UK
VAT 365844660
107-111 Fleet Street
London EC4A 2AB
United Kingdom

athonet.com

Why 5G?

Designed around end users with identical requirements

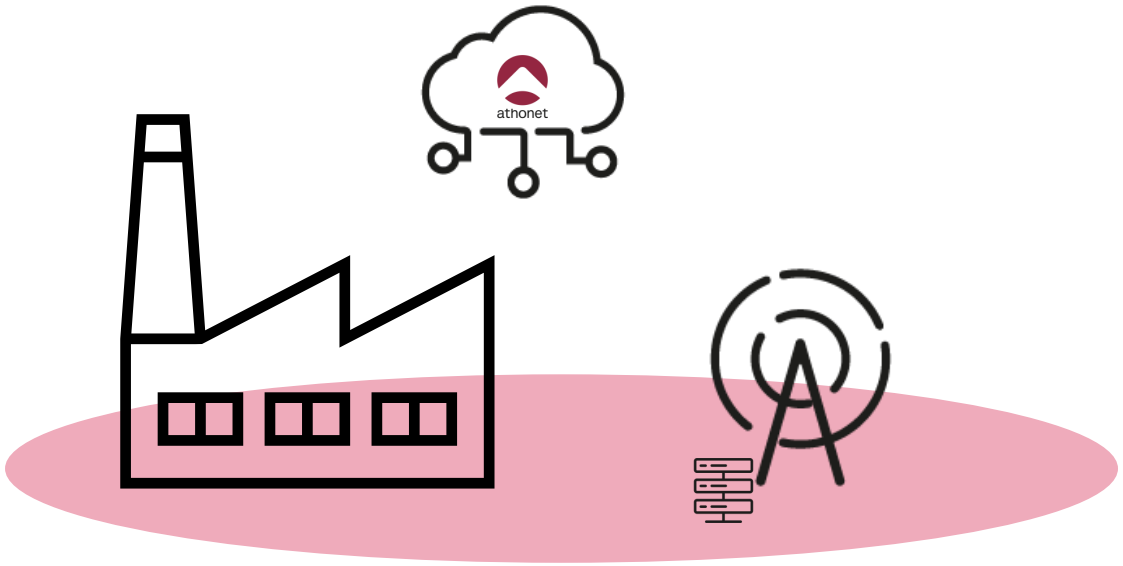
Voice services

Broadband data exchange, especially in downlink

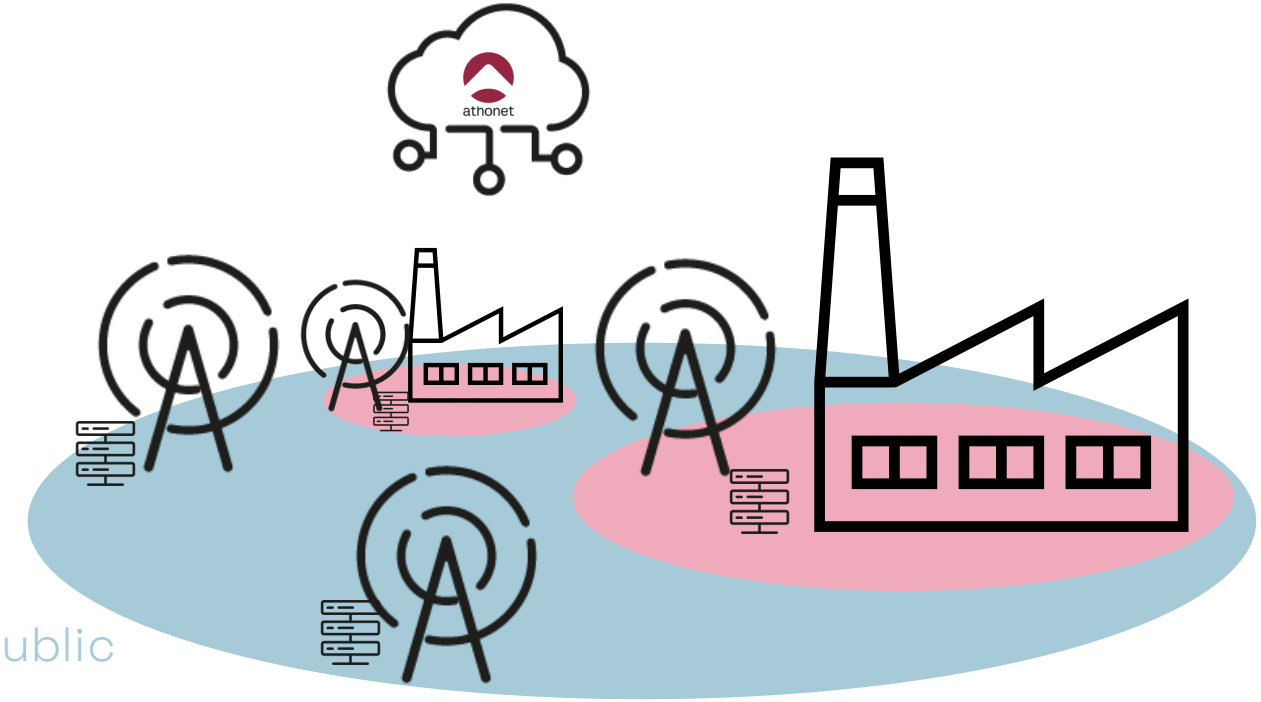
Best-effort performance

Private 5G for 3GPP: Non-Public Networks

Standalone NPNs

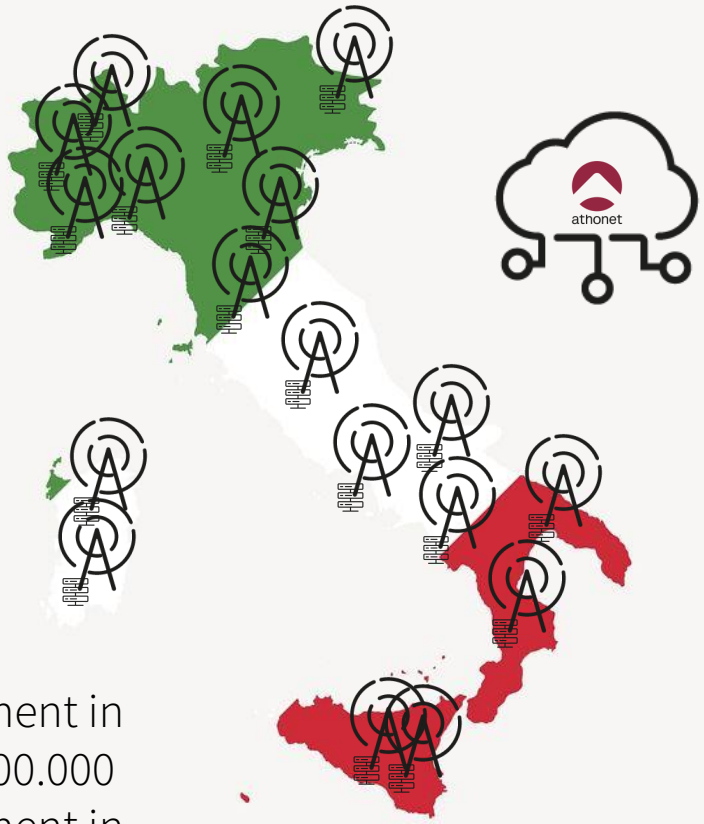


Public Network Integrated NPNs (via network slicing)



Sizes of 4G/5G Private Networks

Tactical network solution
< 14 kg
few-km coverage



Largest deployment in terms of UE: ~700.000
Largest deployment in terms of connected radio towers: ~250.000

Private Edge Connectivity Bubbles

Distributed user plane functionalities and small-size radio equipment, connected to the on-cloud control plane

Enabler of edge computing
Transportable
WiFi-like deployment
Affordable (and smaller costs when traffic does not flow through the cloud)