



imec

Next-generation deterministic communication systems

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5G: 1 ms radio latency spec



Tactile Internet



End-to-end (E2E)
latencies < 5ms

Industrial automation



20us to 10ms latencies
for M2M
Ultra-reliable

Social roboverse / Collaborative robotics



Multi-sensory input
to remote decision-
making < 10-100ms

Holographic-type communications



E2E latencies < 20ms
Gbps rates

Larger-scale, highly variable context!

6G



7 Guiding principles for future deterministic communication systems

END-TO-END
NOTION OF
TIME

CO-DESIGN
PHY/MAC,
SW/HW, APP/NET,
COMM./PROC.,
E2E

DETERMINISTIC
CONTROL
PLANE &
FLAWLESS
AI/ML

xGRedNet/
SpecNet:
LEAN, FIT-FOR-
PURPOSE
SOLUTIONS

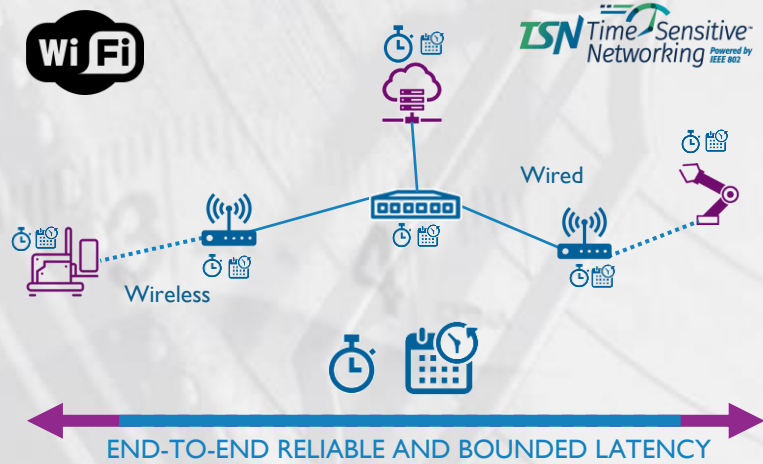
TIME-AWARE
KPIs &
BENCHMARKS

EARLY PROOF
&
VERIFICATION

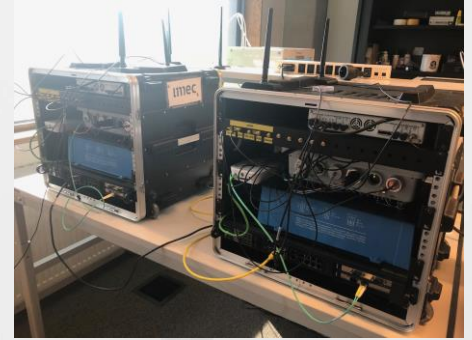
OPEN
INNOVATION,
MORE WHITE-
BOX DESIGNS

imec's key building blocks towards next-gen. deterministic networks

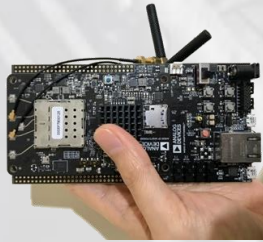
3GPP + IEEE tech



Portable O-RAN 5G-in-a box Standalone testbed



Portable 5G UE



Openwifi

World's first open full-stack chip design

CONVERGENCE

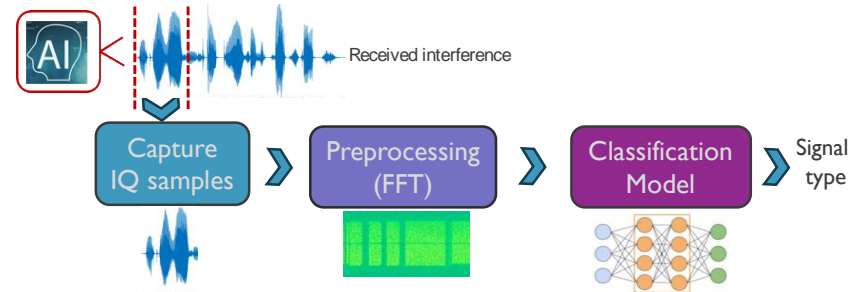
Indoor 5G - Wi-Fi - TSN test facilities

imec's key building blocks

Monitoring, verification & insights

localhost:3000/d/pTSyQloWk/in-band-network-telemetry-wifi?orgId=1&refresh=5s&kiosk=tv

In-band Network Telemetry (WiFi)



Decision-making & adaptation

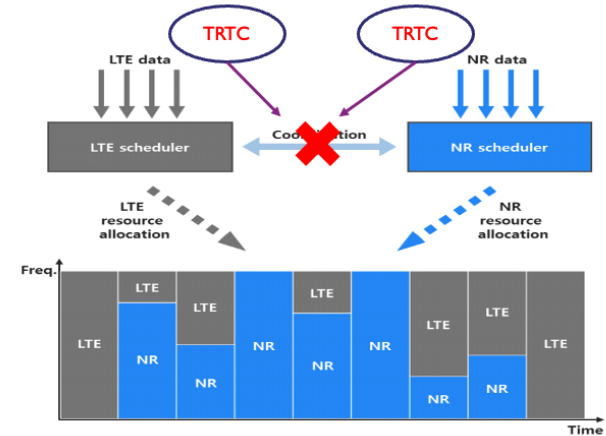
- 1 Resource allocation
- 2 End-to-end scheduling
- 3 Network-aware applications & stacks

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Technology Recognition and Traffic Characterization (TRTC)



Dynamic Spectrum Sharing between 5G-NR and LTE





imec

embracing a better life

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