



# 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

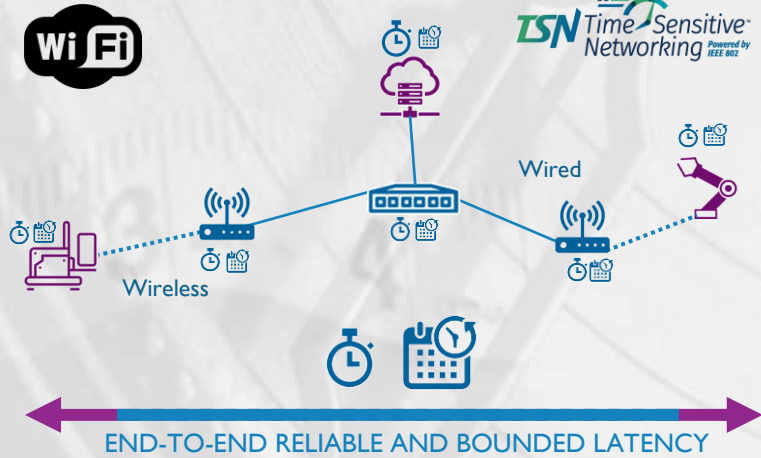
TIME-AWARE  
KPIs &  
BENCHMARKS

EARLY PROOF  
&  
VERIFICATION

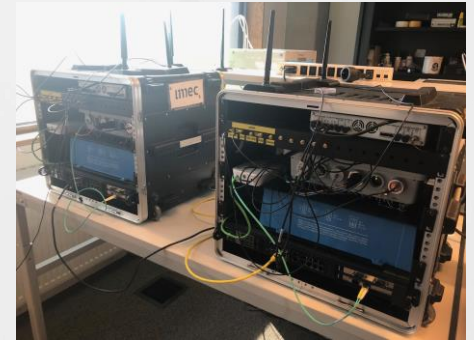
OPEN  
INNOVATION,  
MORE WHITE-  
BOX DESIGNS

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

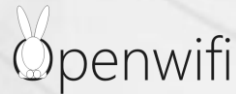
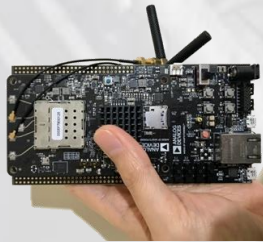
3GPP + IEEE tech



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



Portable 5G UE



World's first open full-stack chip design

CONVERGENCE

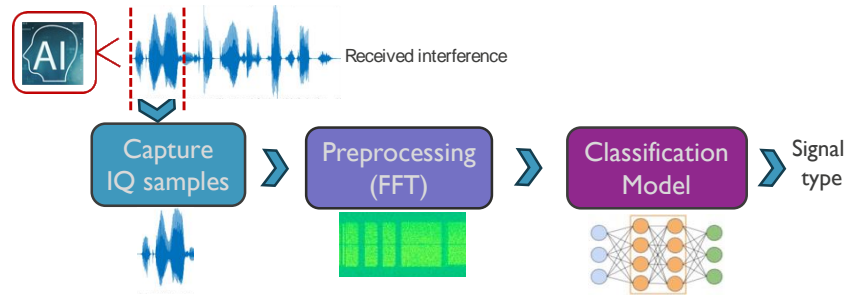
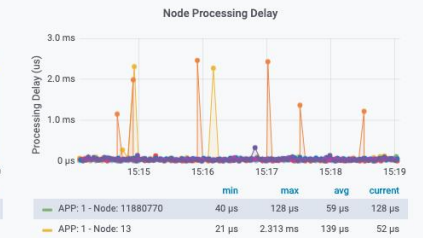
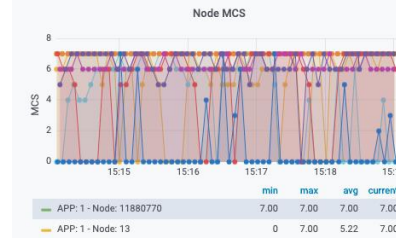
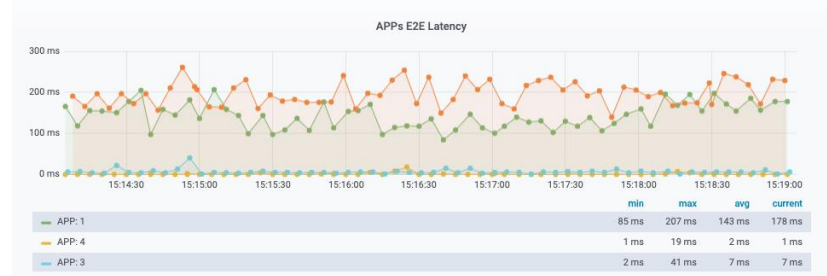
Indoor 5G - Wi-Fi - TSN test facilities



# imec's key building blocks

## Monitoring, verification & insights

### In-band Network Telemetry (WiFi)



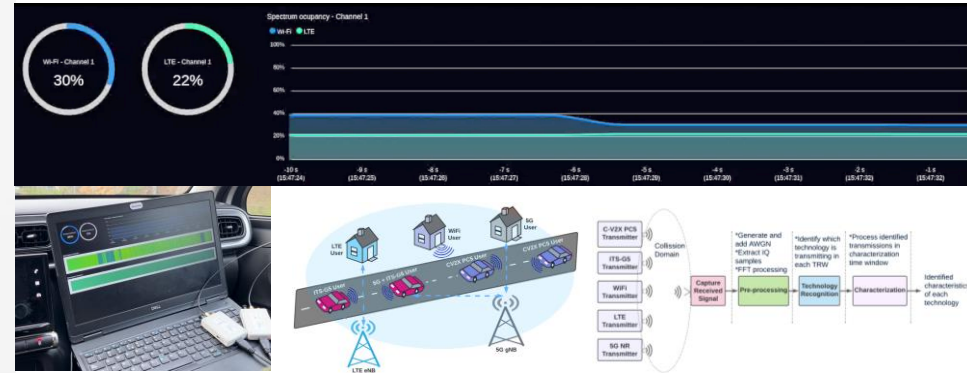
# imec's key building blocks

## Decision-making & adaptation

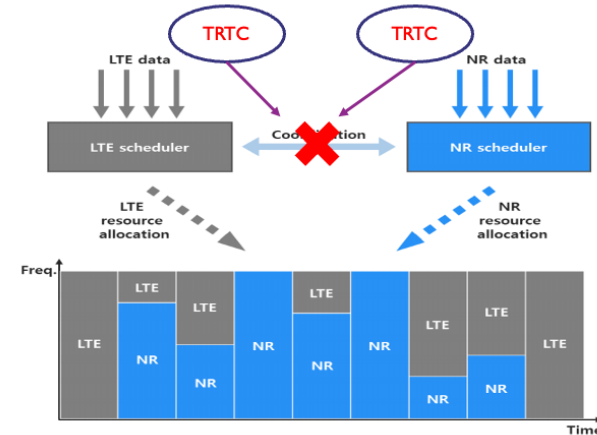
- 1 Resource allocation
- 2 End-to-end scheduling
- 3 Network-aware applications & stacks

...

## Technology Recognition and Traffic Characterization (TRTC)



## Dynamic Spectrum Sharing between 5G-NR and LTE





embracing a better life

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