Delivering the Potential of 5G Networks to the End Users

Michele Polese Department of Information Engineering University of Padova polesemi@dei.unipd.it







5G in a nutshell

- Next generation of cellular networks
- Market deployment 2019 (USA), maturity 2025-2030
- Enables services worth \$123.27 billion (automotive, VR)
- **Ultra-high data rates** with mmWaves (up to 20 Gbps)
- **Ultra-low latency** in the radio access (< 1 ms)

... but the engine is not enough to build a winning race car!



Old & rusty transmission, shell and wheels deliver an underwhelming performance even with a powerful engine

We discovered that 5G severely underperforms if not properly integrated with the rest of the **network**

For more technical info visit **polese.io**

This research project designs networks and algorithms that **match** the capabilities of 5G





The optimization of complex end-to-end networks with 5G base stations requires a comprehensive approach

Architectures	Algorithms	Artificial Intelligence
Protocol video stre (90% of Ir	used for browsing, earning internet traffic)	
5G mobile networks at mmWave frequencies have high capacity but are unrepuble We proposed a multi connectivity approach Reliable performance	TCP suffers the variability of the 5G mmWave channel: high latency and low res milliProxy exploits cross-layer information to reduce end-to-end latency (up to 43 times) and improve the throughput	Data-driven network management
High coverage Low data rates SG mmWave High data rates	$ \begin{array}{c} \hline \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ $	Innovative services based on machine learning
For more technical info visit polese.i	o 😂 (intel) INTERDIGITAL	