# Improved Handover Through Dual Connectivity in 5G mmWave Mobile Networks

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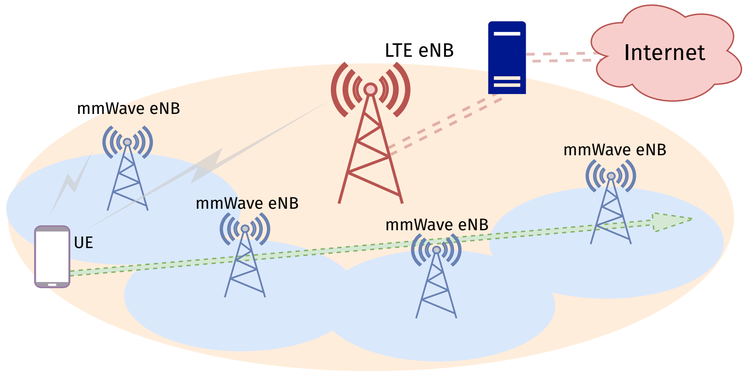
## Objective

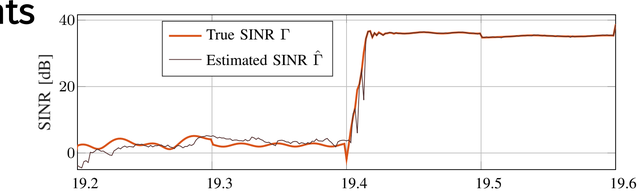
**Dual Connectivity (DC)** architecture (LTE and mmWave) for *agile mobility management* to

- Track the UE SINR across multiple mmWave eNBs
- Promptly react to **outage**
- Provide more stable connectivity
- Reduce the service interruption time




## ns-3 simulator

- NYU measurement based model + LOS/NLOS transitions modeled with **experimental traces of blockage events**




- End-to-end simulator with full TCP/IP and 3GPP-like stacks

## DC Architecture

- UE is connected to LTE eNB and a mmWave eNB at any given time
- PDCP layer aggregation
- Local coordinator (e.g., LTE eNB) collects channel measurements and triggers user association procedures every *D* ms

*Optimal eNB-UE pair tracking*

## Faster mobility procedures

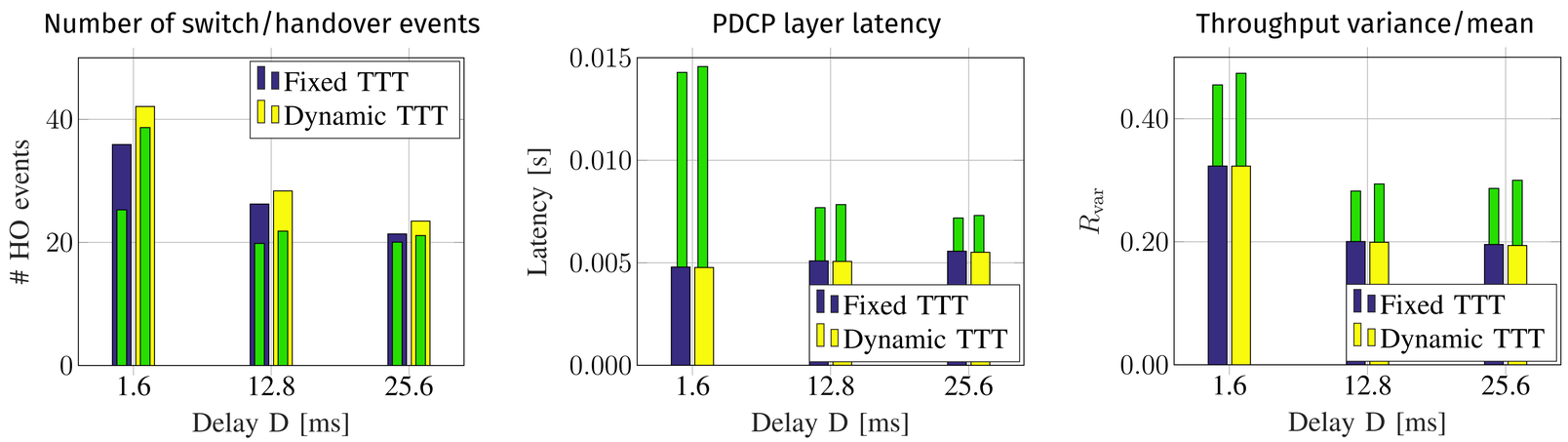
- ***Fast Switching*** **->** instantaneous switch to LTE when all the mmWave eNBs are in outage
- ***Secondary Cell Handover*** **->** fast HO aided by the LTE coordinator to avoid interactions with the core network

*No service interruption*

## Main results

*First evaluation of handover in mmWave with detailed mmWave dynamic models + e2e protocol stack + DC architecture*

- Narrow green bars -> baseline with hard handover and single connectivity
- Yellow and blue bars -> proposed DC architecture with two HO algorithms: fixed Time-to-Trigger (TTT) is the traditional LTE handover and dynamic TTT adapts the TTT based on the SINR




*DC enables smarter mobility management with lower latency and smaller throughput variations*

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