

DI5GUISE: A highly Dynamic Framework for Real-Time Simulated 5G Evaluation

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Summary

A real-time hybrid physical and simulated framework to evaluate both high throughput applications and large scale low-rate devices in a 5G network by extending mmWave (5G) module of NS-3

Contribution: DI5GUISE allows running reproducible experiments in a simulated 5G network. Over 70 different configuration choices are available. Packet route is optimised over the EPC. Modifications to the TTI scheduler code offer Channel Quality Indicator (CQI) rates for each attached active client

DI5GUISE

- Simulation tool for real-time 5G streaming
 - full stack 5G infrastructure
- Building on the existing 'mmwave' module
 - PGW, EPC/5GC, gNB, RAN, UEs
- Scheduling, Pathloss and Mobility models
- Optimised EPC packet routing
- Use cases easily extendable to other applications:
 - IoT (Massive IoT, NB-IoT)
 - Vehicular (Autonomous, Connected)
 - Industry 4.0 (CPF, Cloud, Edge)
 - Smart City (CPS, M2M)

Simulation Framework

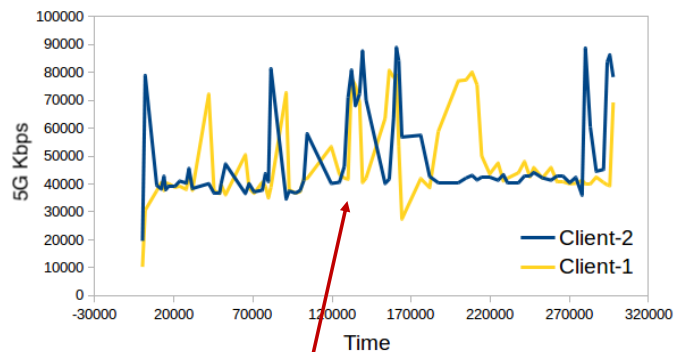
- Extendable NS-3 based tool
 - over 70 configuration options
 - tested on Ubuntu 16.04, 18.04
 - build options for NS-3 versions .26, .29
 - build options for mmwave 2.0
 - TTI scheduler modifications for CQI
 - Viewable rates in excess of 80Mbps

Further information and build instructions available at:
<http://www.cs.ucc.ie/misl/research/software/di5guise/>

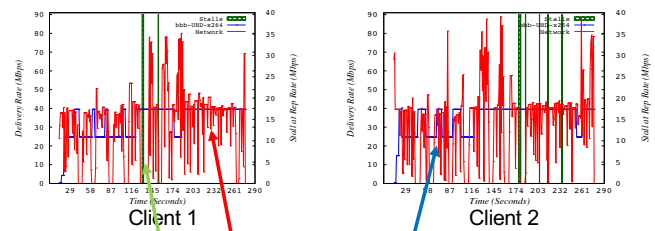
Use Case

Real-Time 4K UHD DASH Video Streaming

2 Client - NS3 5G mmwave simulation



Cumulative Bitrate in Excess of 150 Mbps



Variation in Throughput, Achievable Video Quality and the impact of Stalls due to 5G model options for Mobility, Fading loss and Scheduling Decisions

4 Client - NS3 5G mmwave simulation

