



5GIA-TSDSI Webinar on “5G Trials and Pilots”

22 September 2021 1100-1300 CET / 1430-1630 IST



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5G Smart City

Massive Multi-access Uplink from Mobile Ambulance

By

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Trice Imaging ties up with Samsung (Dallas)

<https://triceimaging.com/project/emergency-medicine-project/>



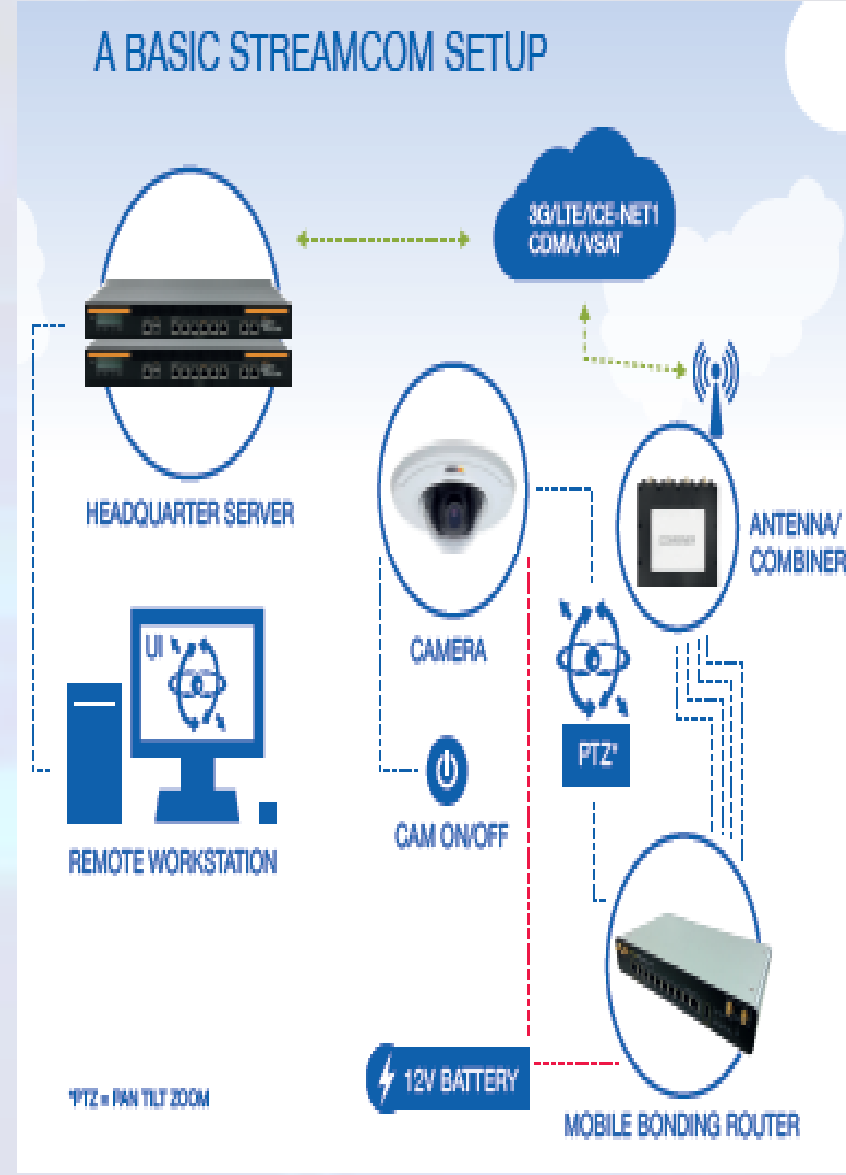
Mobile Stroke Unit fitted with CT Scanner

<https://med.uth.edu/neurology/news/uthealth-introduces-nations-first-mobile-stroke-unit/>



UTILISE CRITICAL TIME WITH REMOTE VIEWING

1. Camera with predefined positions. Switching view with a remote controlled interface, enables live feed treatment.
2. Reliable hardware setup ensures that video streaming is delivered directly to your own firewall protected server.
3. Control the situation with Pan, Tilt and Zoom controls embedded into your remote user interface (software).
4. User interface can be customized during the installation process, so that all your requirements are met.

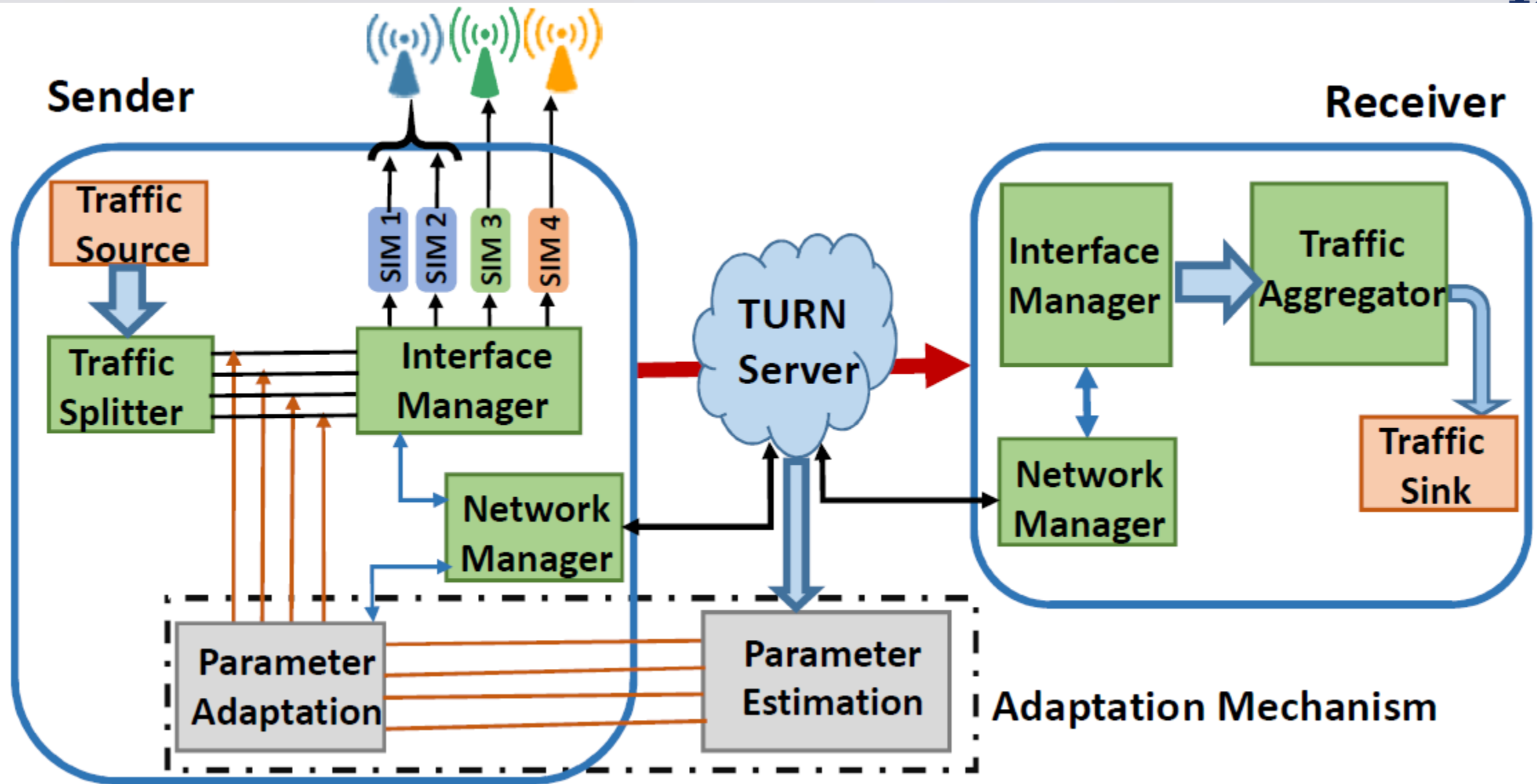


Existing Scenario

- Increasing trend of connecting ambulances to the emergency response centre
- Ambulances expected to act as a source of data (imagine 4k resolution streaming) with strict delay jitter requirements
 - Uplink
- Cellular systems are not designed for high uplink bandwidth
- Coverage during mobility is not predictable (includes cell load)
 - No data loss (recover from short-term losses)

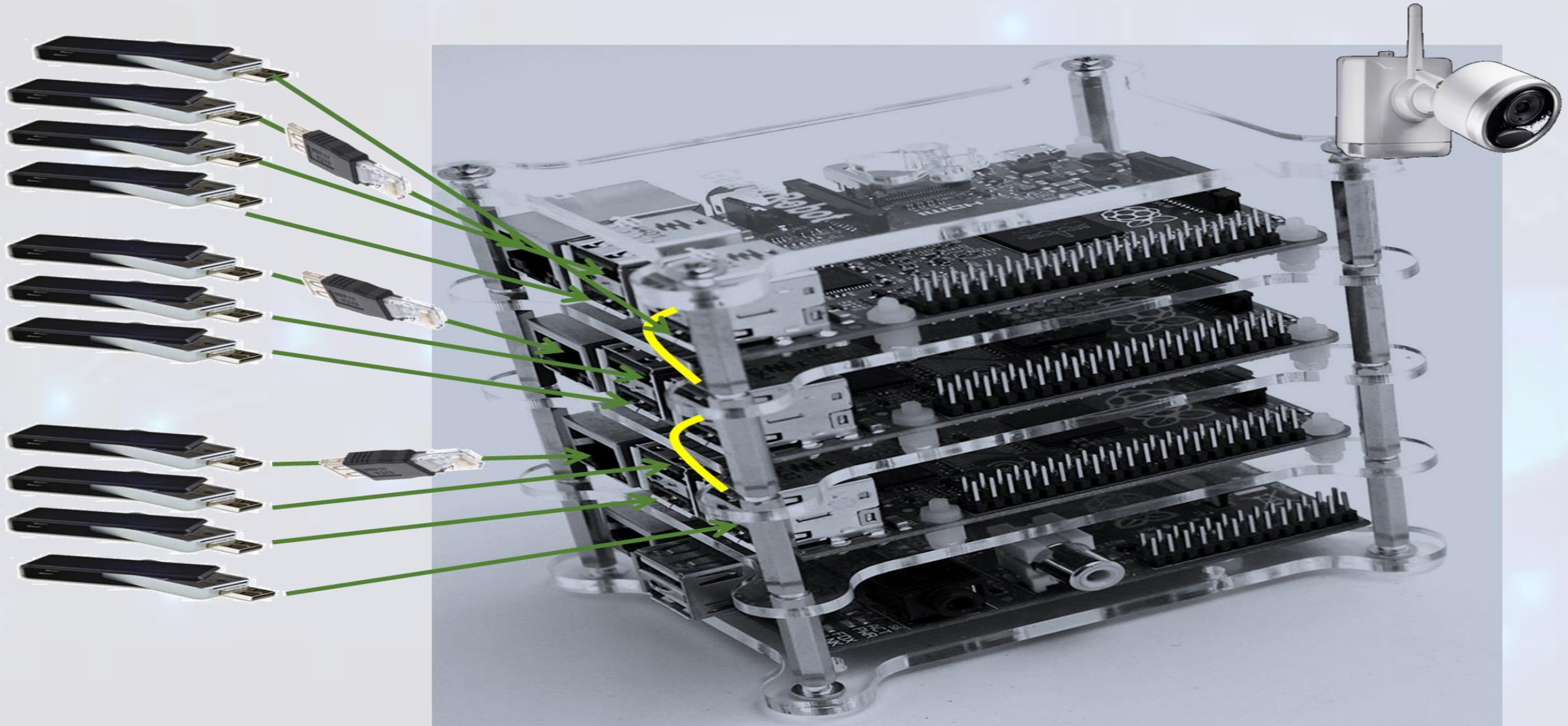
Our Approach

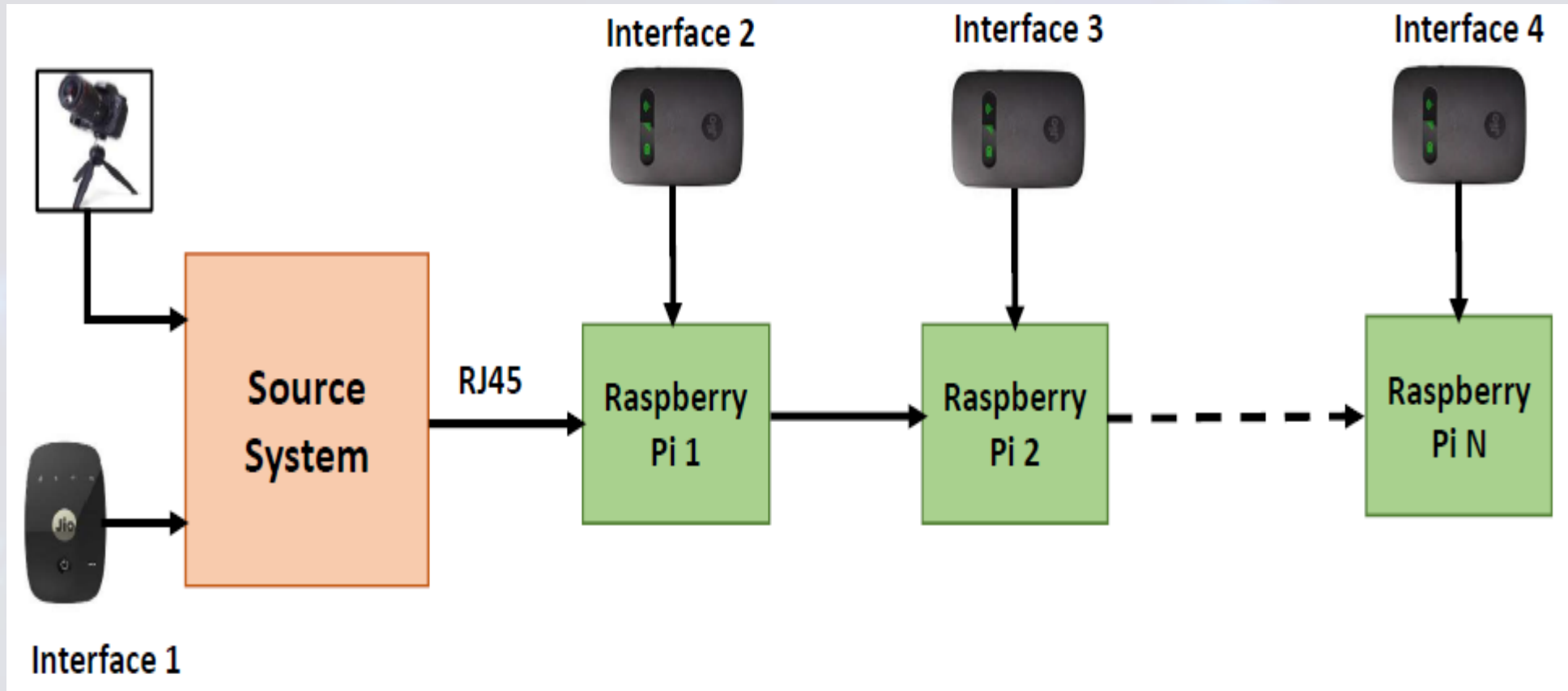
- Use massive multi-path (multiple operator SIMs): Achieving a target delay jitter in multi-path scenario is a technical challenge
- Predictive cellular base-station selection and offloading: Based on learning algorithms assisted by edge computing solutions
- Application-layer solution with Edge computing support



We have added inter-stream coding also now.

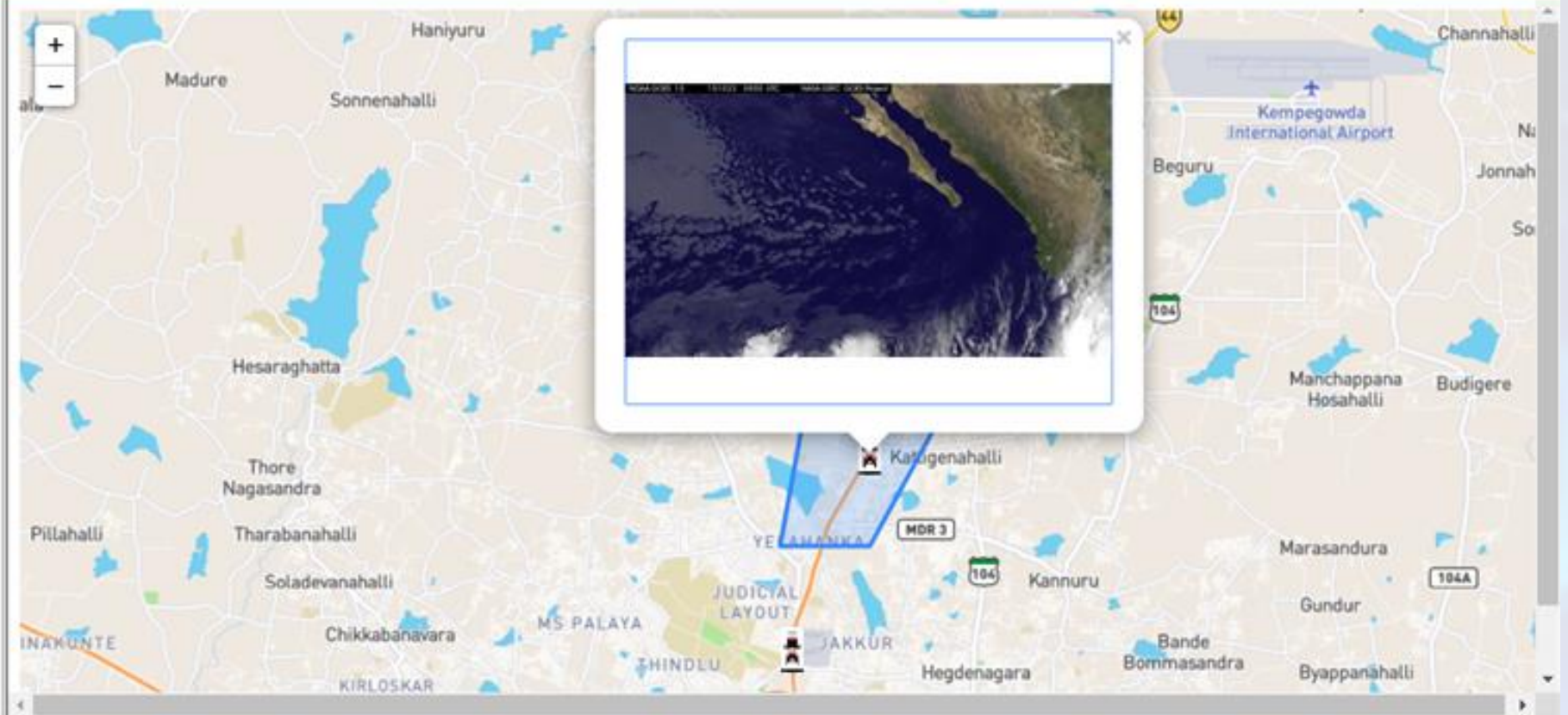
The Stackable Approach for Product Offering

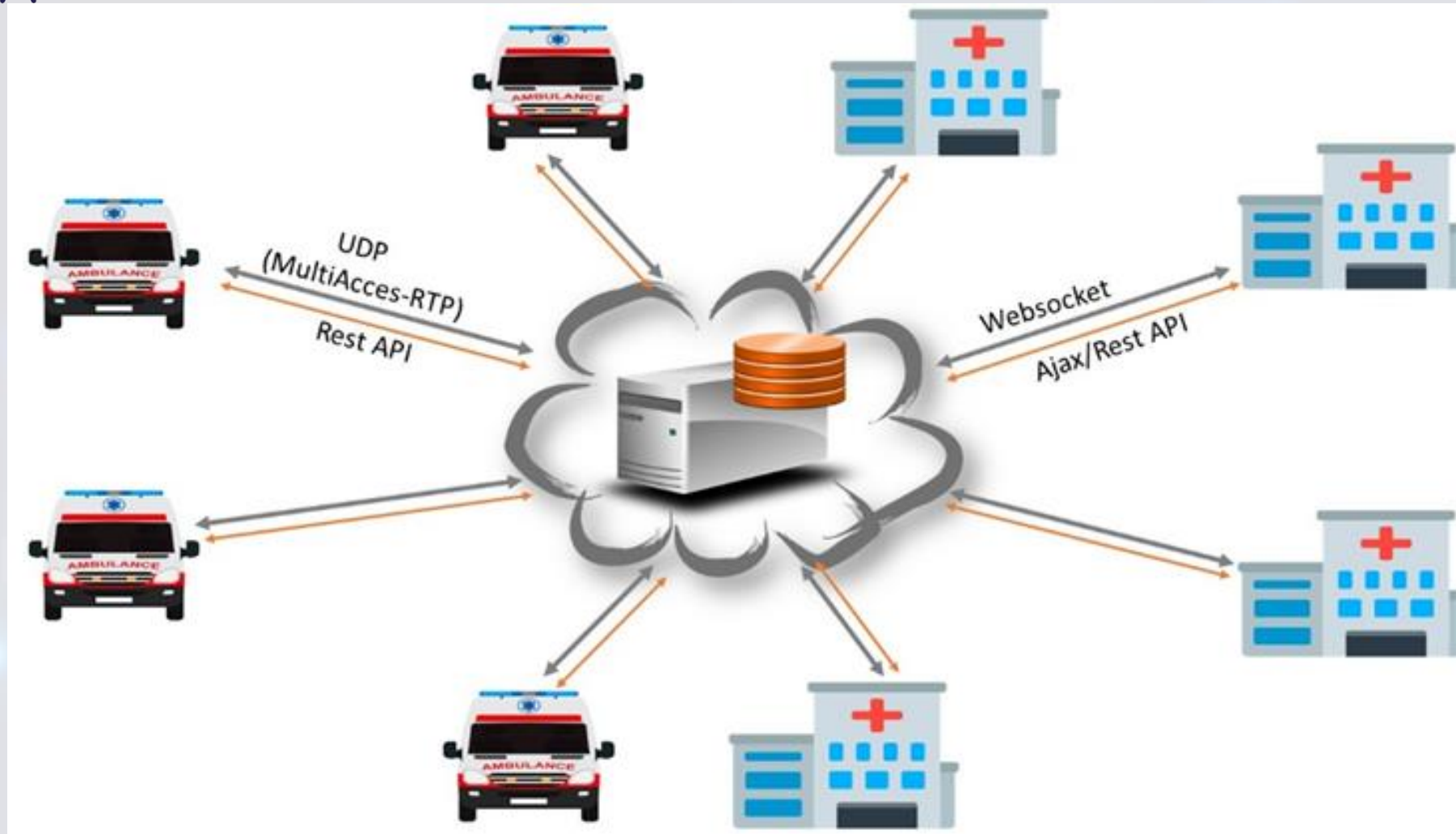




Working setup demonstrated in COMSNETS 2019.

Welcome to the Live Ambulance Dashboard



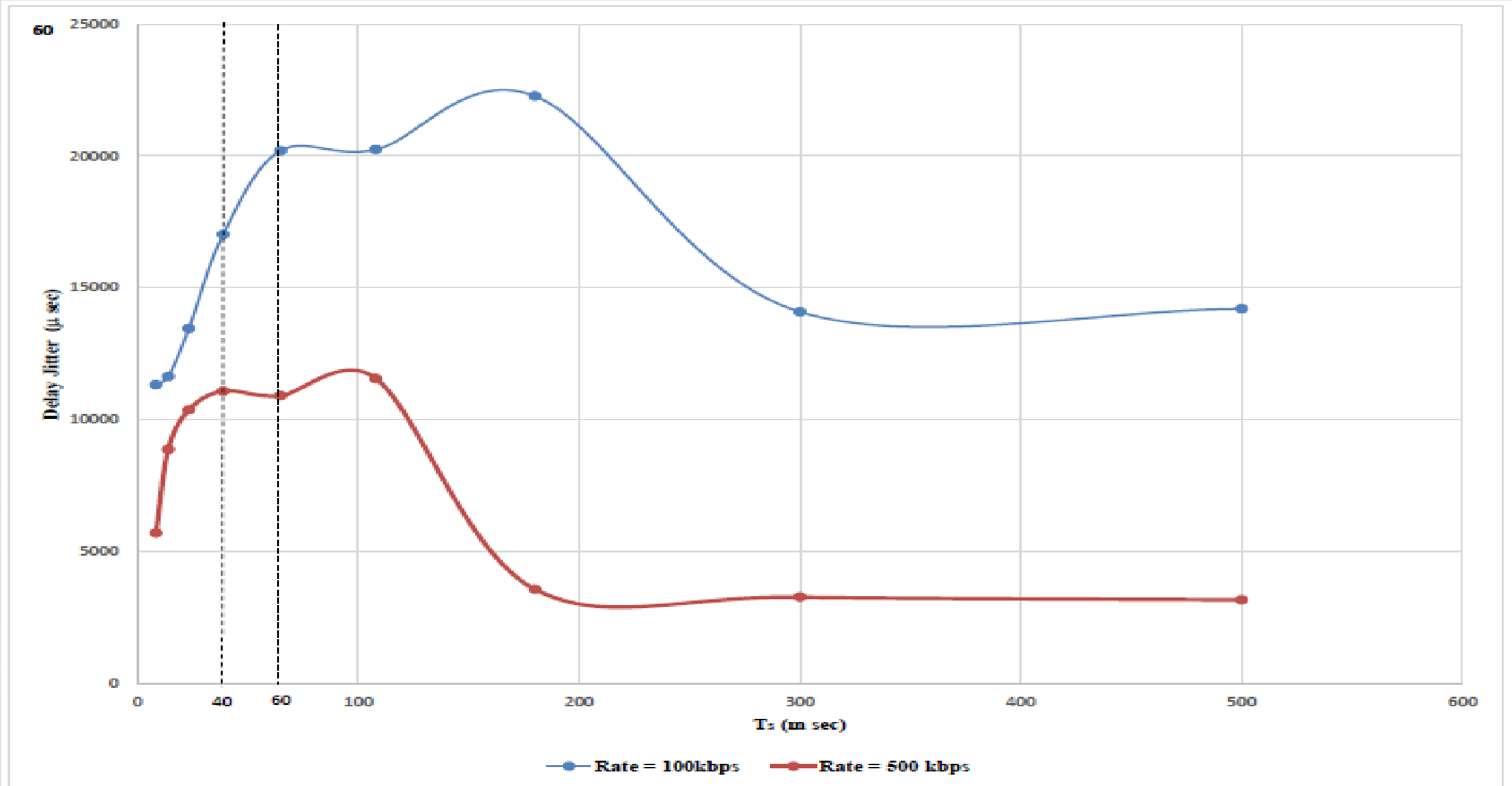


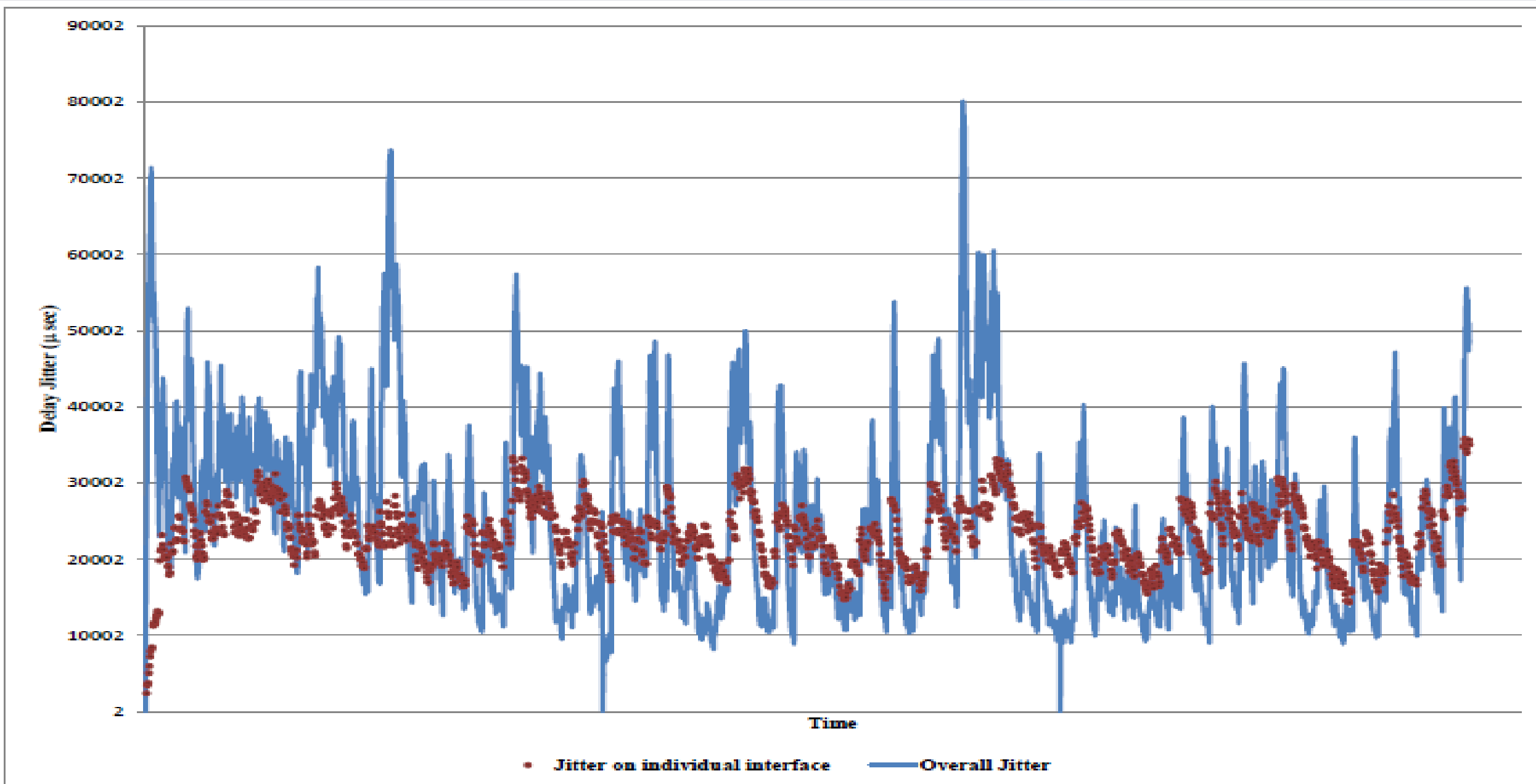
Central server connected with each ambulance and each hospital through Web Socket for video data and REST API for state information before sending data.

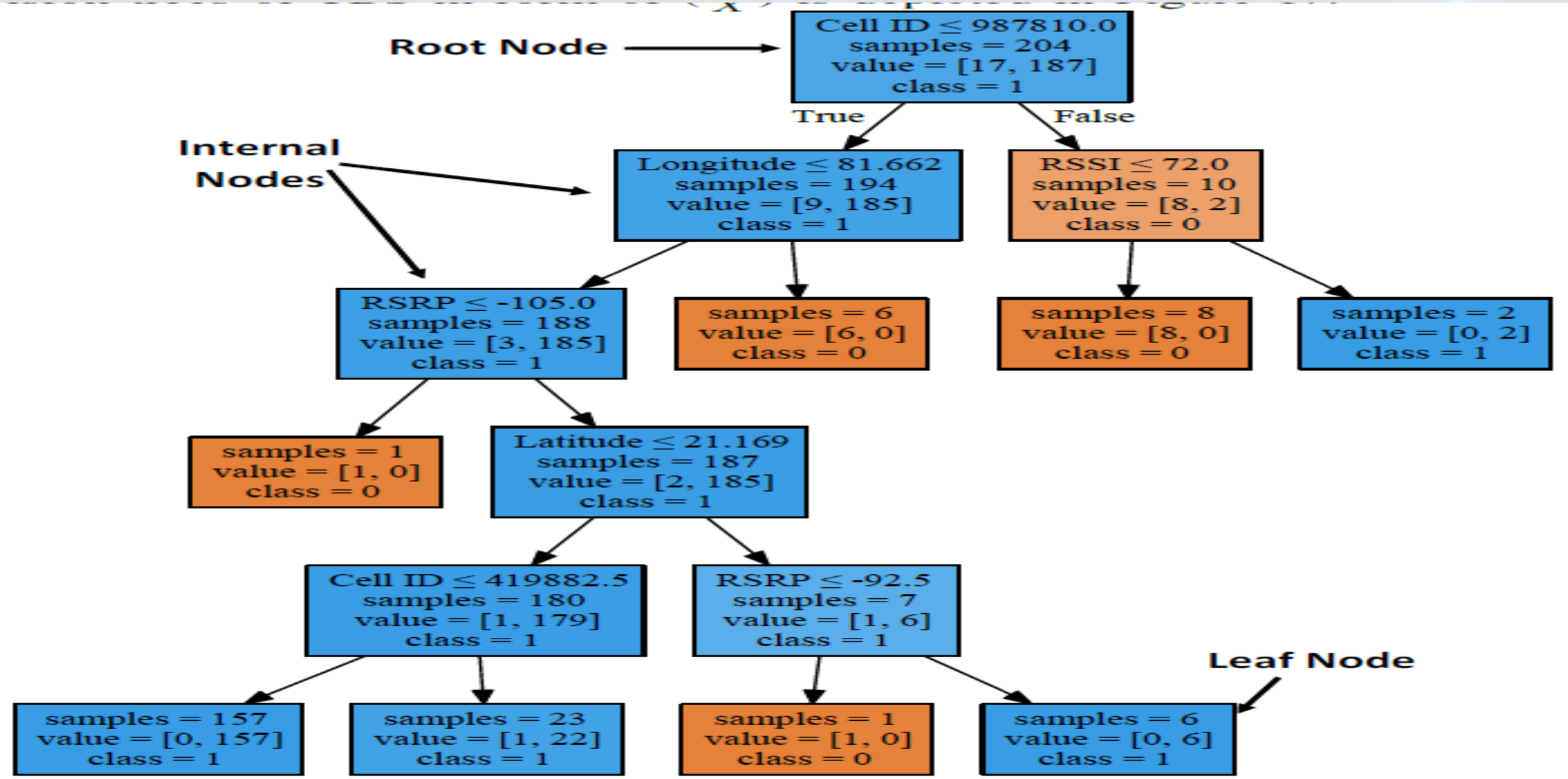
Performance Measure

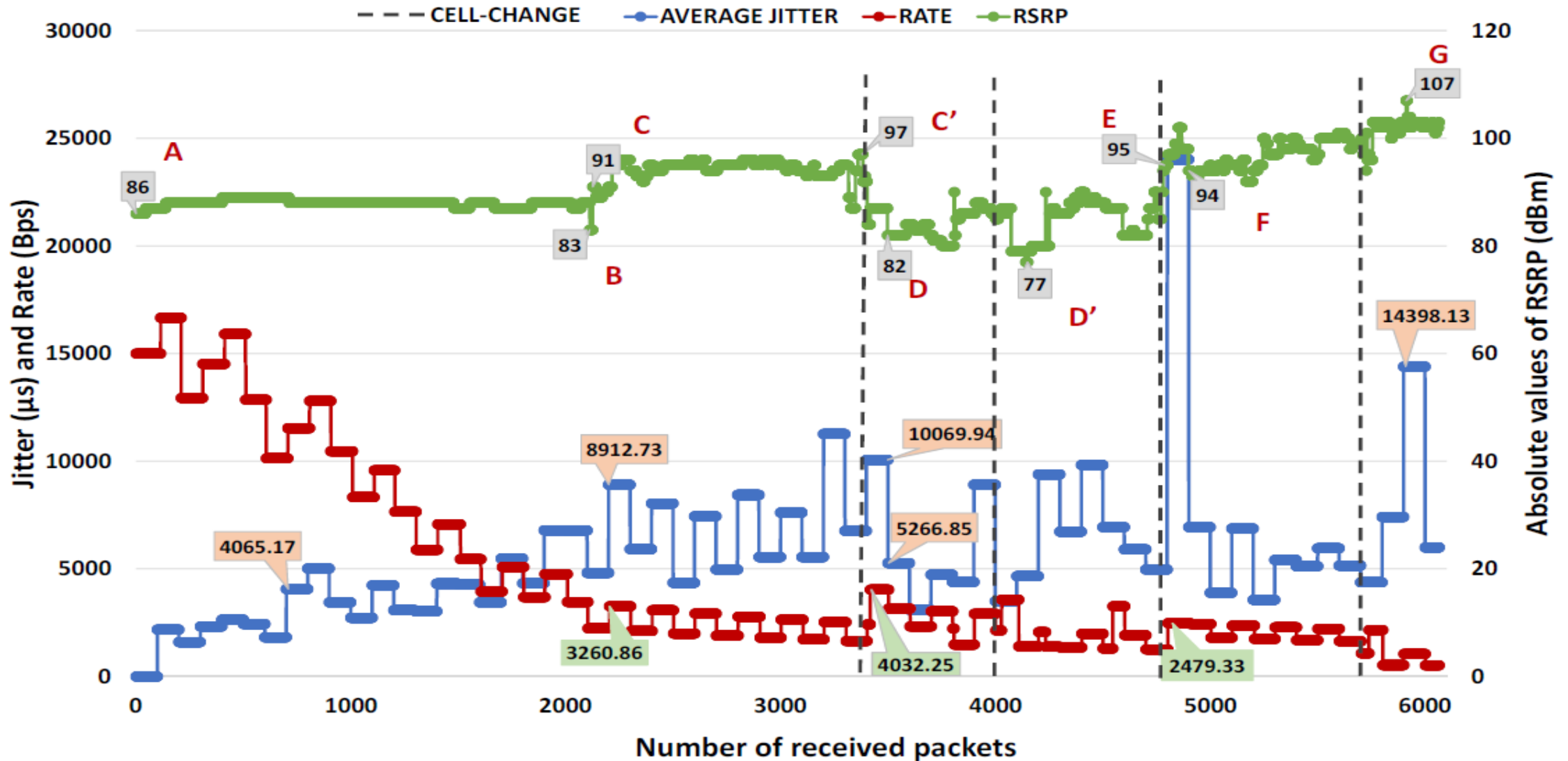
- Delay Jitter
 - For now

Challenge: Delay Jitter vs rate for a single modem

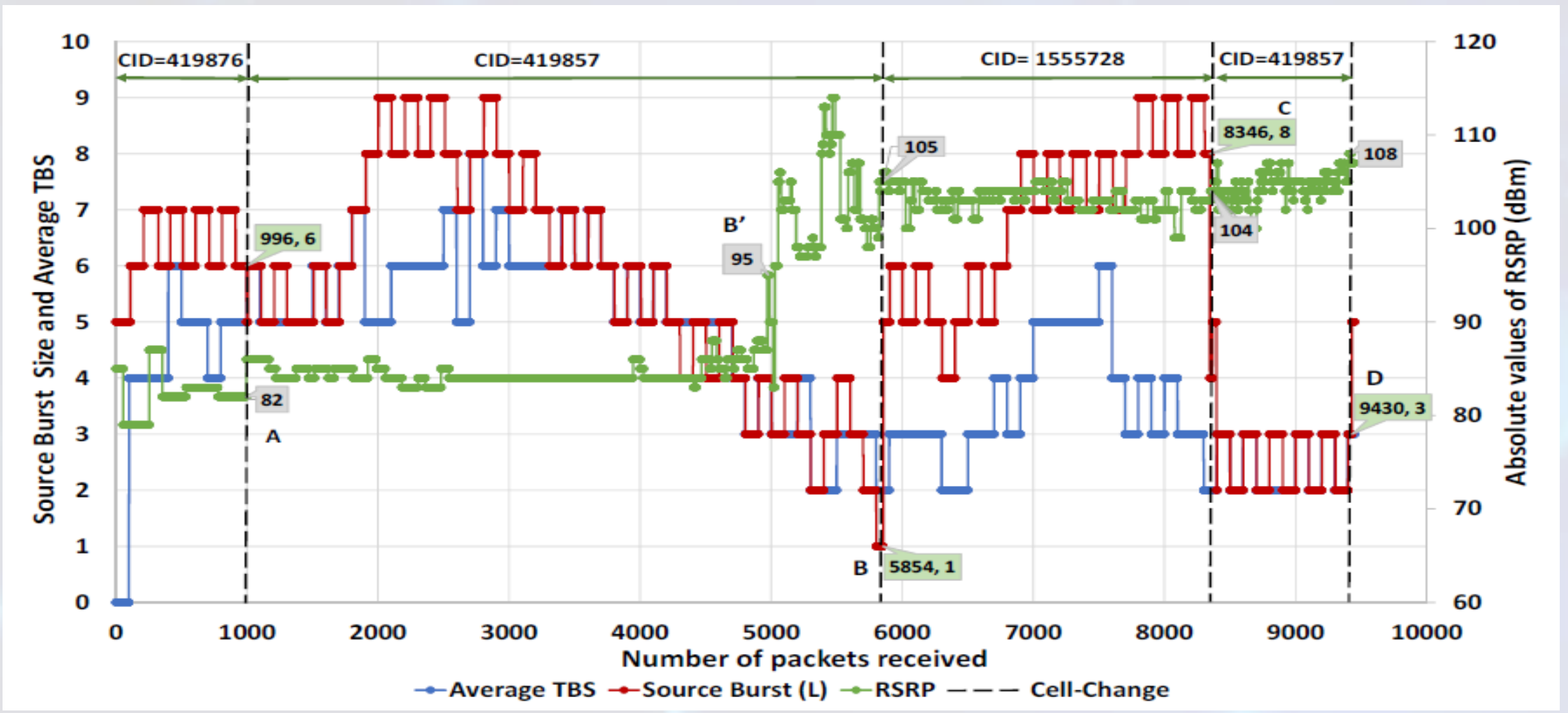




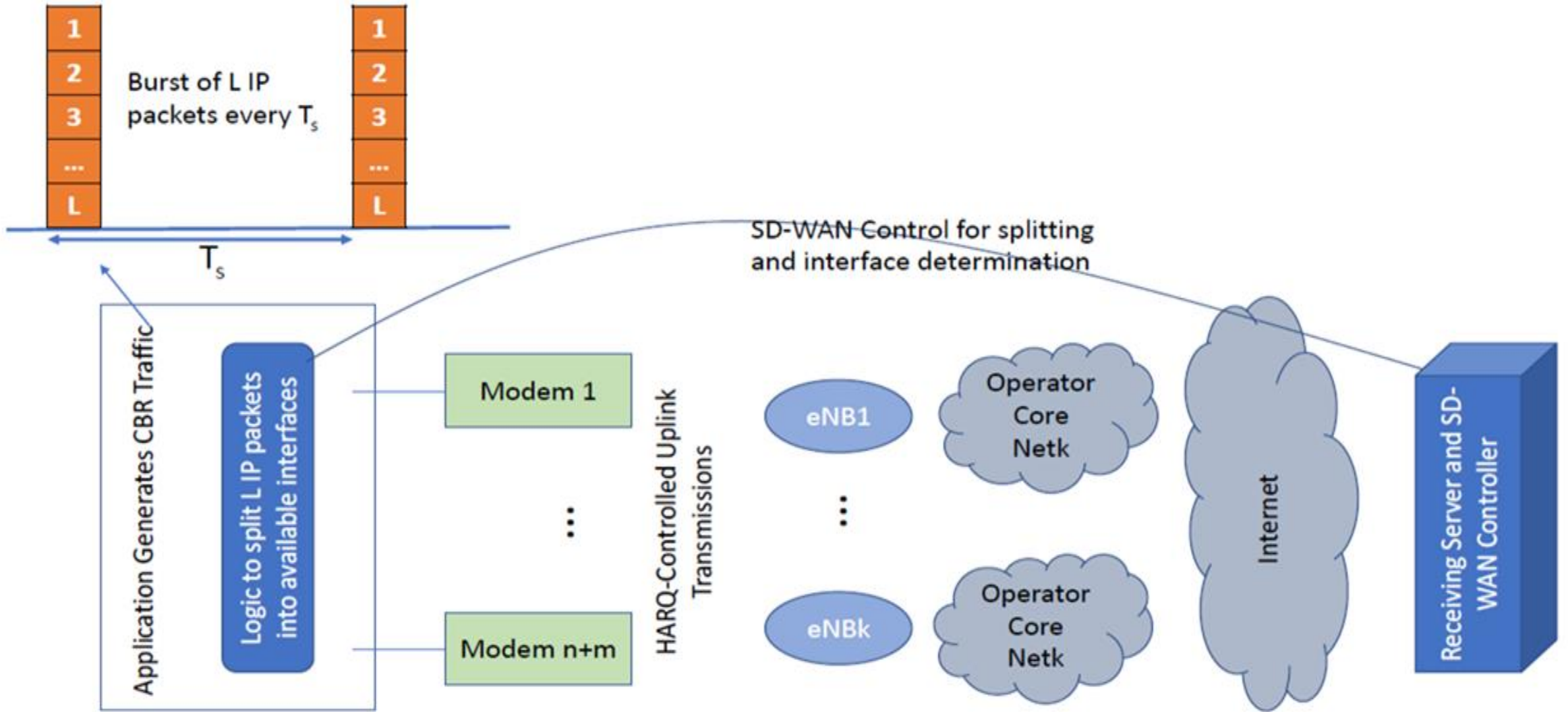




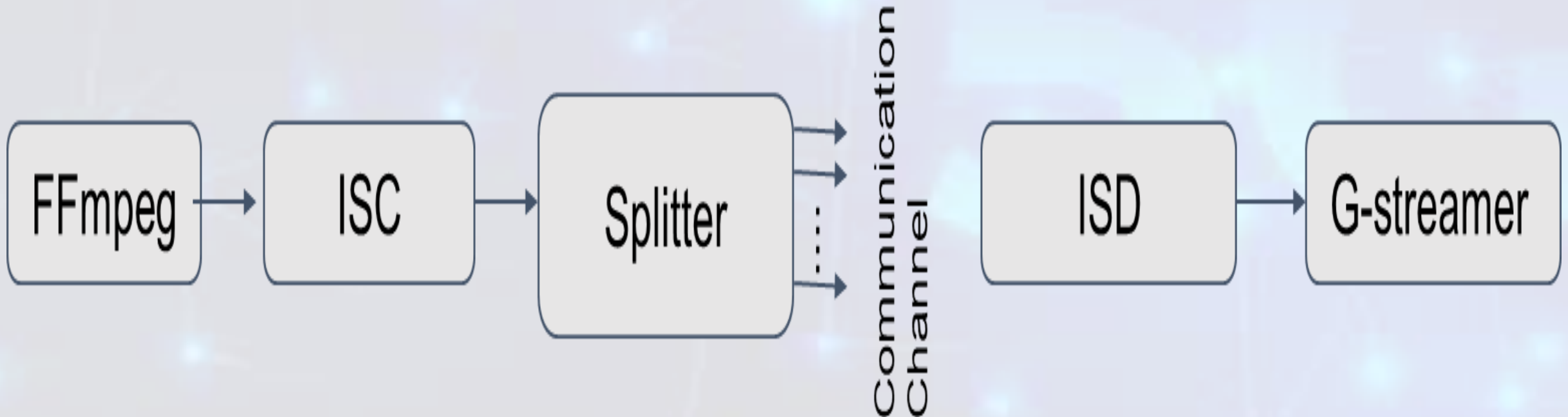
Overall adaptation for a single interface, with mobility



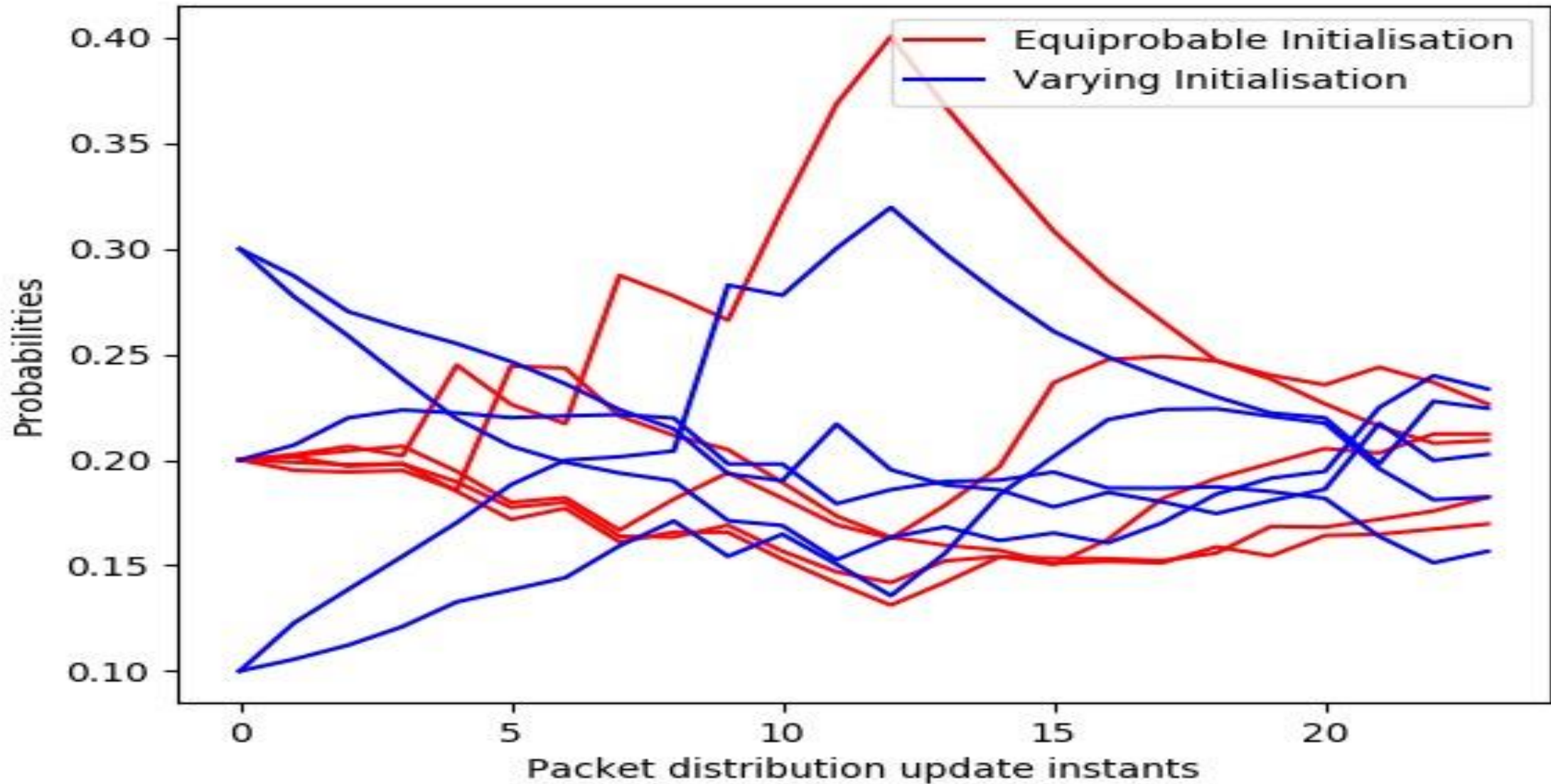
Multiple Interfaces: Splitting and Inter-Stream Coding



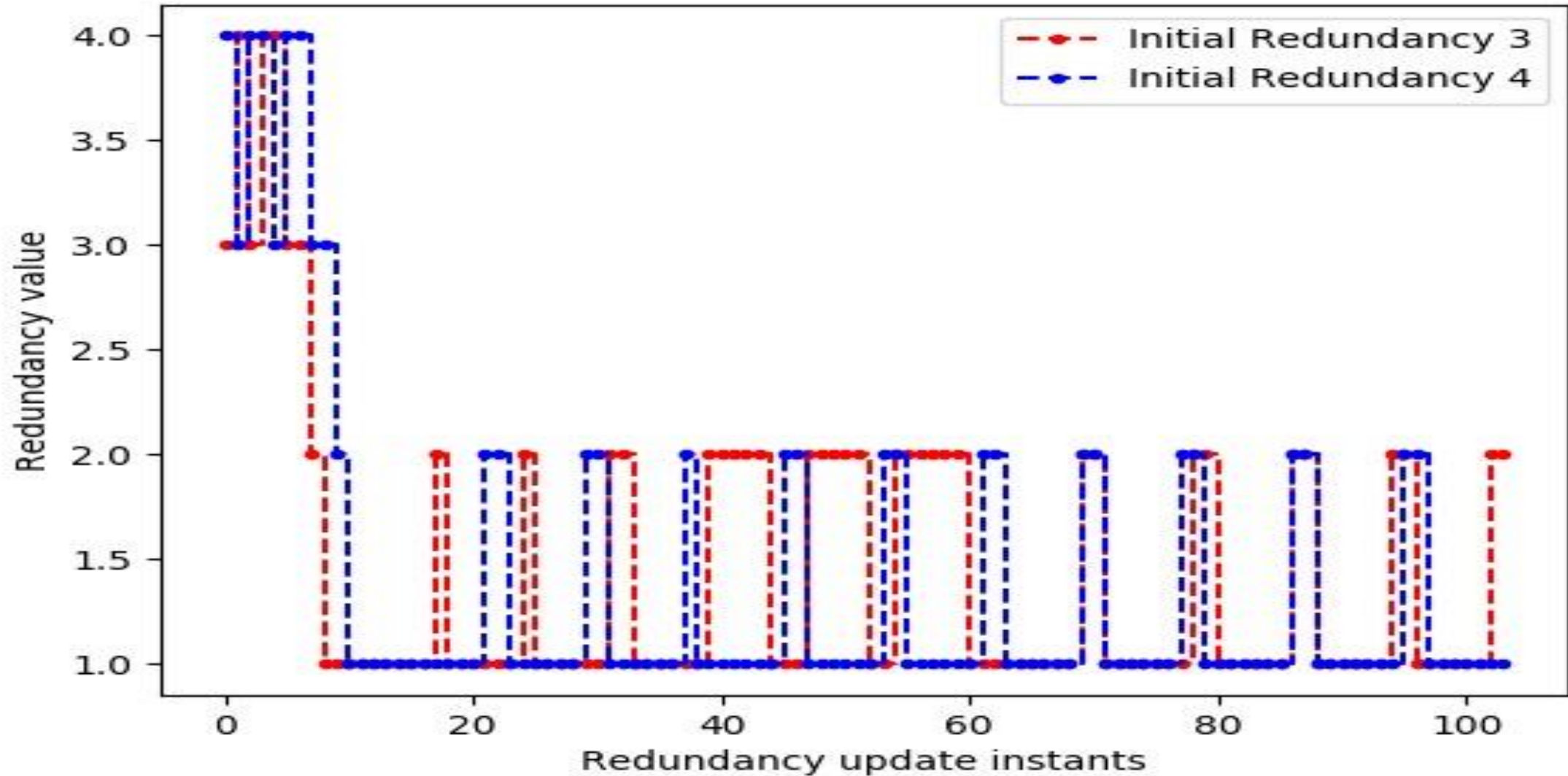
Every Module in the Pipeline is pluggable, portable and replaceable.



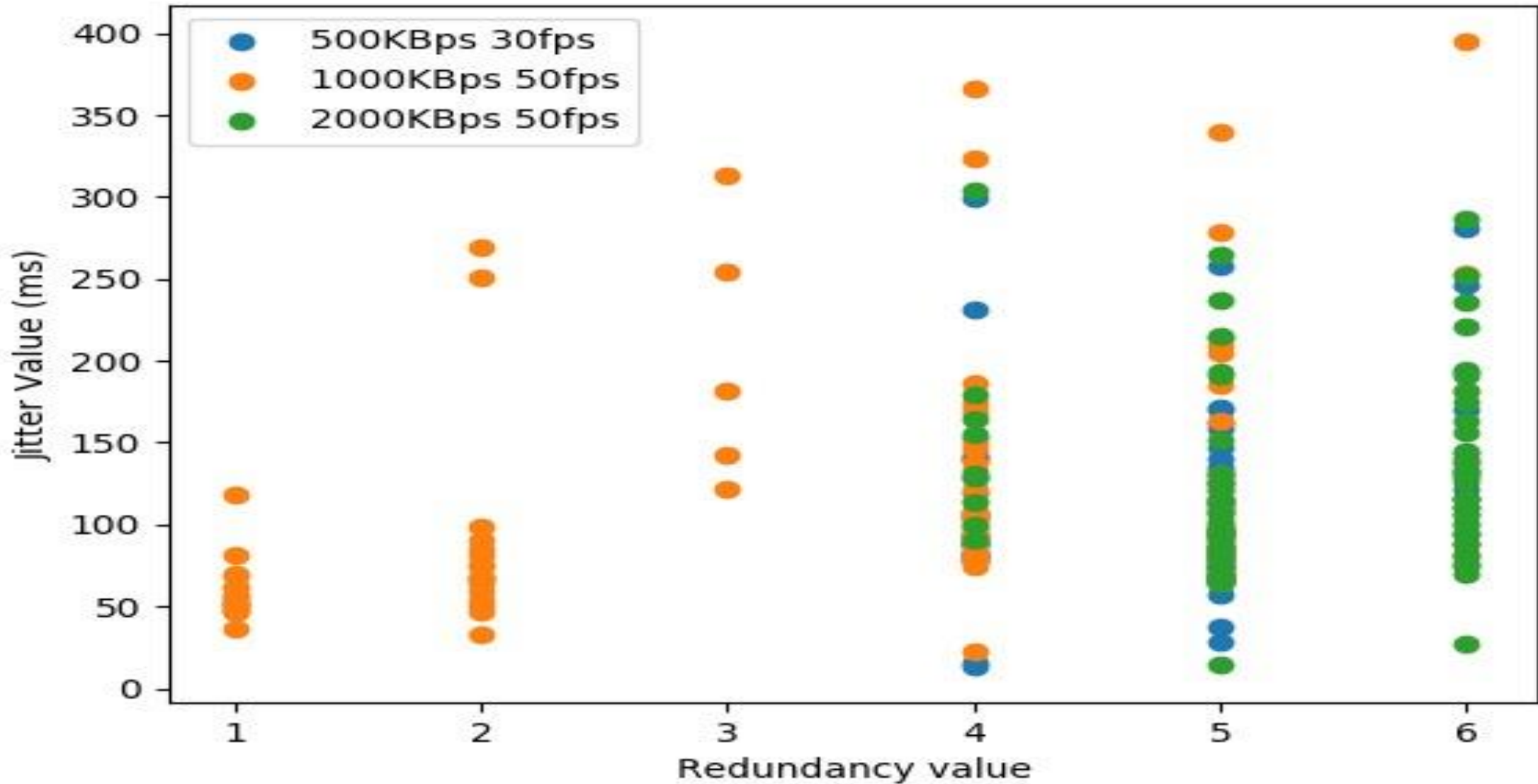
5G IA Results (Open Air Interface)



Results(OpenAirInterface Simulations)



5G+ Results (Field Deployment, with adaptation)





Thank You

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<https://www.iitbhilai.ac.in/index.php?pid=arzad>