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Smart 5G Control with AI and RIC

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1 Motivation

- Private 5G networks need adaptive control for changing traffic and latency demands
- AI-driven intelligence enables real-time optimization and boosts network performance

2 Research Goals

- Develop AI-based methods for adaptive 5G network control and optimization
- Improve QoS, QoE, and automation across private 5G setups

3 AI-Driven Private 5G Testbeds

- Combines SDR, srsRAN and Open5GS for hands-on experimentation
- Support AI/ML-based automation and QoS/QoE optimization
- Include A1, O1 and E1 interfaces for AI-based policy updates and telemetry monitoring

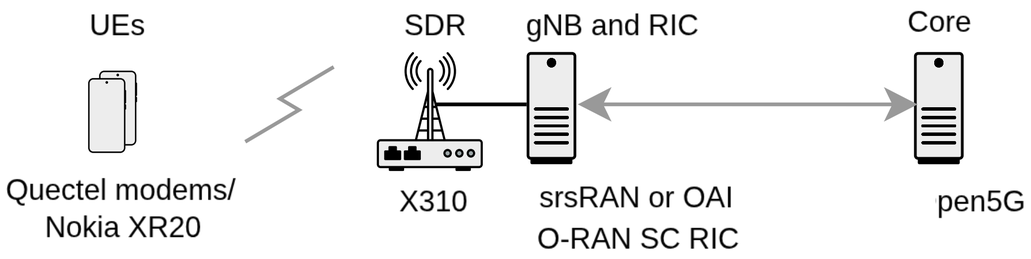


Fig. 1. Physical Testbed for 5G Network Experiments.

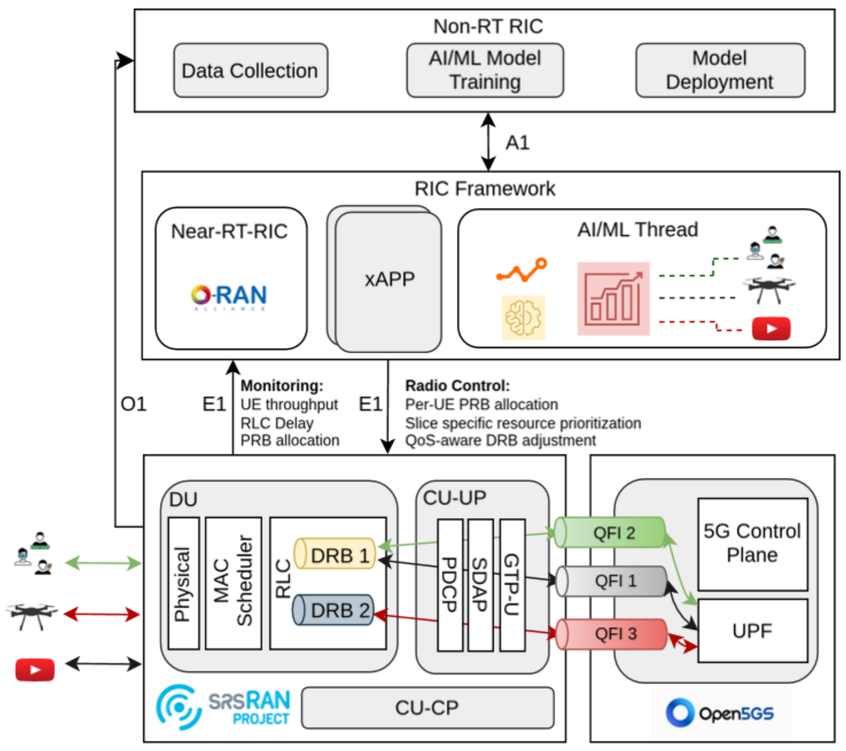


Fig. 2. AI/ML-Driven RAN Resource Control.

4 Use Cases & Applications

- Demonstrates smart resource allocation for different traffic types
- Enables optimized performance and reliability for key use cases:
  - **Smart grids**
  - **Industrial IoT**
  - **Mission-critical Communication (MCX)**
  - **Security:**
    - Network intrusion detection
    - Network threat detection
    - Automated policy enforcement

Type (Example Application)	Latency Sensitivity
Real-time interactive (Cloud Gaming)	Very High
Conversational voice (VoIP)	High
Conversational multimedia (Video Conferencing)	High
Real-time control (Remote Desktop)	Medium to High
Buffered streaming (YouTube, Vimeo)	Low

Fig. 3 & Tab 1. Application and Runtime Classification Results

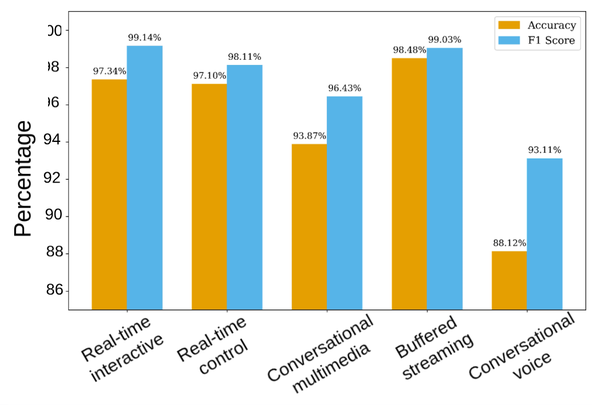
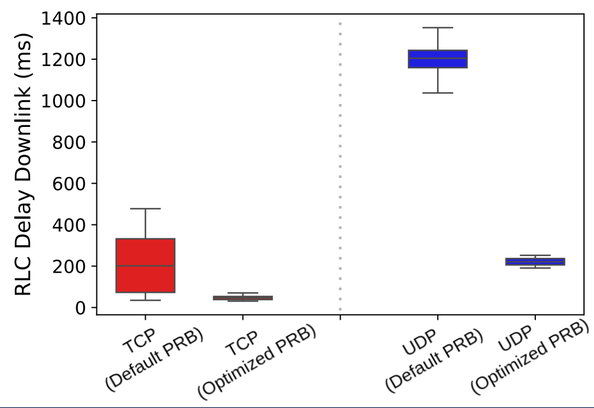
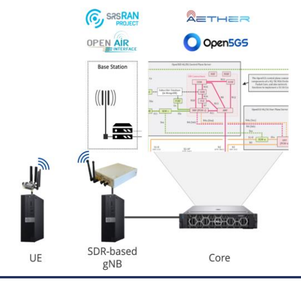


Fig. 3.



5 Collaboration & Next Steps

- **Reusable AI-driven testbed** available for further research and experimentation
- Open to integrate with security, ML and edge computing studies
- **Goal:** build a shared foundation for **adaptive**, **secure**, and **intelligent** 5G network



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