

# Latency-aware ad-hoc authentication for IoT in 6G

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- Ad-hoc and continuous authentication can solve many security challenges in critical applications.
- Traditional, cellular networks-based, authentication in geographically large networks with dispersed UEs results in higher signaling costs and introduces delay, besides challenges in security or self-custody applications and use-cases.
- Lightweight blockchain-based authentication can be the solution, as we show in this poster.

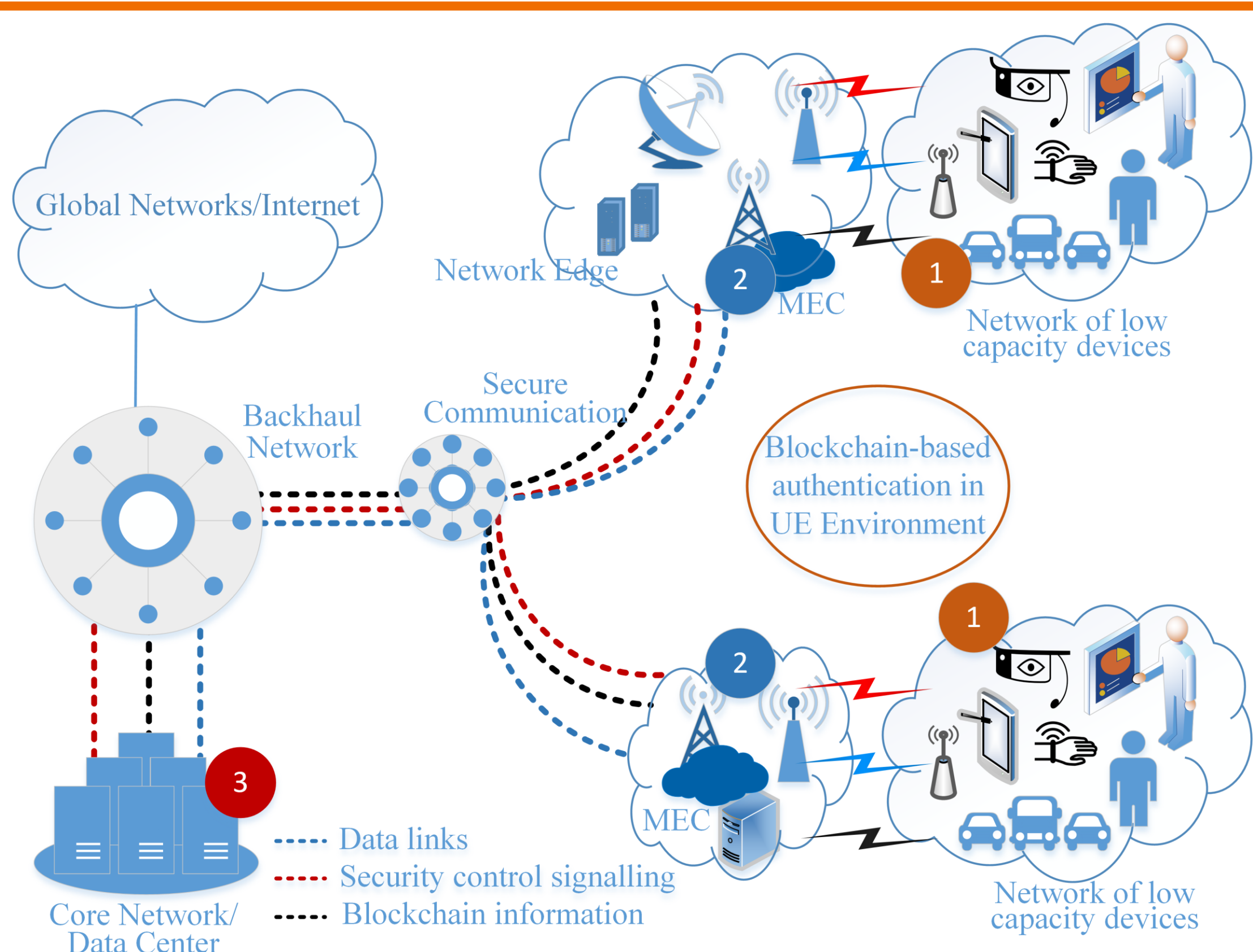


Fig 1: A conceptual framework of blockchain-based localized ad-hoc authentication in large cellular (5G) networks.

## Experiments & Setup

- ❖ The experiment were performed to measure authentication latency in localized vs non-localized manner:
  - ❖ Authentication in 5G in local core network (UE and core network in Espoo).
  - ❖ Authenticaion in 5G in remote core network (UE in Oulu, core network in Espoo).
  - ❖ Authentication in 5G in very remote core network (UE in Netherlands, core network in Espoo).
  - ❖ Authentication using blockchain (localized edge)
- ❖ The AMF machines didn't run the blockchain code but served to the pure 5G authentication
- ❖ For the blockchain app, separated machines next to AMF were used (they are next to each other, with RTT~0.3ms)

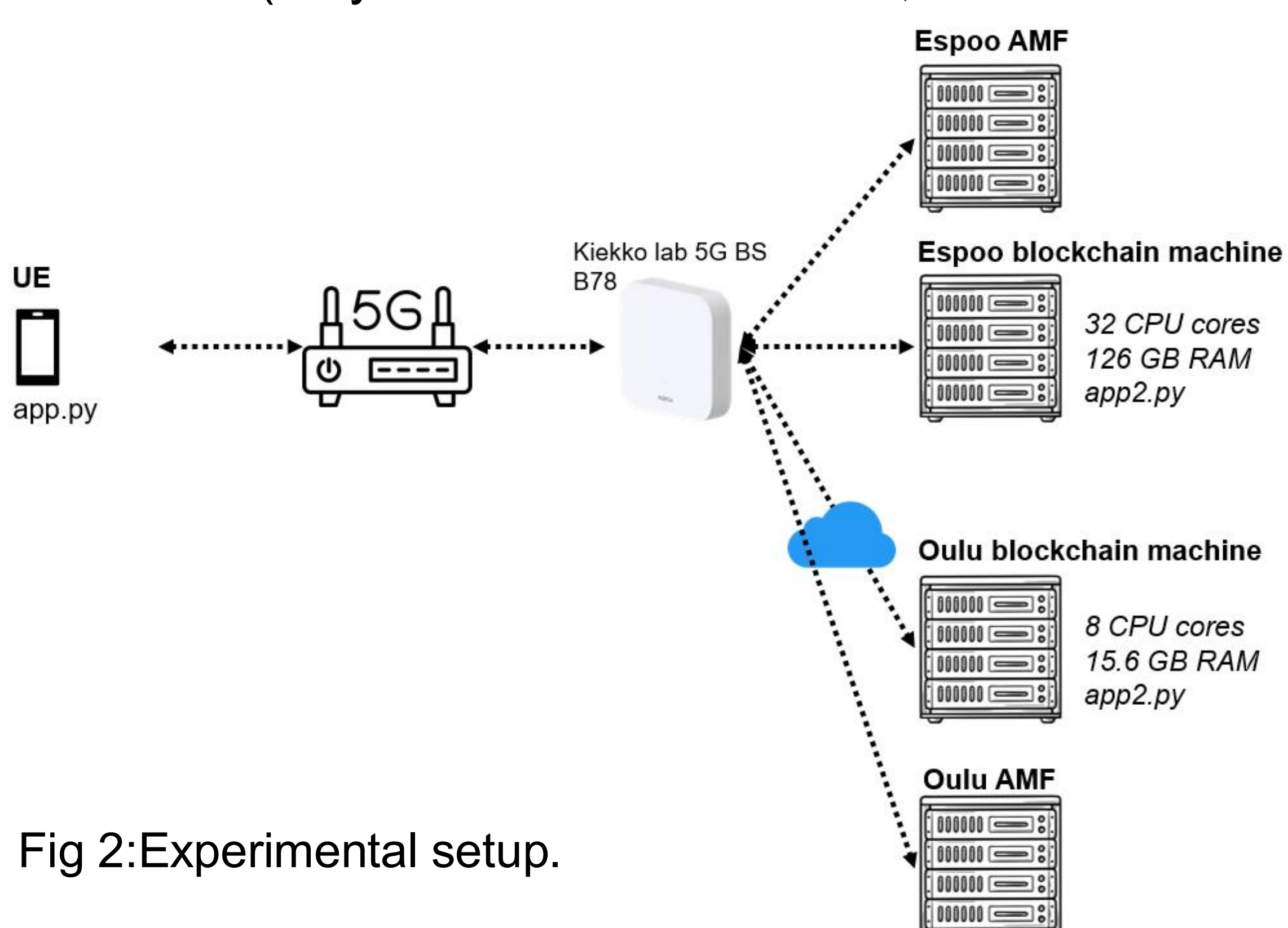


Fig 2: Experimental setup.

## Results Analysis

There is a clear gain in terms of latency

- ❖ Latency due to geographical distance reduced.
- ❖ There is gain in terms of minimizing signaling costs in the backhaul.
- ❖ Improved security and enhanced applicability in IoTs.

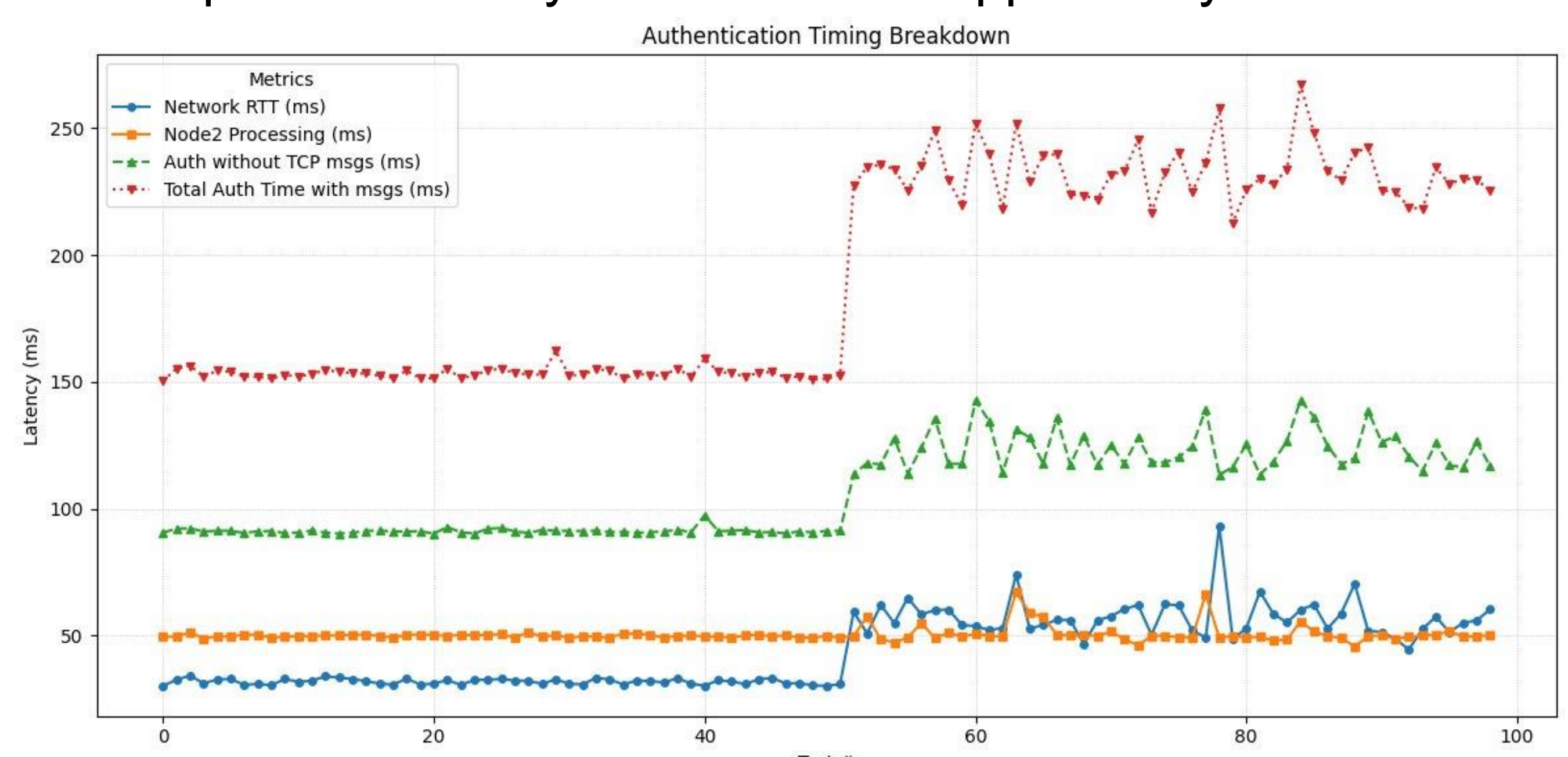


Fig 3: Latency in local vs non-local core network.

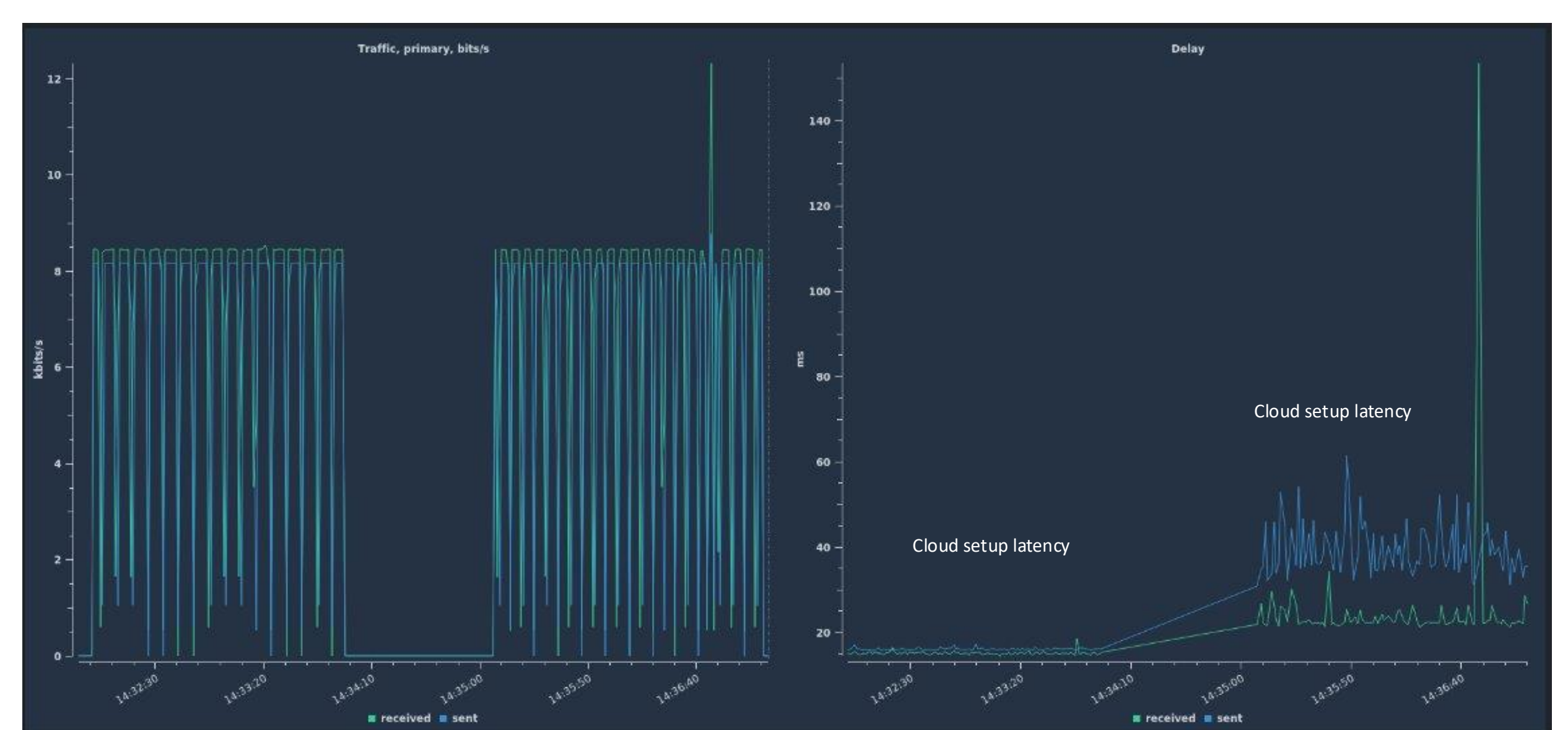


Fig 4: Data rate & latency in local vs non-local core network.

## Takeaways

- Localized authentication saves resources, e.g., backhaul signaling.
- Localized authentication improves latency for time-critical applications.
- Localized and blockchain-based authentication improves security
- This is a step towards self-controlled information and self-custody of user credentials.