

Context-Triggered Mobile Network Measurement

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1. Motivation and Problems

Measurements from mobile devices are vital for diagnosing and debugging problems near the edge of network.



Mobile Devices

Cellular Networks

However, **network** and **battery resources** on mobile devices are **scarce**. Traditional **continuous**, **periodic** or **random** measurements are **ineffective**.

How can we measure important network phenomena with minimal cost?

2. Approach

Trigger measurements only when necessary, using device **context**

- **Context:** location, signal strength, movement and historical performance data etc.
- **Sources:** **local** (from single device)
global (collected from multiple devices)
- **Efficiency:** Use **prediction** to improve success rate

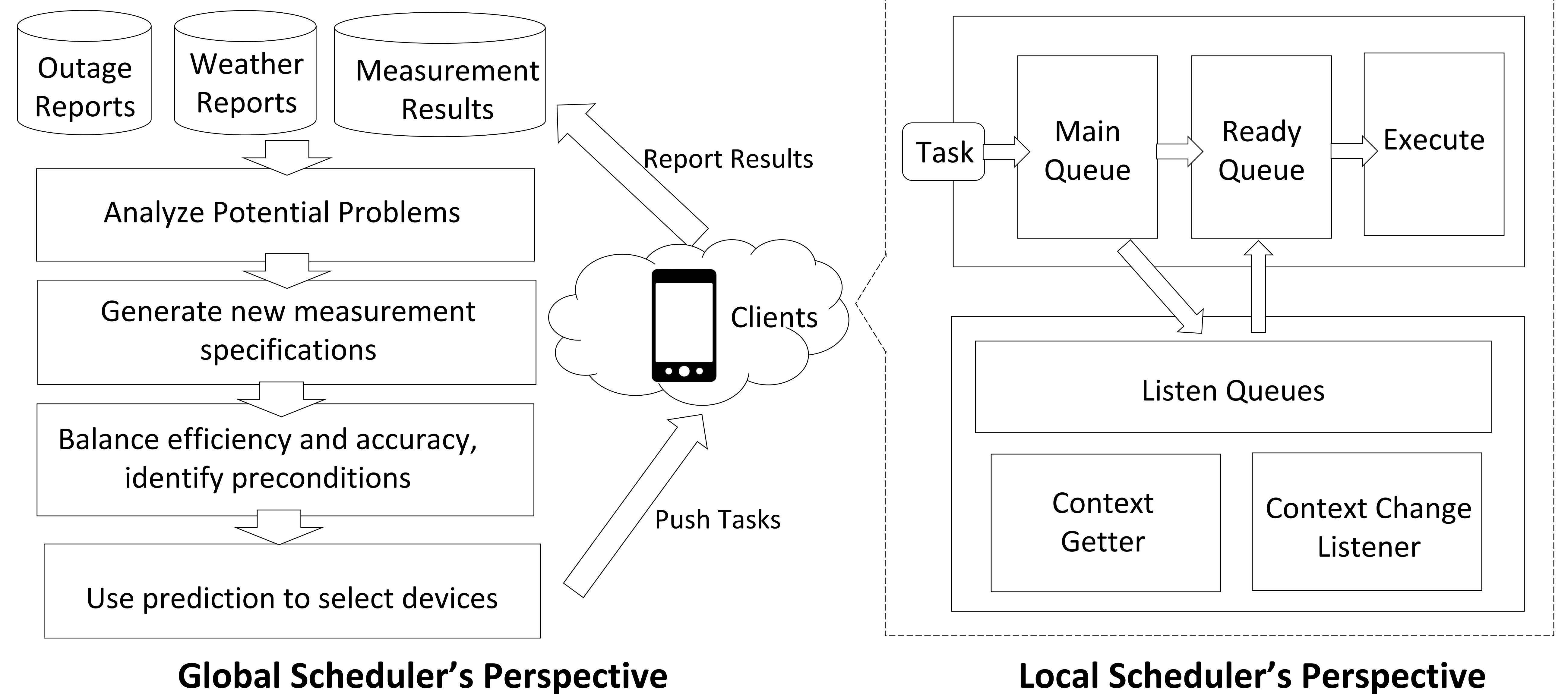
Global Scheduler



Based on historical movement pattern, devices X, Y, and Z will likely be available to measure performance at a certain location.

3. System Design

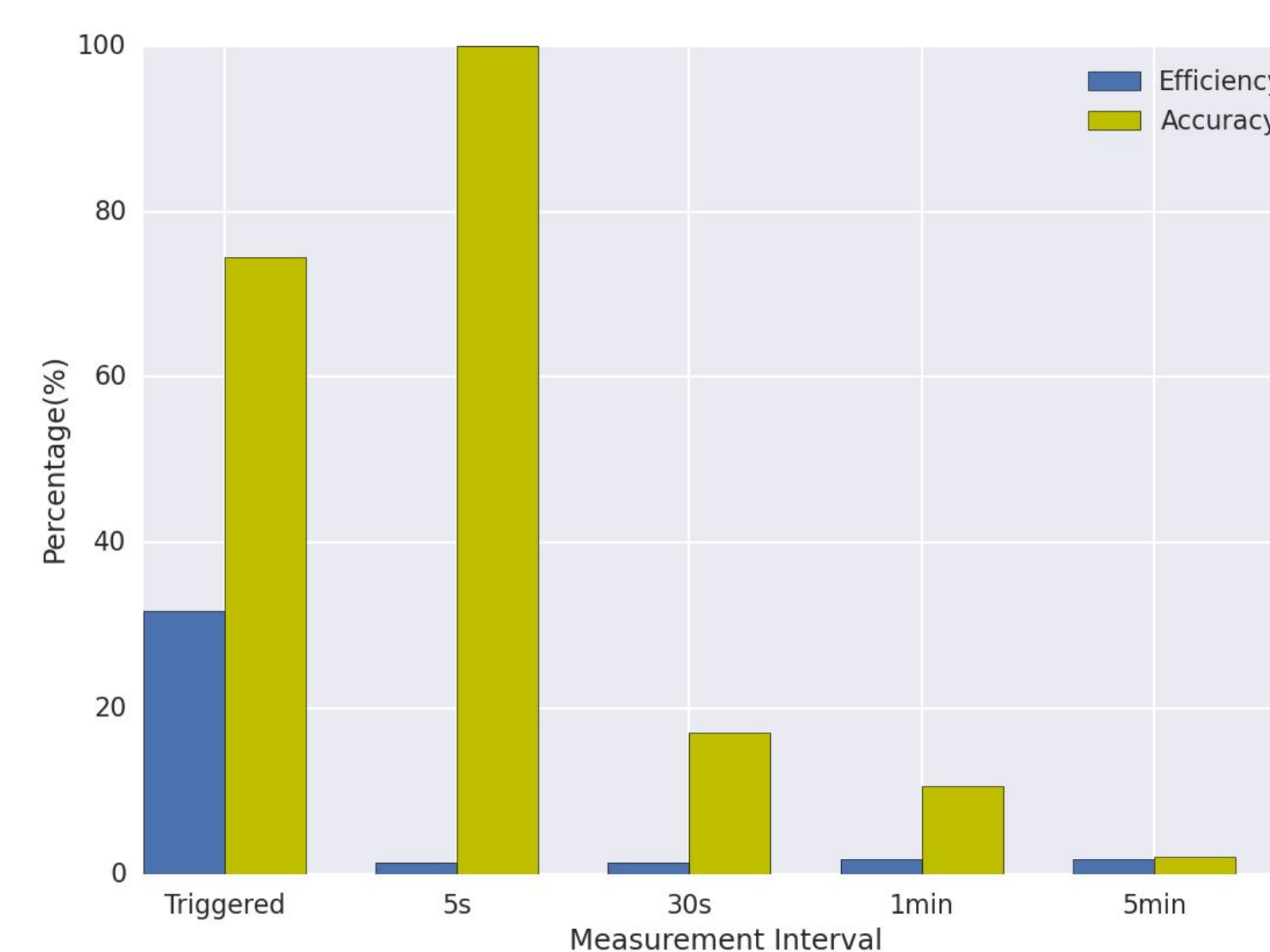
- Implemented on Mobilyzer [1]



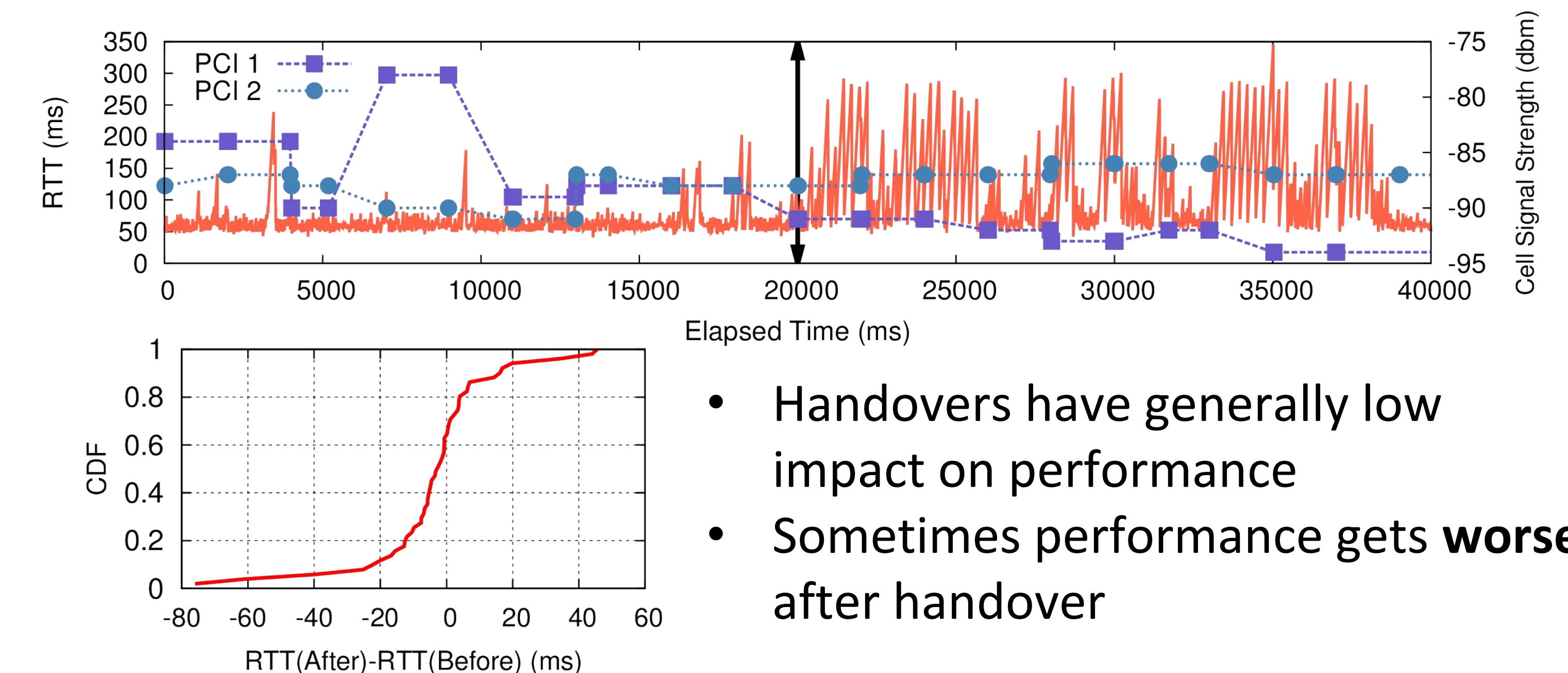
4. Use case -- Handover

What is the performance impact of handovers between different cells in LTE network?

- **Observation:** Handover occurs when RSSI from neighbor is sufficiently above serving cell.
- **Outcome:** Use threshold to trigger measurements



Triggered measurements: accurate and efficient



Measurement Results

- Handovers have generally low impact on performance
- Sometimes performance gets **worse** after handover