WiSense: A Client Based Framework for Wireless Diagnosis

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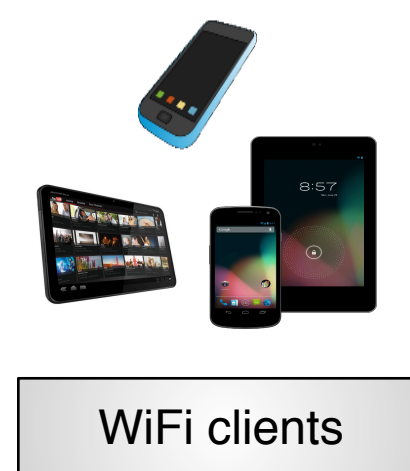**Wisconsin Wireless and NetworkinG Systems (WiNGS) Laboratory, UW-Madison**
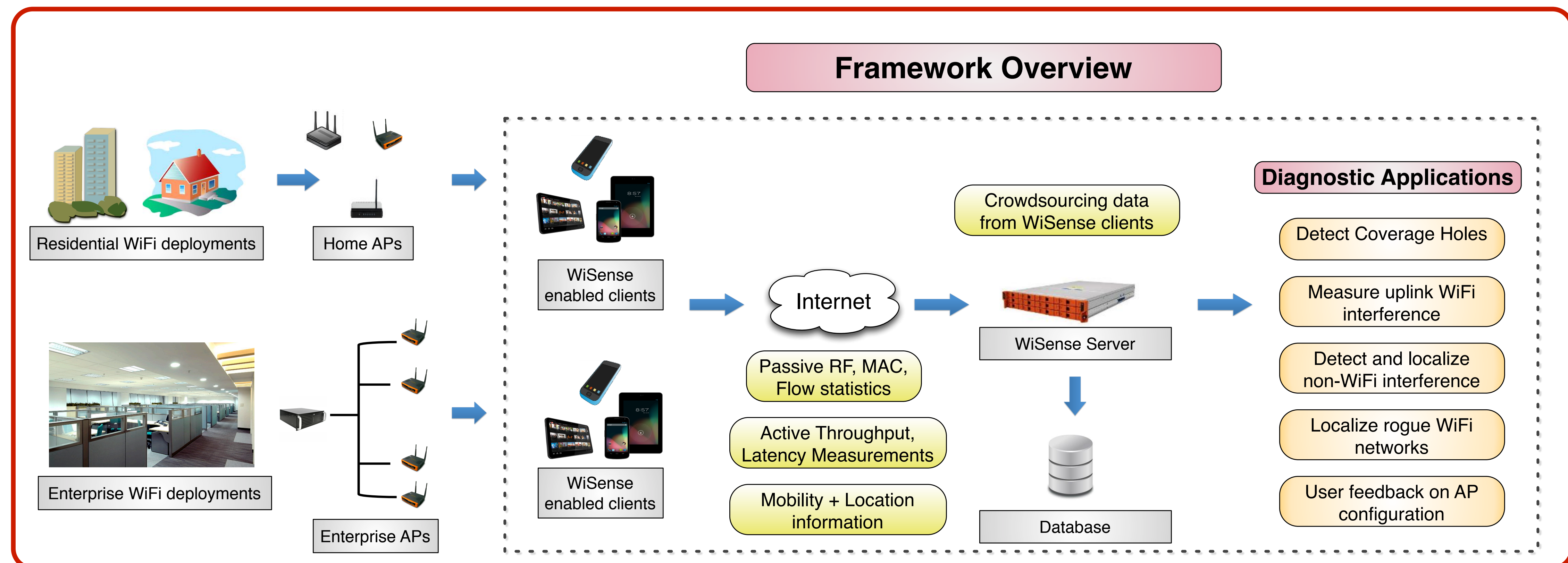
MOTIVATION

- Extensive WiFi deployments in homes and enterprises
- Performance issues
  - RF coverage
  - WiFi Link Interference
  - Non-WiFi interference
  - Traffic Hotspots / Channel contention
- Problems can location and time dependent
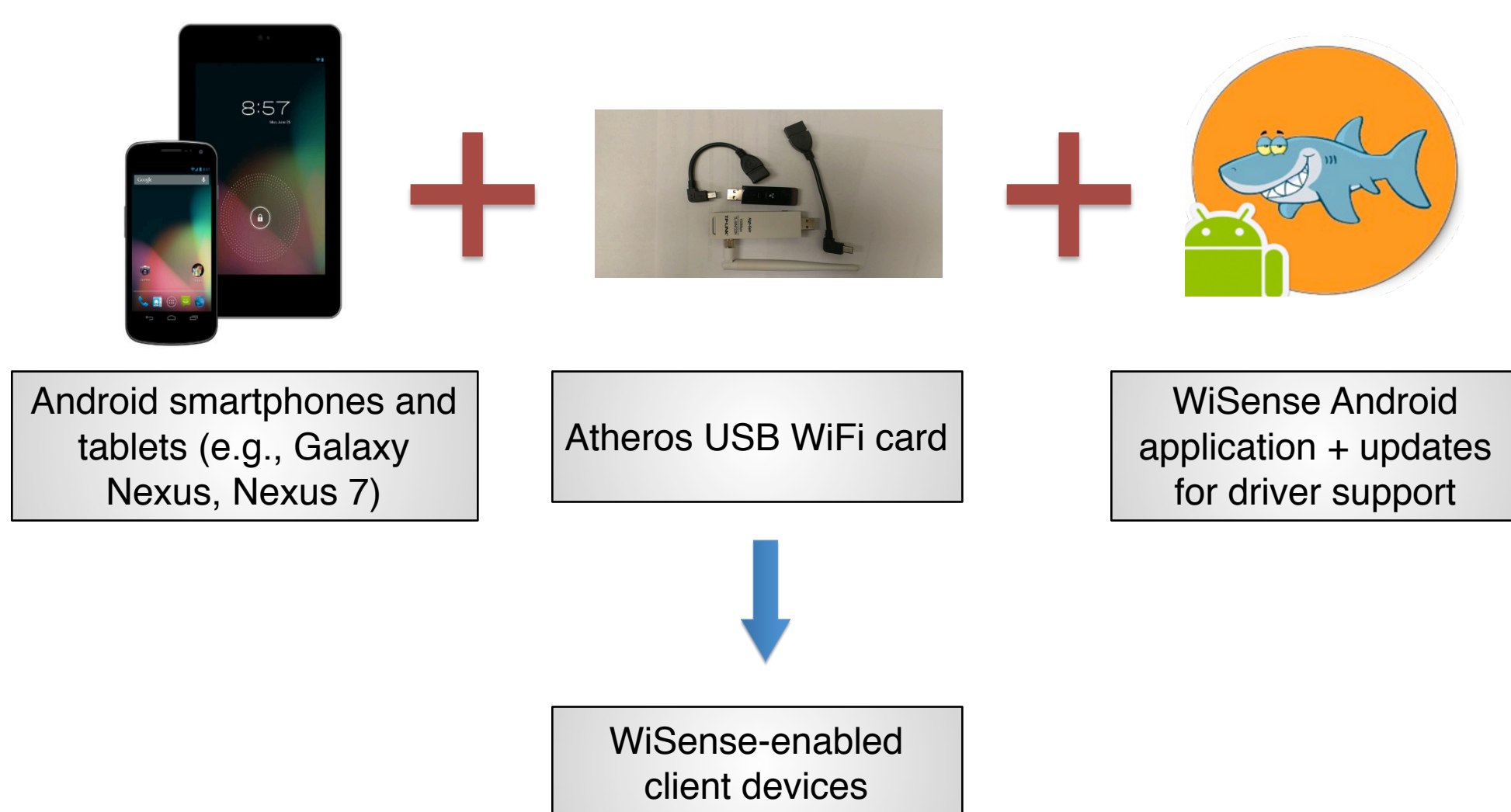
Leveraging WiFi client devices

- Client mobility can identify location specific problems
- No Access Point (AP) support: same client can be used at multiple locations
- Augment AP-only view of network performance

WiFi clients

WiSense FRAMEWORK

Framework Overview

Residential WiFi deployments → Home APs

Enterprise WiFi deployments → Enterprise APs

WiSense enabled clients → Internet → WiSense Server

Passive RF, MAC, Flow statistics

Active Throughput, Latency Measurements

Mobility + Location information

Crowdsourcing data from WiSense clients

Database

Diagnostic Applications

- Detect Coverage Holes
- Measure uplink WiFi interference
- Detect and localize non-WiFi interference
- Localize rogue WiFi networks
- User feedback on AP configuration

IMPLEMENTATION

Android smartphones and tablets (e.g., Galaxy Nexus, Nexus 7) + Atheros USB WiFi card + WiSense Android application + updates for driver support

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WiSense-enabled client devices

- External USB card used for RF analytics (can potentially use internal WiFi chipset)
- Collects MAC layer data for link quality analytics
- Active measurements to correlate performance with other metrics

WiSense download and installation instructions available at: http://www.wisense.io

WiSense FEATURES

Live RF Heatmap

Non-WiFi device detection

Airtime usage information

Active throughput measurements

EXAMPLE APPLICATIONS

RF coverage

WiSense Server

Interference Detection

Packet Losses?

Packet Losses?

Interference?

WiSense Server