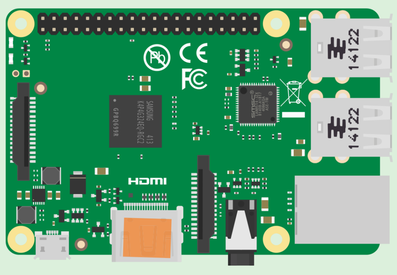
Probr – A Generic and Passive WiFi Tracking System

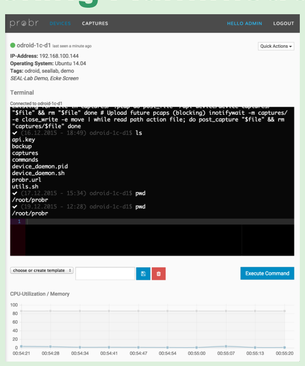
Design Goals

Support for Commodity Sniffing Devices



Any device that supports UNIX and promiscous WiFi can be used for sniffing

Web Based Device and Tracking Administration

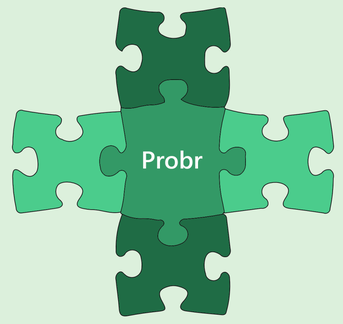


Remotely set up sniffing devices and start collecting 802.11 probe requests

Real-Time Analysis

Real-Time analysis using MapReduce and Web-based exploration and visualization

Extendible Architecture



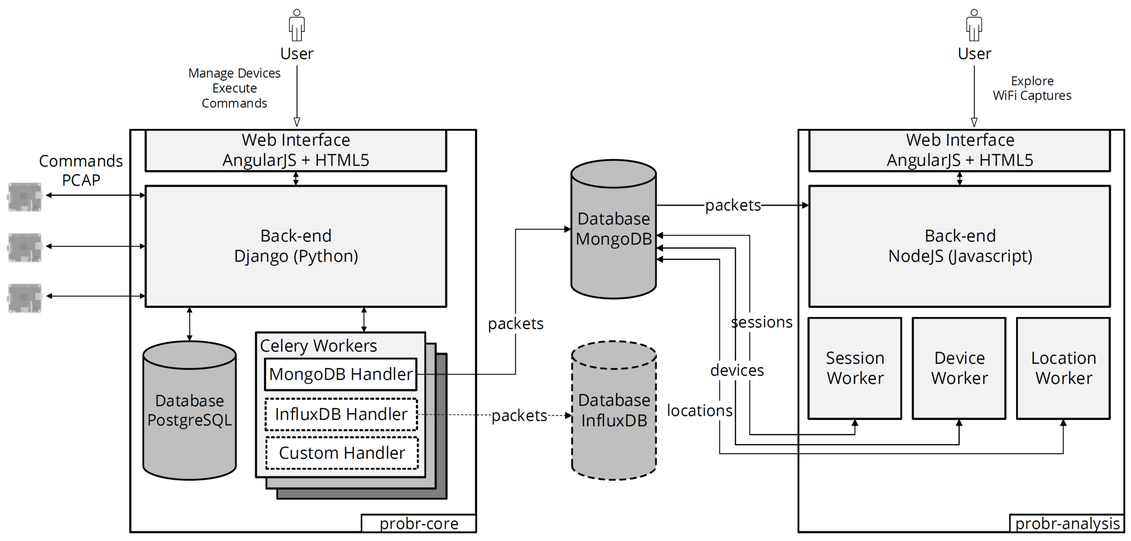
Attach custom analysis tools such as R, Matlab to Probr-Core for your own research

Probr-Core

Remote command execution on sniffing devices with predefined sniffing command templates

Extracts packets from collected PCAP files and stores them to central storage

Multiple adapters for different storage solutions (MongoDB, PostgreSQL, Redis, Kafka etc.)



Probr-Analysis

Live-display of current packets

Interactive visualization of analysis results

Query and filter collected packets by timestamp, MAC address etc.

Worker-based asynchronous analysis and computation

Location-heatmap of monitored devices

Session Tracking

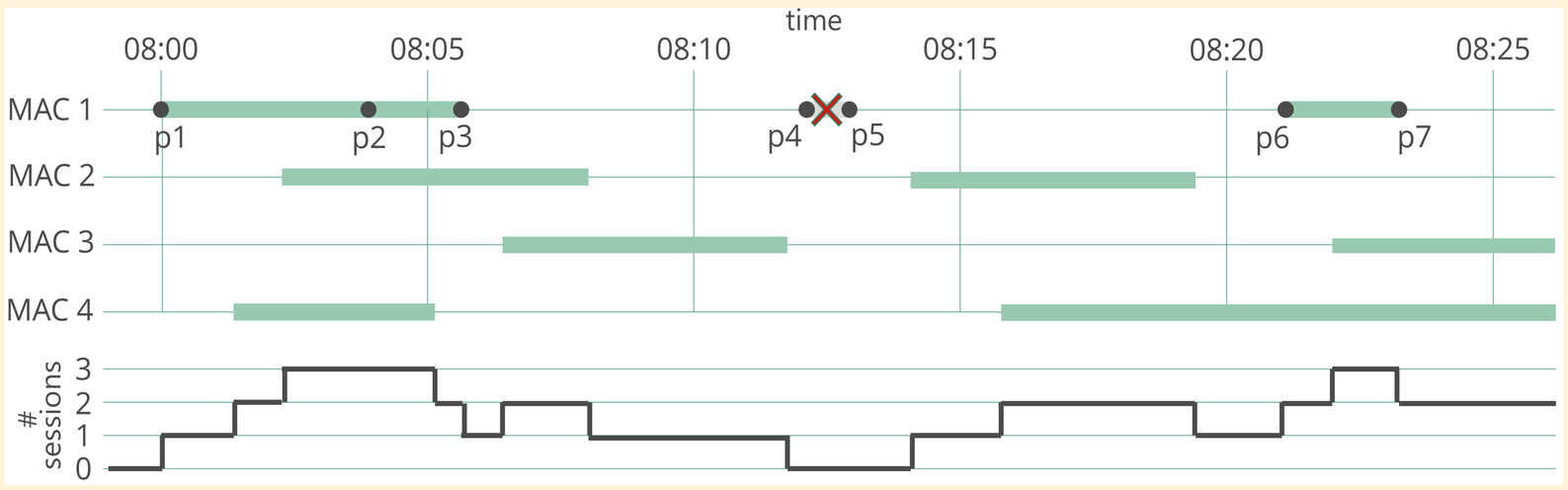
Groups packets into session windows based on MAC address presence

Separates session windows by gaps of inactivity

Discards sessions shorter than predefined threshold to reduce noise

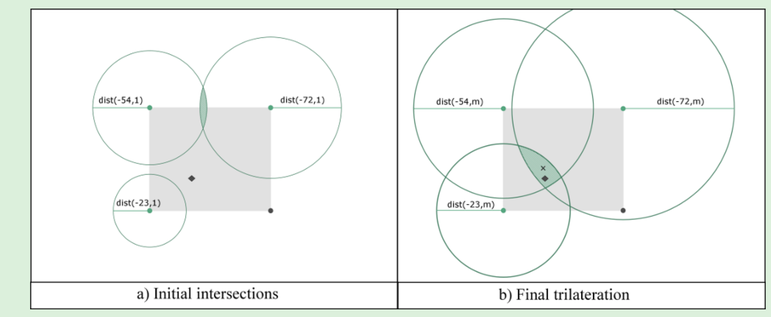
Aggregates concurrent sessions over time

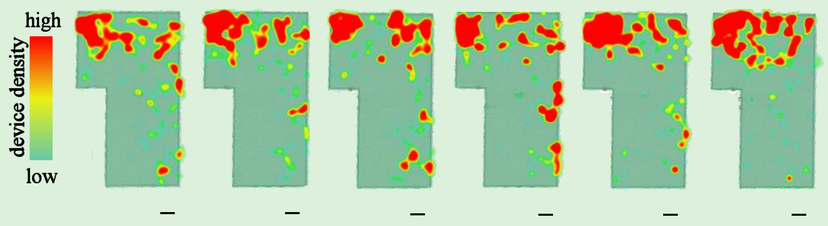
Serves as a basis for room utilization



Device Localization

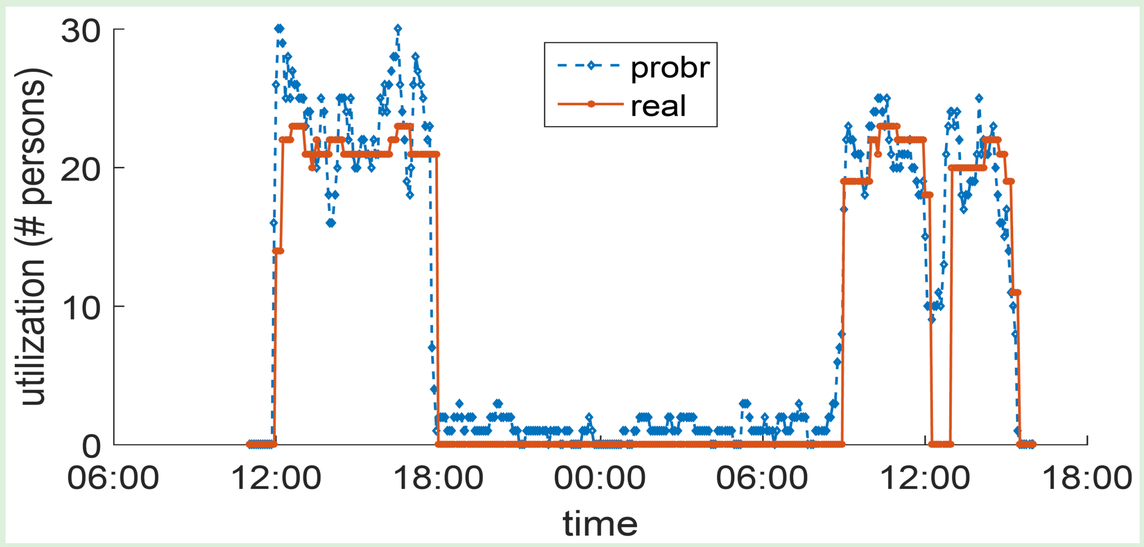
Computes locations of monitored devices based on the Received Signal Strength Indicator (RSSI)





Room Utilization

Estimates utilization of a monitored area or room by utilizing concurrent session count at any given time



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