

## Introduction

- A two-layered optimization approach to improve the user perceived QoS in heterogeneous networks.
- Top layer views the problem of prediction of the network dependent on user preferences.
- User preferences are offered bit rate, price, mobility support and reputation.
- At bottom layer, network operator hypothetically, reconfigures the network, subject to the network constraints of bandwidth and acceptable SNR in order to optimize the network coverage to support users who are not serviced adequately.

## Applications

- Dynamic Cell Coverage Control
- Cognitive Radio & Wireless Networks
- Cooperating Networks

## System Model

- Problem of "Selecting the most suitable network" and the user preferred criteria are represented into hierarchy of dependencies in Figure 1.
- Analytic Hierarchy Process (AHP) is used to calculate the weight for each criteria based on user priorities (on 1 to 9 scale).
- The comparison matrix is created by pair-wise comparisons between the considered criteria

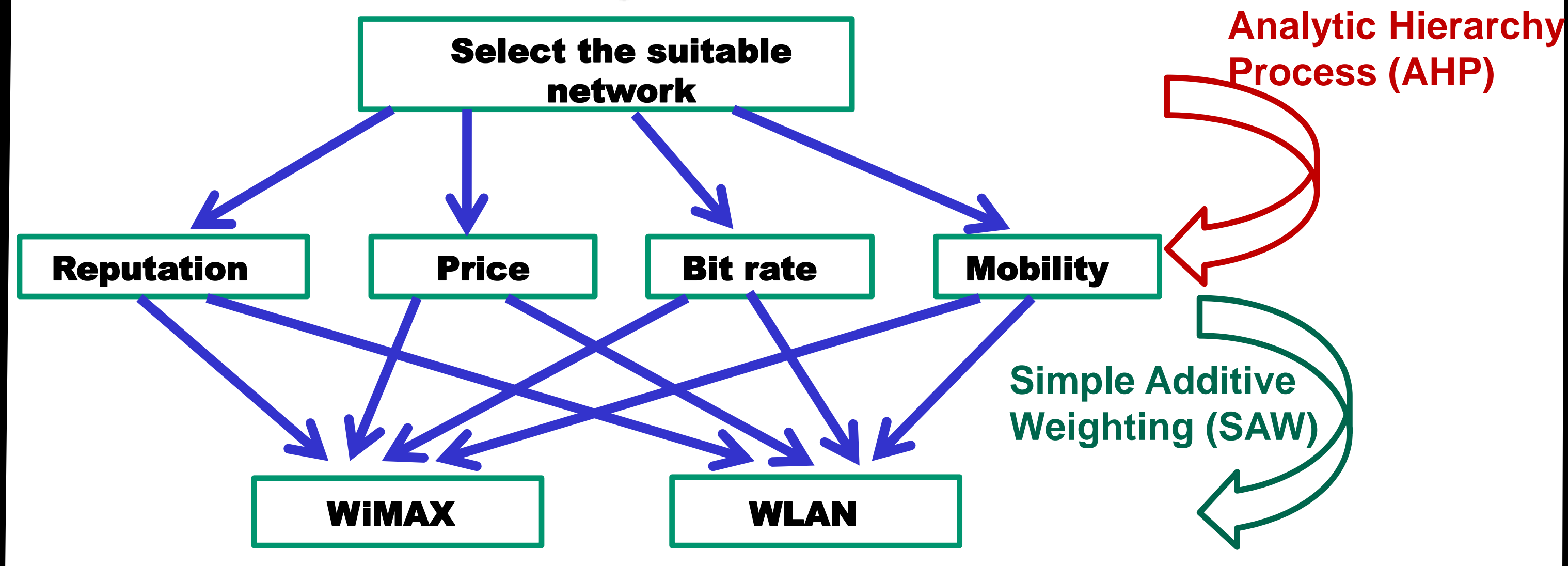


Figure 1 Network Selection Hierarchy of Dependencies



Figure 2 Android Application to collect data for considered criteria from the network

- The developed Android mobile application installed in HTC handsets will be used to collect the network related data (as shown in Figure 2) and SAW is used to calculate the weight of each network with respect to the considered criteria.
- Finally the heterogeneous user received payoff for selecting each network is calculated and the network with highest payoff is selected. This network selection gives an initial partition showing the proportion of users who prefer WiMAX and Wi-Fi.

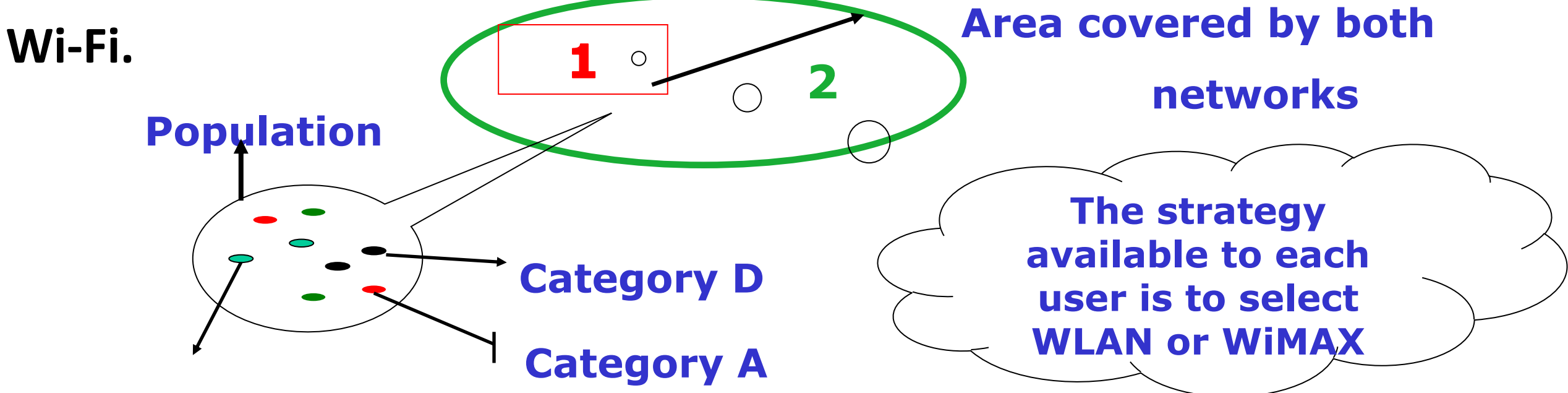
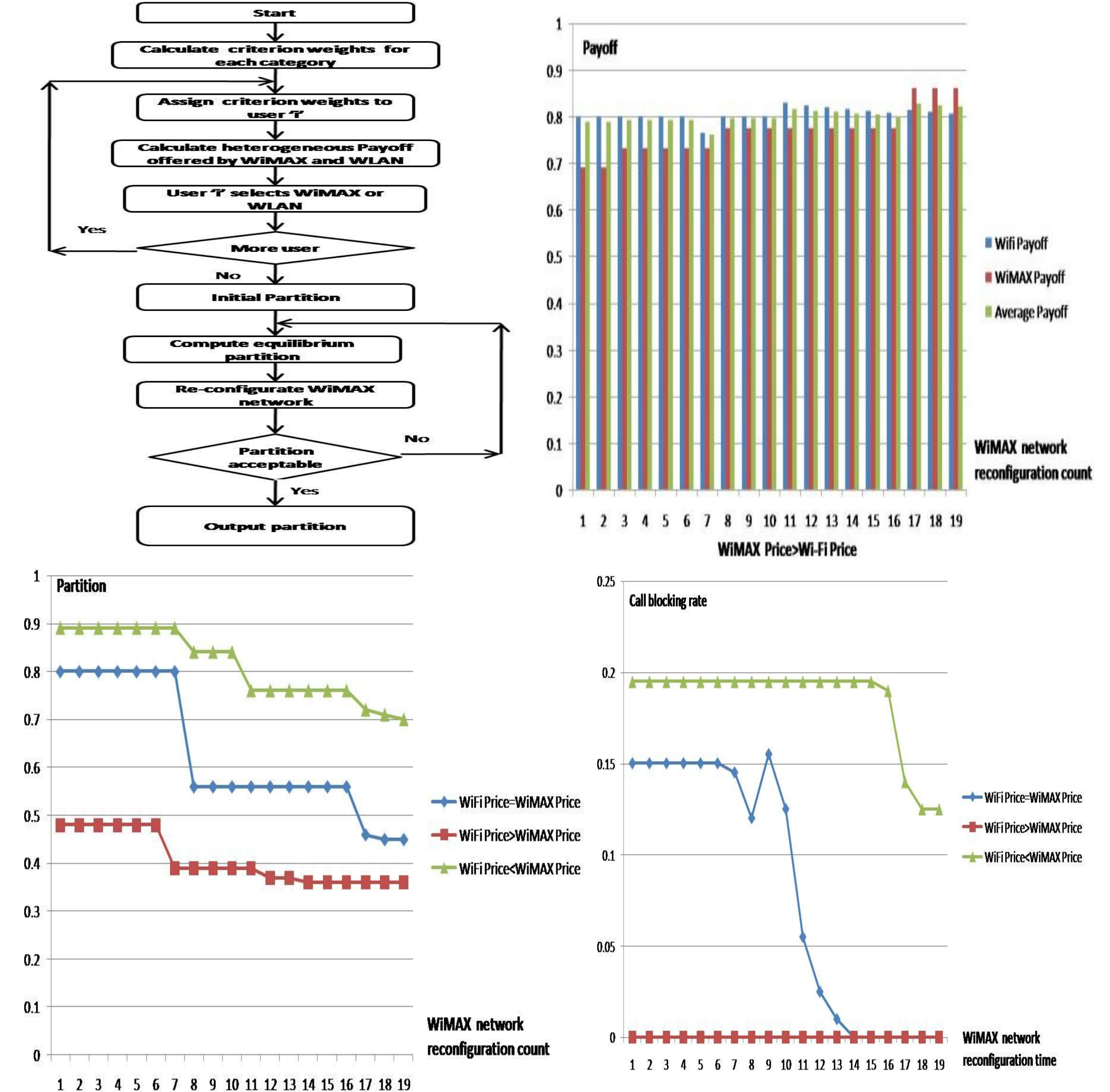


Figure 3 Simulation Scenario

## System Performance Evaluation



## Publications

- Haris Pervaiz, Haibo Mei, Peng Jiang and John Bigham. (2010) **Enhanced cooperation in heterogeneous wireless networks using coverage adjustment.** In Proceedings of the 6th International Wireless Communications and Mobile Computing Conference in session of Cognitive radio communications and networks (cooperative and cognitive networks) in Caen, France. Pages 241-245.
- Haris Pervaiz and John Bigham. (2009) **Game Theoretical Formulation of Network Selection in Competing Wireless Networks: An Analytic Hierarchy Process Model.** In Proceedings of Third International Conference on Next Generation Mobile Applications, Services and Technologies (NGMAST09) in Cardiff, Wales. Pages 292-297.