

ABSTRAK

MANAJEMEN INTERFERENSI MENGGUNAKAN METODE ALGORITMA PENJADWALAN BERDASARKAN POSISI DAN BEBAN TRAFIK *USER* PADA TEKNOLOGI *CELL-LESS CLOUD-RADIO ACCESS NETWORK*

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Permintaan pengguna seluler untuk kualitas dan kapasitas data meningkat seiring berkembangnya layanan (*multimedia, game online, download, upload, dll*). Hal ini mengemukakan tantangan besar bagi penyedia layanan. Maka, optimalisasi penggunaan sumber daya radio adalah masalah utama dalam jaringan nirkabel. Teknologi Cloud-Radio Access Network (C-RAN) mendukung strategi inovatif dengan mempertimbangkan jaringan sebagai "sel hiper" daripada sekumpulan sel yang independen satu sama lain. Strategi yang sering disebut "*Cell-less*" memungkinkan untuk memusatkan pengambilan keputusan. Teknologi Cell-less C-RAN secara dinamis menangani penjadwalan di setiap sel sesuai dengan *Channel State Information* (CSI) masing-masing untuk mengurangi interferensi.

Scheduling yang dilakukan masih menimbulkan permasalahan interferensi dan *fairness* di setiap sel. Untuk itu, skripsi ini menggunakan metode *Combination of Dynamic Scheduling* (CDS) berdasarkan posisi dan beban trafik *user* untuk mengatasi dua jenis permasalahan tersebut. *Signal to Interference plus Noise Ratio* (SINR), *Throughput*, *Spectral Efficiency*, dan *Fairness* digunakan sebagai parameter untuk mengevaluasi kinerja sistem.

Pemodelan dan simulasi digunakan untuk menguji sistem. Hasil simulasi yang didapatkan menunjukkan bahwa dengan metode CDS nilai SINR, *Throughput*, *Spectral Efficiency*, dan *Fairness Index* lebih baik daripada tanpa menggunakan metode tersebut. Metode tanpa CDS yang digunakan sebagai pembanding adalah tiga buah metode *scheduling* yaitu: (1) *round-robin*, (2) *scheduling* berdasarkan posisi *user* dan, (3) *scheduling* berdasarkan beban trafik. Dengan metode CDS, nilai SINR kurang dari 20 dB sebesar 11 persen, sedangkan tanpa metode CDS sebesar 100 persen. Nilai *Throughput* dengan metode CDS kurang dari 60 Mbps bernilai 14 persen sedangkan tanpa metode CDS sebesar 100 persen. Dengan metode CDS nilai *Spectral Efficiency* lebih besar dari 5 bit/s/Hz sebesar 3 persen, sedangkan tanpa metode CDS sebesar 60 persen. Nilai *Fairness Index* menggunakan CDS memiliki nilai 0,837, sedangkan tanpa metode CDS memiliki nilai *Fairness Index* 0,807.

Kata Kunci: *Dynamic Scheduling, C-RAN, Cell-less, SINR, Fairness.*

ABSTRACT

INTERFERENCE MANAGEMENT USING SCHEDULING ALGORITHM BASED ON USER POSITION AND TRAFFIC LOAD IN CELL-LESS CLOUD-RADIO ACCESS NETWORK TECHNOLOGY

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The demand of mobile users for data quality and capacity increases due to the development of services (multimedia, online games, downloads, uploads, etc). It poses a major challenge for service providers. Therefore, optimizing the use of these resources is a major problem in wireless networks. Cloud-Radio Access Network (C-RAN) technology supports an innovative strategy by considering a network as a "hyper cell" rather than a set of cells which is independent of each other. The strategy that is often called "Cell-less" allows for centralized decision making. Cell-less C-RAN technology dynamically handles scheduling in each cell according to each Channel State Information (CSI) to minimize interference.

Scheduling that is done still causes interference and fairness problems in each cell. For this reason, this undergraduate project uses the Combination of Dynamic Scheduling (CDS) method based on the user's position and user traffic load to overcome these two types of problems. Signal to Interference plus Noise Ratio (SINR), Throughput, Spectral Efficiency, and Fairness are used as parameters to evaluate system performance.

Modeling and simulation are used to evaluate the system performance. The simulation results obtained show that with the CDS method the values of SINR, Throughput, Spectral Efficiency, and Fairness Index are better than without using this method. The method without CDS used as a comparison is three scheduling methods, namely: (1) round-robin, (2) scheduling based on user position and, (3) scheduling based on traffic load. With the CDS method, the SINR value which is less than 20 dB is 11 percent, while without the CDS method it is 100 percent. The throughput value with the CDS method of less than 60 Mbps is 14 percent, while without the CDS method it is 100 percent. With the CDS method the Spectral Efficiency value which is greater than 5 bits/s/Hz is 3 percent, while without the CDS method it is 60 percent. The Fairness Index value using the CDS has a value of 0.837, while without the CDS method it has a Fairness Index value of 0.807.

Key Words: Dynamic Scheduling, C-RAN, Cell-less, SINR, Fairness