Analisa kinerja dan efisiensi energi pada implementasi infrastruktur green network berbasis virtualisasi menggunakan model jaringan thin client = Performance and energy efficiency analysis of virtualization based green network infrastructure in thin client network implementation

Fia Retnawati, author

Abstrak

Pesatnya perkembangan teknologi beserta tingkat penggunaannya membawa dampak positif di berbagai bidang kehidupan manusia, namun juga dapat membawa dampak negatif bagi kelestarian lingkungan. Bidang ICT adalah salah satu penyumbang emisi karbon dunia, data pengukuran pada tahun 2007 menyebutkan bahwa 2% dari total emisi karbon dunia berasal dari sektor ini. Pengurangan emisi karbon di bidang ICT dapat dilakukan dengan penerapan Green Networking, yaitu implementasi infrastruktur jaringan berbasis pada teknologi ramah lingkungan. Virtualisasi adalah metode kunci dari solusi green networking ini.

Salah satu metode virtualisasi adalah virtualisasi desktop yang dikenal juga dengan istilah thin client. Thin client adalah model infrastruktur jaringan tersentralisasi dimana seluruh proses dalam jaringan dibebankan pada server sementara dumb terminal di sisi user dikonfigurasi dengan perangkat seminimal mungkin (setiap terminal hanya terdiri dari display monitor, keyboard dan mouse) sebatas bertugas sebagai media input (keystroke dan mouseclick) dan output (display).

Pengimplementasian jaringan thin client pada penelitian ini dibangun dalam skala laboratorium. Kinerja jaringan dan kemampuan penyediaan layanan yang dapat dinikmati user menjadi sorotan dalam implementasi model thin client, untuk itu dilakukan uji kinerja jaringan dari segi rataan beban (load average), penggunaan sumber daya memori (memory usage) dan penggunaan prosesor (CPU usage) agar dapat diketahui pola penggunaan infrastruktur jaringan selama user melakukan aktivitas penggunaan aplikasi lightweight, mediumweight dan heavyweight.

Selain itu dilakukan juga penghitungan konsumsi energi dan emisi CO2 untuk melihat dampak virtualisasi jaringan terhadap angka emisi CO2 secara riil. Hasil penelitian menunjukkan bahwa emisi CO2 pada infrastruktur thin client 77.35% lebih rendah dibandingkan emisi CO2 infrastruktur komputer desktop konvensional emisi CO2.

<hr><i>The rapid technology developments and utilization generates positive impact in many areas of human life but also has obvious downside on environmental sustainability. ICT has become one of the contributors to global carbon emissions. According to report provided by Climate Group in 2007, 2% of total global carbon emissions come from ICT sector. Reducing carbon emissions in the field of ICT can be done with application of Green Networking, namely the implementation of network infrastructure based on eco-friendly technologies.

One of the methods of virtualization is desktop virtualization which also known by the term thin client. Thin client is a centralized network infrastructure model where the entire process in a network depend highly on server while the terminal on the user merely served as a input (keystroke and mouseclick) and output (display) media and are arranged with minimum configuration (each terminal only consists of display

monitor, keyboard and mouse).
In this research, the thin client network implementation is developed in university laboratory scale. Network performance and service delivery analysis are necessary in the implementation of thin client infrastructure model, performance test and result analysis would be deployed to Network performance and service delivery analysis are necessary in the implementation of thin client infrastructure model, performance test and result analysis measuring load average, memory usage and CPU usage are deployed to map utiilization pattern of user activities in using lightweight, mediumweight and heavyweight application.
This research also covers energy consumption and carbon emisision measurement of the implemented thin client network to analize the technology virtualization effects on carbon emission in small scale network implementation. Result showed that CO2 emission generated by thin client network is 77.35% lower than CO2 emission of conventional desktop computer network.</i>