CECS 546

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Project Proposal

**Simulation based analysis of Spanning Trees and its relation with Balance factor**

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**Abstract:**

In the age of parallel processing, parallel communication using spanning trees is a preferential method when it comes to network performance. Spanning trees may be used for personal communication and message broadcasting across an interconnected network as it has shown potential in enhancing the security, fault tolerance and overall bandwidth of the network. Our project focuses on the importance of the Balance Factor (BF) of the spanning tree with respect to the broadcast ability of the network under consideration. The BF determines the root nodes level of access to all the other nodes. A spanning tree having a BF closer to 1 has a more balanced structure and can exhibit efficient data transfer, low latency and higher throughput thus leading to efficient broadcasting and personal communication.

The project performs simulations using NS2 (Network simulator 2) which is a discrete event simulator that emulates the target network. It takes into consideration the numerous scenarios that can influence network performance. The tool provides support for simulation of TCP, routing and multicast protocols over wired and wireless networks. The focus of simulation is on the comparison between Spanning Binomial Tree (SBT) and the Balanced Spanning Binomial Tree (SBnT) for 4 – cube. Analysis will test network parameters at all relevant nodes in the spanning tree. The parameters through which our analysis be based on will be data loss per data generated, delay per packet, jitter, throughput transferred per throughput generated and network connectivity. The simulation can further be carried out for star topology.

**Reference:**

**A Comparative Study of Topological Properties of Hypercubes and Star Graphs**: Khaled Day and Anand Tripathi IEEE Transactions on Parallel and Distributed systems, vol. 5, no. 1, January 1994, pp. 35-37

**Fault-Tolerant Optimal Broadcast Algorithm for the Hypercube Topology:** Lokendra Singh Umrao, Ravi Shankar Singh International Journal of Computer, Electrical, Automation, Control and Information Engineering Vol:9, No:2, 2015