

Enhancing Inter-Satellite Data Relay in Dynamic Space Communication

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Abstract— In this paper, we explore the design and operations of an inter-satellite data relay network, which includes Low Earth Orbit (LEO), Medium Earth Orbit (MEO), and Geostationary Orbit (GEO) satellites. Due to the different orbiting speeds and dynamic behaviors of these satellite constellations, we consider Delay-Tolerant Networking (DTN) between them and implement contact graph routing (CGR) at the layer-3 and Licklider Transmission Protocol (LTP) at layer-4. We base our analysis on a realistic space scenario where satellite locations and movements over time are extracted from a real-time satellite database. We demonstrate end-to-end latency and goodput of a file transfer through the satellite network under consideration.

Keyword— Delay Tolerant Networks (DTN), Contact Graph Routing (CGR), Licklider Transmission Protocol (LTP)



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