

Pornchai Buabanprom 2006: A Study on Reliable Multicast on Unidirectional Satellite Link Using Broadcast Disk, FEC and Peer-to-Peer Sharing Techniques.  
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An alternative mean for people in remote geographical areas and scattered islands in SE Asia in receiving information is from satellite broadcast due to the lack of terrestrial infrastructures. The conventional reliable communication protocols require an acknowledgement from receivers which implies that bidirectional communication is required. With the unidirectional link restriction, sending such feedback to the senders cannot be done. The Asian Internet Interconnection Initiatives (AI3) Project funded by Japanese government has been operating both unidirectional and bidirectional satellite based testbed network in SE Asia and producing a series of research activities. However, the AI3 unidirectional links are not fully utilized due to the nature which existing protocols ensure the transmission reliability. This research is to study constraints and requirements needed for designing and implementing a communication protocol for reliably distributing data over a unidirectional satellite link. The protocol supports high-level applications such as bulk file transfer for any type of media. The techniques studied for providing reliability are Data Carousel, Forward Error Correcting (FEC), and Peer-to-Peer Sharing. The experimental results are obtained from NS-2 simulations, DummyNet emulations and actual runs on an AI3 link. We found that Data Carousel technique, the easiest method, requires the most transmission bandwidth because the data must be sent repeatedly. Using FEC requires lesser bandwidth reducing the number of repetitive sending rounds, but requires a much greater processing time for encoding and decoding process. Finally, Peer-to-Peer Sharing technique though requires more complex receivers but it can improve the bandwidth consumption dramatically.

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