Manta: A Peer-to-Peer file sharing protocol for MANETS

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What is Manta?

A protocol and system for sharing large files with nearby devices in a Mobile Ad-Hoc Network over Wifi-P2P.

When can Manta be used?

- When network bandwidth is low.
- To save cellular data.

Example Transaction:
1) Exchange text messages about desired file.
2) Once filename is known, use Manta to request file.
3) If file is found, Manta downloads file to your device.

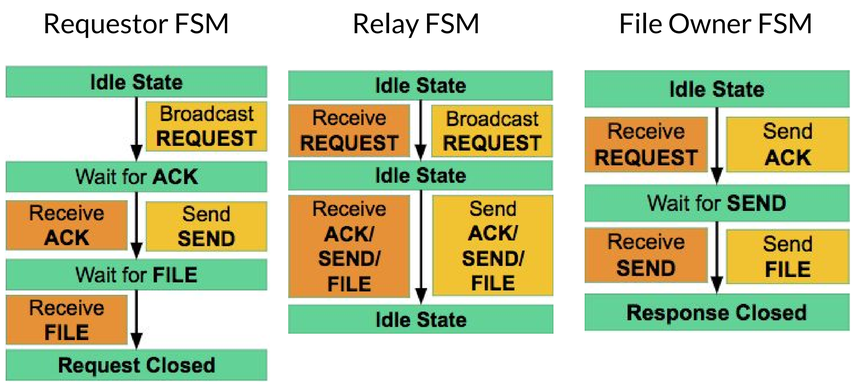
Design Decisions

- **Request-based** file sharing (v. upload based)
  - Minimize network congestion.
- Participant nodes are **stateless**
  - Don't store information about network topology.
  - Allows continuous network reconfiguration.
- **Unicast** replies (*but broadcast initial file request*)
  - Pro: Minimizes network congestion.
  - Con: Fragile download paths if network churn is high.

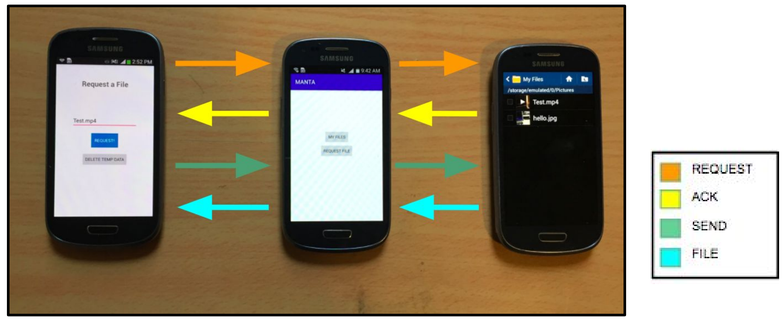
Messages in Manta Protocol

REQUESTOR DEVICE	FILE OWNER DEVICE	PURPOSE
REQUEST	ACKNOWLEDGEMENT	Establish path
SEND	FILE	Complete file transfer

Finite State Machines



Android Evaluation



Distance	0 ft	41.67 ft	83.33 ft
Response Time	1.20min	1.25min	too far

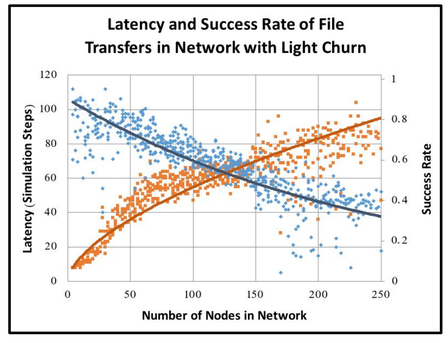
* Above metrics taken with .8 MB file

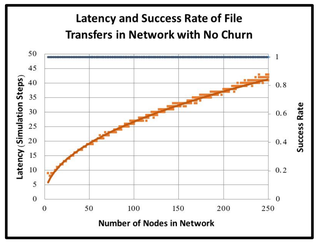
Protocol Simulation

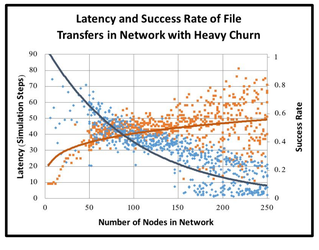
We built a simulator for modeling our protocol and measured its performance with the following variables:

Dependent Variables	Independent Variables
Avg. transfer success rate	network size (number of nodes)
Avg file transfer latency	amount of network reconfig. (churn)

System Evaluation







■ Latency ◆ Success Rate

Future Work

- Support for unstable topology at every step
- Handle name collisions
- Experiment with broadcast messages rather than unicast
- BitTorrent built upon this protocol