A Message Ferrying Approach for Data Delivery in Sparse MANETs

M Wael AlSidawi
Freiburg Universität
Nodes Resources
mobility-assisted approach which utilizes a set of special mobile nodes called message ferries (ferries) to provide communication service for nodes in the deployment area.
• Non-randomness in the movement of the nodes

• Help deliver data
Crisis - driven

Battlefield & disaster applications, where fixed and stable infrastructure is limited or unavailable due to environmental conditions

* Digital photos: Mobility-Assisted Data Delivery in Wireless Networks Slides  Mostafa Ammar - College of Computing- Georgia Institute of Technology- Atlanta, GA
Message Ferrying Applications

Geography-driven

Wide area sensing and surveillance applications, where sensor networks are inherently sparse due to the geographic span involved.
Message Ferrying Applications

Cost-driven

Applications that could use other existing technologies, and message ferries offer a cost effective alternative.
Applications that require a service not provided by other available networking infrastructure.
MF Schemes

- Node-Initiated MF (NIMF)
- Ferry-Initiated MF (FIMF)
• Node-Initiated MF (NIMF)
• Ferry-Initiated MF (NIMF)
Node-Initiated MF (NIMF)

Ferry moves according to specific route

NIMF Operations

• WORKING
• GO_TO_Ferry
• SEND/RECV
• GO_TO_WORK
NIMF Operations

- **WORKING**
- **GO TO FERRY**
- **GO TO WORK**
- **SEND/RECEIVE**

The diagram illustrates the flow between different operational states.
Node Trajectory Control

WORKING

Or should I meet the ferry !?

hello
The movement of nodes to meet the ferry will generally degrade performance on the tasks that are assigned to nodes.

Nodes need to strike a balance between performance gain in data delivery and performance degradation in assigned tasks.
Ferry-Initiated MF (NIMF)

Long range Radio
Short range Radio

Service Request
Location Update
Ferry-Initiated MF (NIMF)

Ferry takes proactive movement to meet up with nodes for communication purposes

FIMF Operations

• ASSOCIATED
• DISASSOCIATED
FIMF Operations

Sending “Service_Request”

“ASSOCIATED” mode

Interaction with the ferry

“DISASSOCIATED” mode
Ferry Operations

**IDLE**

*Follows a specific default route*

*It receives Service_Request*

**WORKING**
Node Trajectory Control

Message drops

Ferry location

Energy consumption
Message Ferrying

Ferries are special nodes take responsibility for carrying data between regular nodes.

Have fewer constraints in resources.

Provide communication capacity between regular nodes.
Farther work

Multiple Ferries

Send messages with priority concept
References

• Wenrui Zhao, Mostafa Ammar - College of Computing Georgia Institute of Technology Atlanta, GA

• DakNet project. http://web.media.mit.edu/~amir/daknet/.


• Mobility-Assisted Data Delivery in Wireless Networks - Mostafa Ammar - College of Computing Georgia Institute of Technology Atlanta, GA
Thanks for listening

Q & A