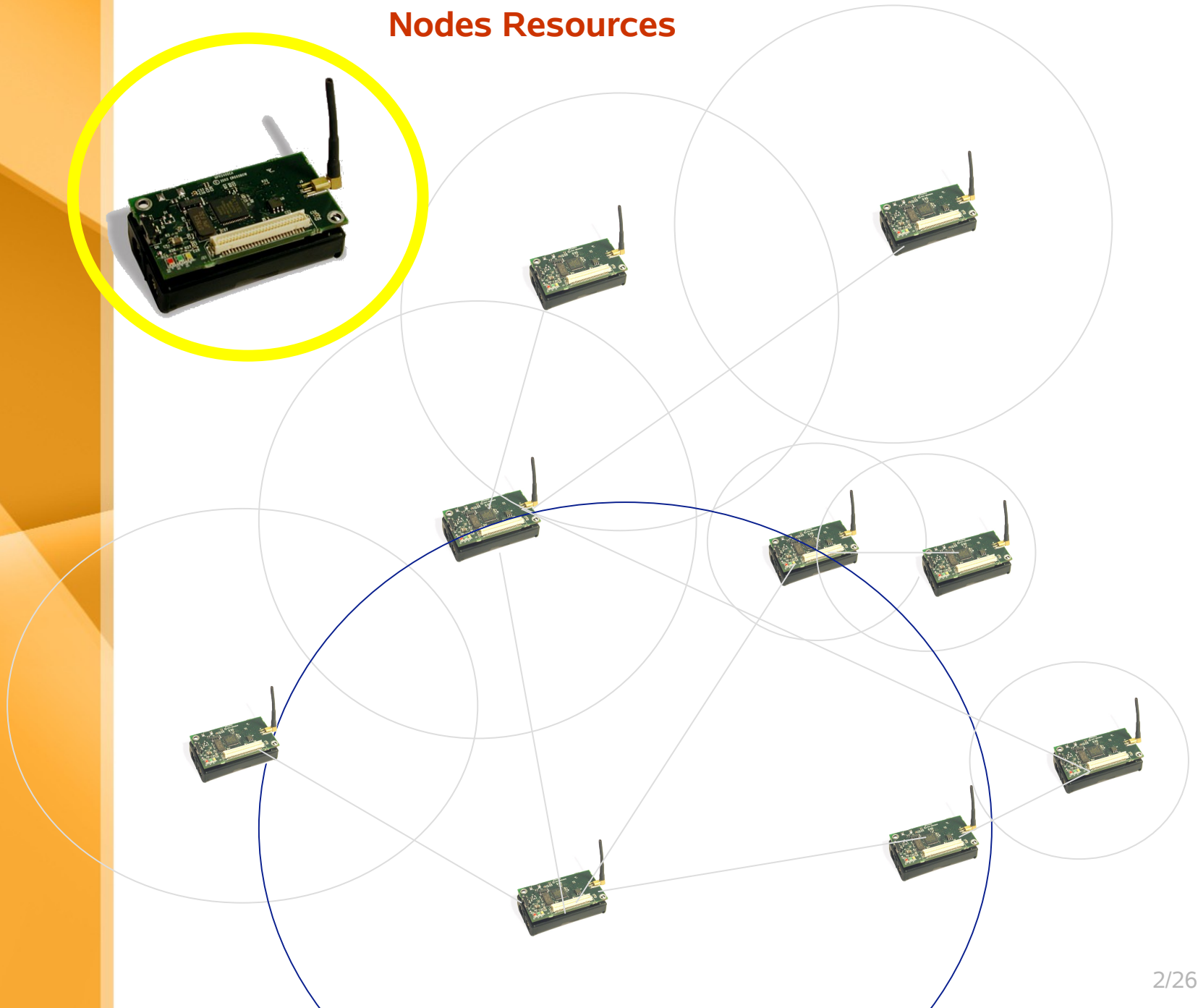# A Message Ferrying Approach for Data Delivery in Sparse MANETs

M Wael AlSidawi
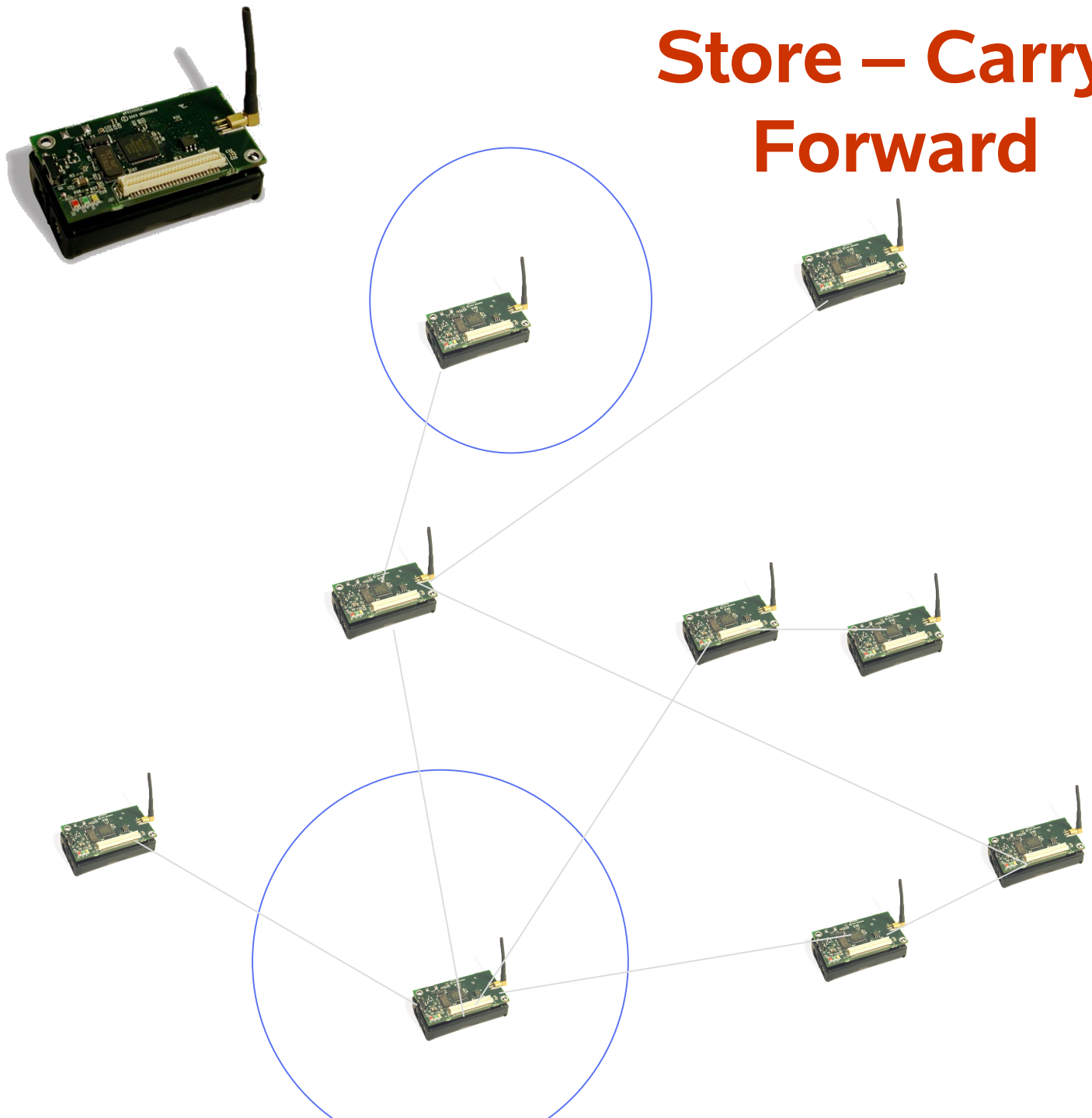Freiburg Universität

Nodes Resources

Message Ferrying

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.

Store – Carry Forward

- **Non-randomness in the movement of the nodes**

- **Help deliver data**

Message Ferrying Applications

Crisis - driven

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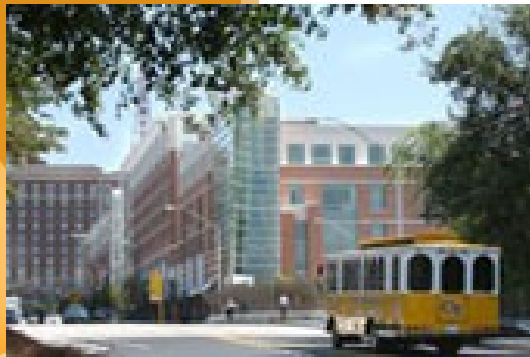
Message Ferrying Applications

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.

* Digital photos: Mobility-Assisted Data Delivery in Wireless Networks Slides   Mostafa Ammar - College of Computing- Georgia Institute of Technology- Atlanta, GA
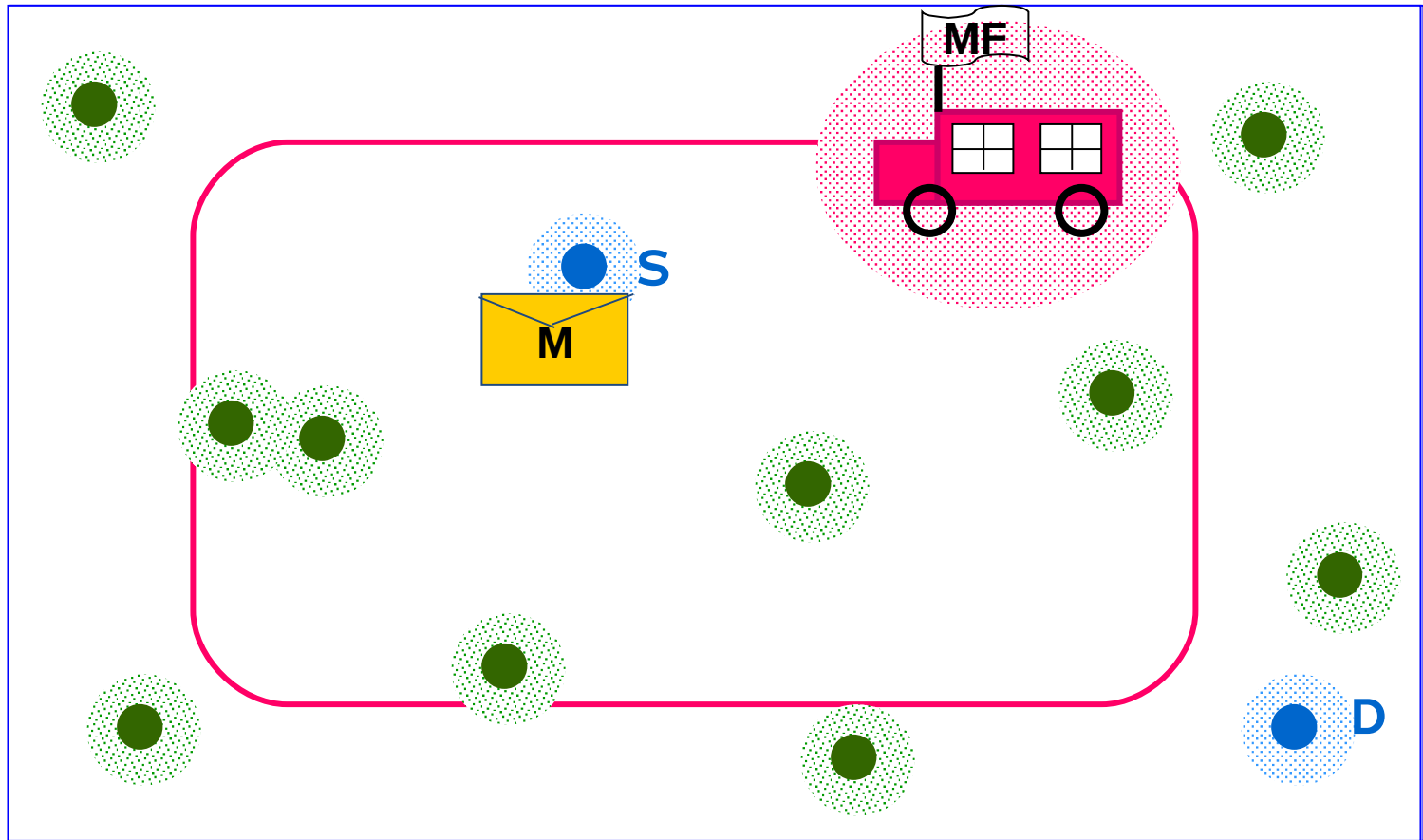
8/26

Message Ferrying Applications

Service - driven

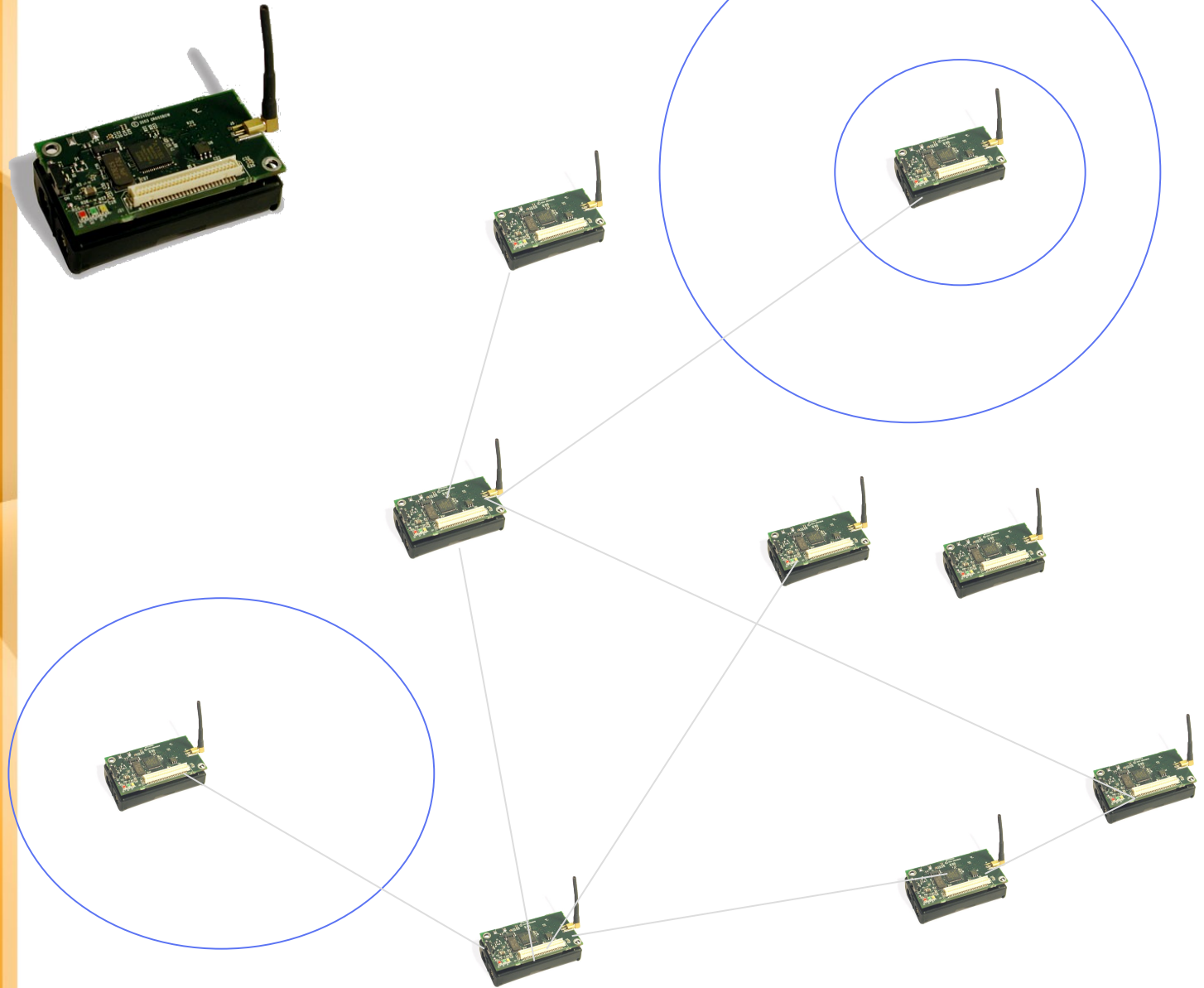Applications that require a service not provided by other available networking infrastructure.

MF Schemes

- Node-Initiated MF (NIMF)

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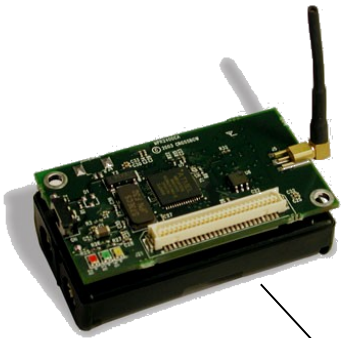
•Node-Initiated MF (NIMF)

•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

WORKING

GO_TO_FERRY
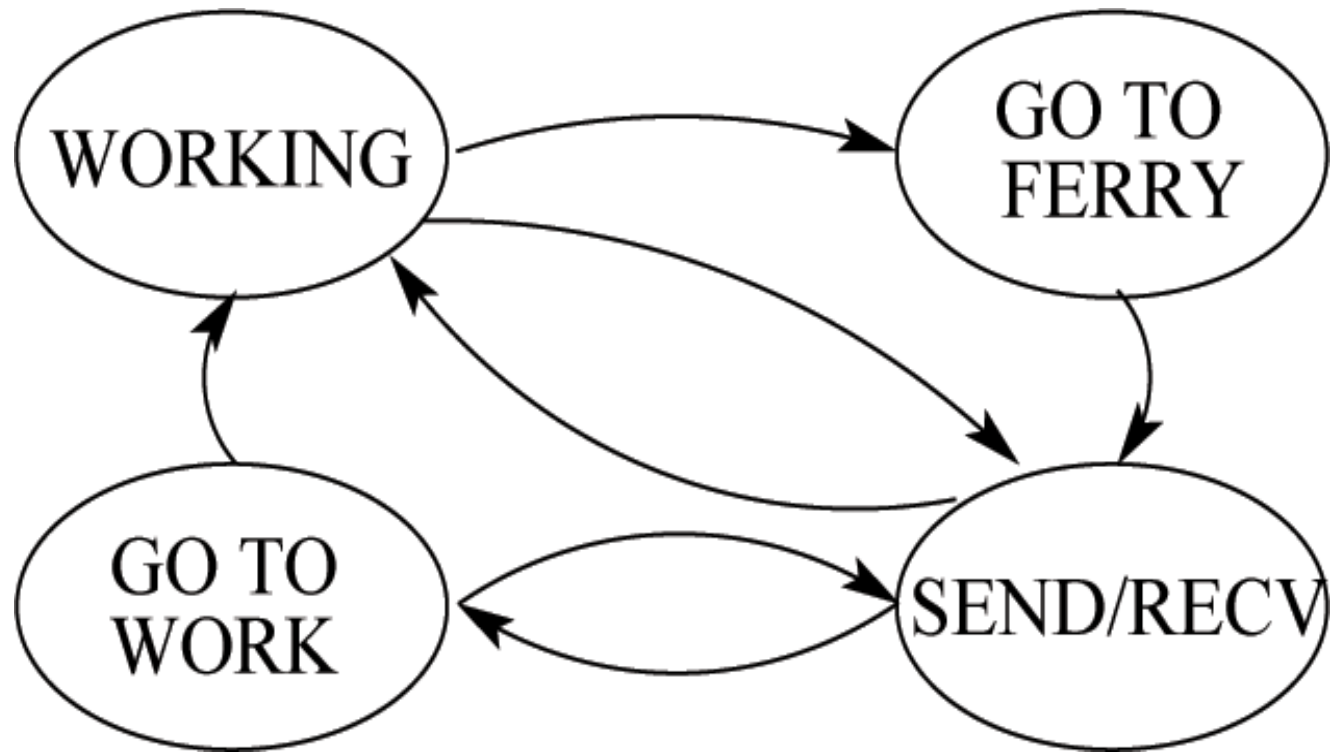
SEND/RECV

hello

GO_TO_WORK
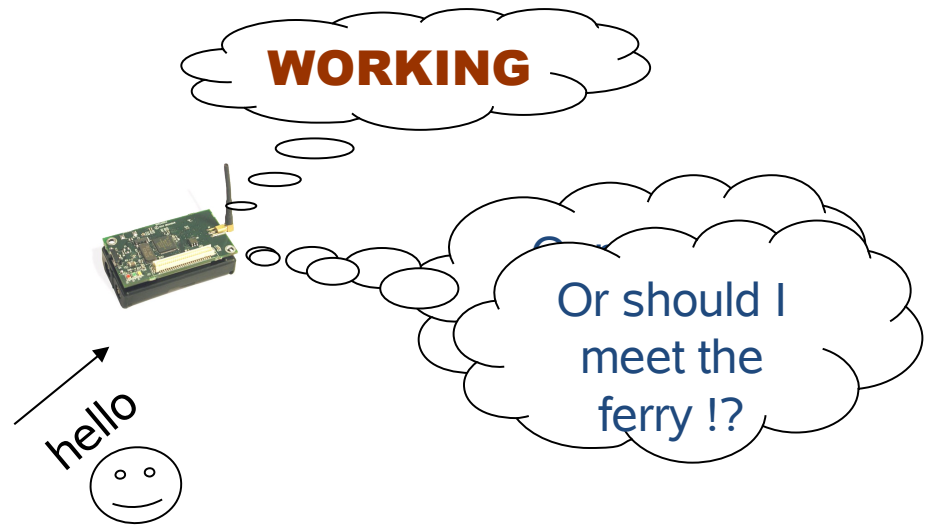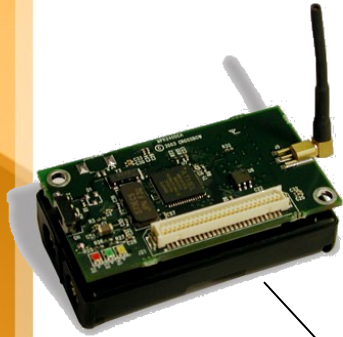
NIMF Operations

Node Trajectory Control

WORKING

Or should I meet the ferry !?

hello
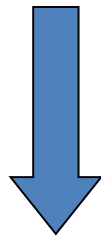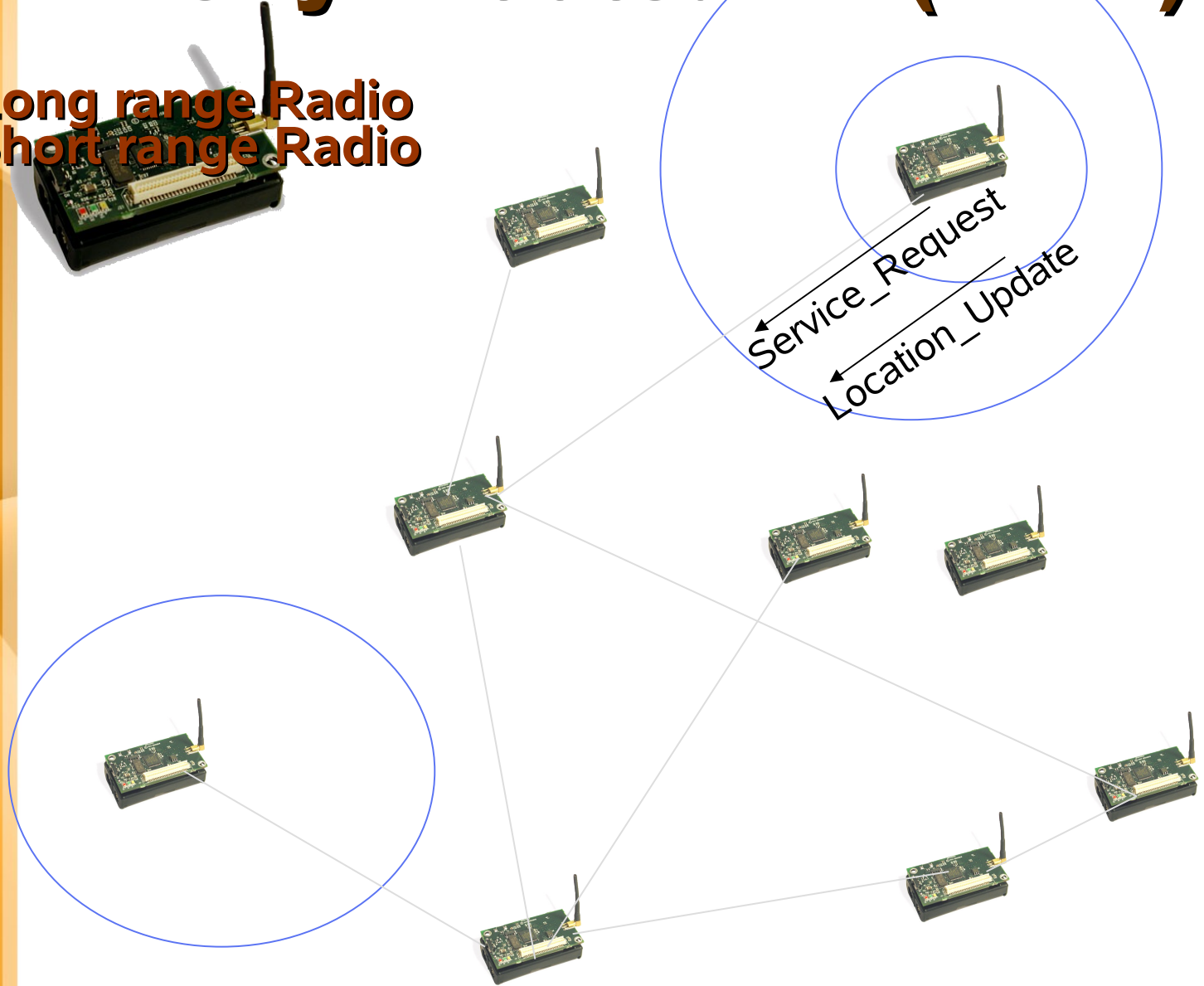
Node Trajectory Control

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
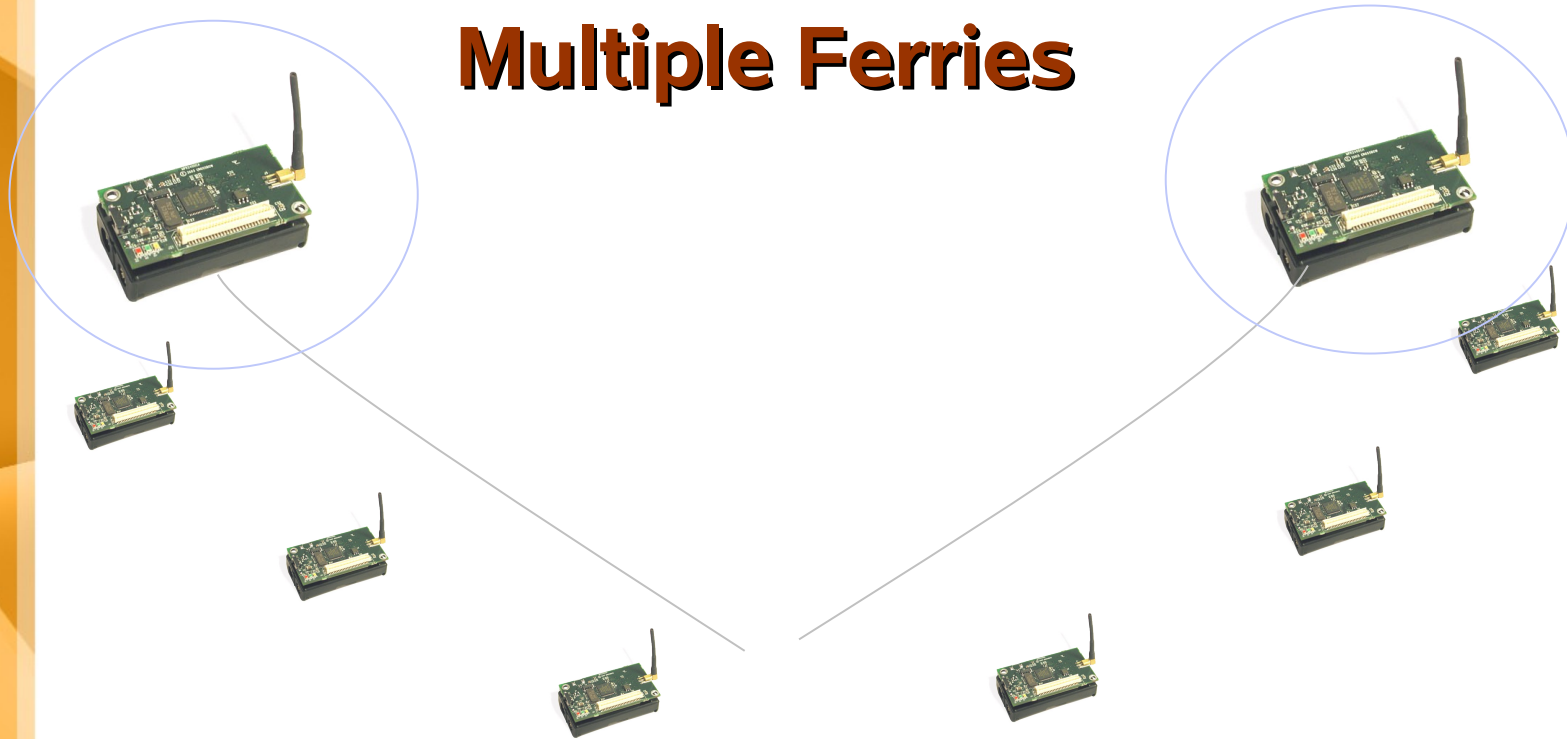
Message Ferrying

<u>Ferries</u> 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/.

- M. Ahmed, S. Krishnamurthy, R. Katz, and S. Dao. Trajectory control of mobile gateways for range extension in ad hoc networks.

- Mobility-Assisted Data Delivery in Wireless Networks - Mostafa Ammar **-** College of Computing Georgia Institute of Technology Atlanta, GA

Thanks for listening

Q & A