

Adaptive Computing Systems Using **Mobile Adhoc Grid Networks**

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- ❑ Distributed, Hybrid Embedded Systems
- ❑ Reconfigurable Architectures and Dynamic Resource Allocation
- ❑ System Intelligence, Optimization, and Control

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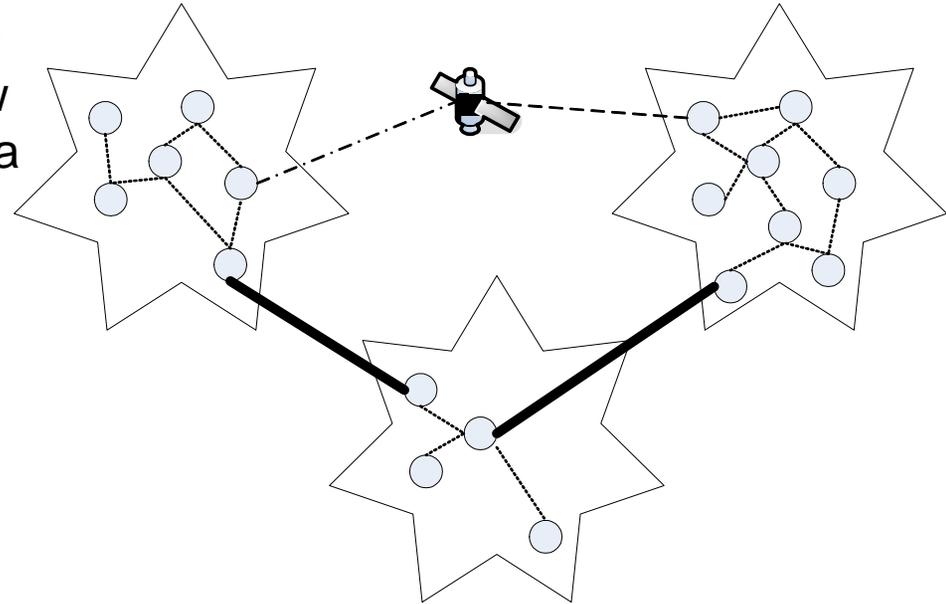
- ❑ Mobile Adhoc Network routing protocols.
 - ❑ Algorithms for Multicasting with QoS constraints.
 - ❑ Distributed Algorithms for reconfiguration
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MAGNETs: Mobile Adhoc Grid Networks

Motivation and Objectives:

- ❑ A distributed set of mobile devices could be observing a phenomenon and/or computing and communicating.
- ❑ A user A would use these devices to perform analysis X, and a user B would use the same or subset of these devices to perform analysis Y.
- ❑ Need for a **adaptively reconfigurable architecture** with protocols for to allow multi user application execution using a set of mobile communication and computational devices.
- ❑ Develop a framework to manage resources in MAGNET.
- ❑ Develop a high-level language specification using which a user can configure and use MAGNETs.

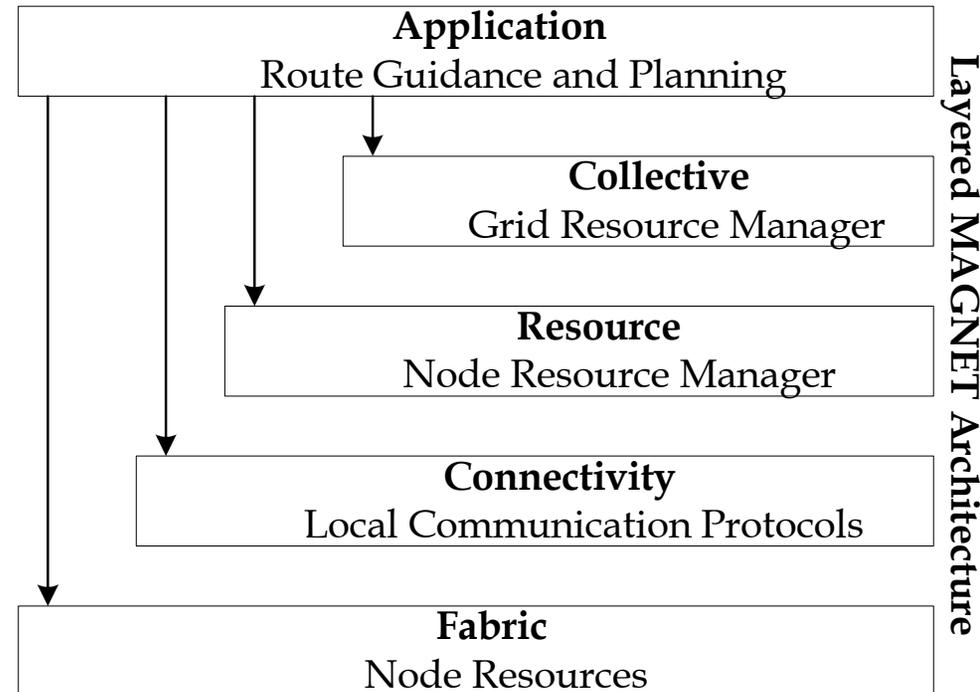
- ❑ MAGNETs are a set of mobile computing devices that form a MANET which can be used for coordinated computation and communication.



Layered MAGNET Architecture

- Layered architectures allow of adaptively configuring and reconfiguring MAGNETs that suit the application needs.
- **Fabric Layer:** data collection, storage, network resources, resident code for processing data, and computational resources
- **Connectively Layer:** connection management functions, reliable transport of data, code fragments, and output resulting from distributed execution, authentication services for establishing user-based trust relationships.
- **Resource Layer:** access to the resources at a node in the grid, API Interfaces, mobile code management

- **Collective Layer:** manages resources of the entire MAGNET.
- **Application Layer:** Execution of Mobile code on the behalf of the user.



Language G for Application Development in MAGNETs

- A programming language for accessing the MAGNETs should enable hiding of low level communication specification and implementation.
 - Language G (G for Grids) will allow a high-level problem solver to:
 - Specify the properties of the desired MAGNET upon which the application will be executed.
 - Properties include, size, communication requirements, node resources
 - Mobile code will be sent to each member of the MAGNET using which
 - The communication protocol can be specified which is to be followed by the each node for this application.
 - The computation to be performed and mechanisms to transfer the results of the computation.
 - Allow the problem solver to configure and use more than one MAGNET.
 - Specification of communication patterns between MAGNETs (sequential and parallel execution).
 - Iteration and conditional branching
 - The execution of language G involves use of the Layered MAGNET Architecture to configure MAGNETs.
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