

# Survey of Ad Hoc Network Routing Protocols

Team Adhocracy  
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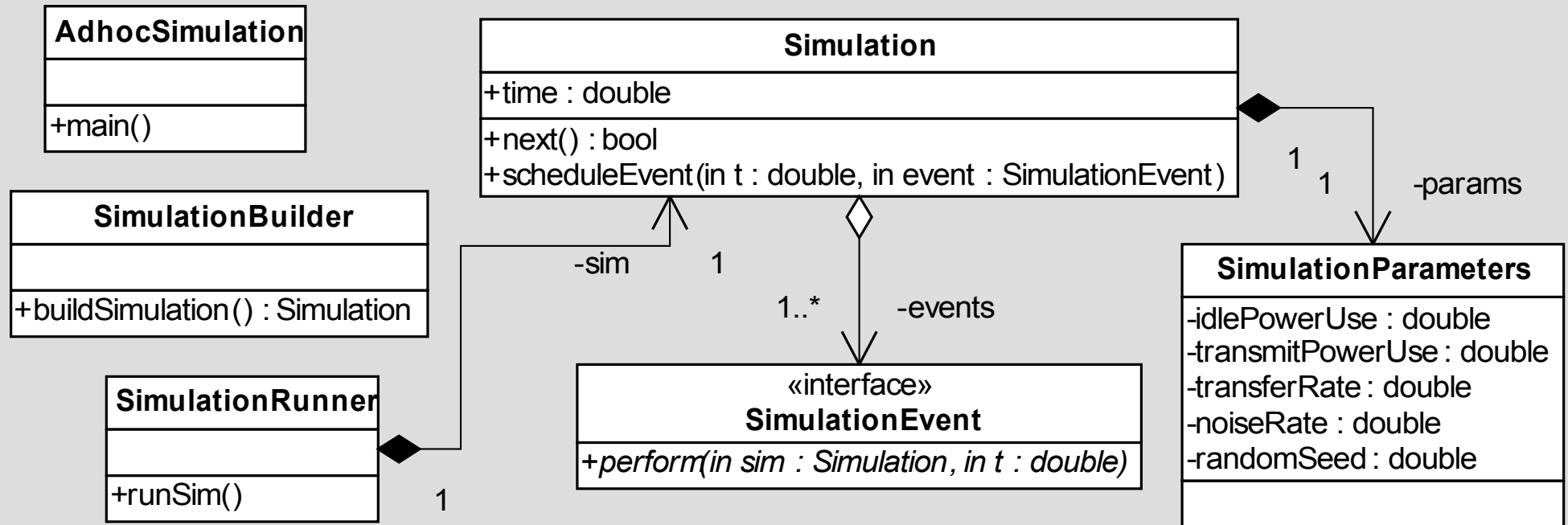
# Coming Up

- Summary
- Simulation Design
- Simulation Tests
- Simulation Expected Results
- Question/Comments
- References

# Project Summary

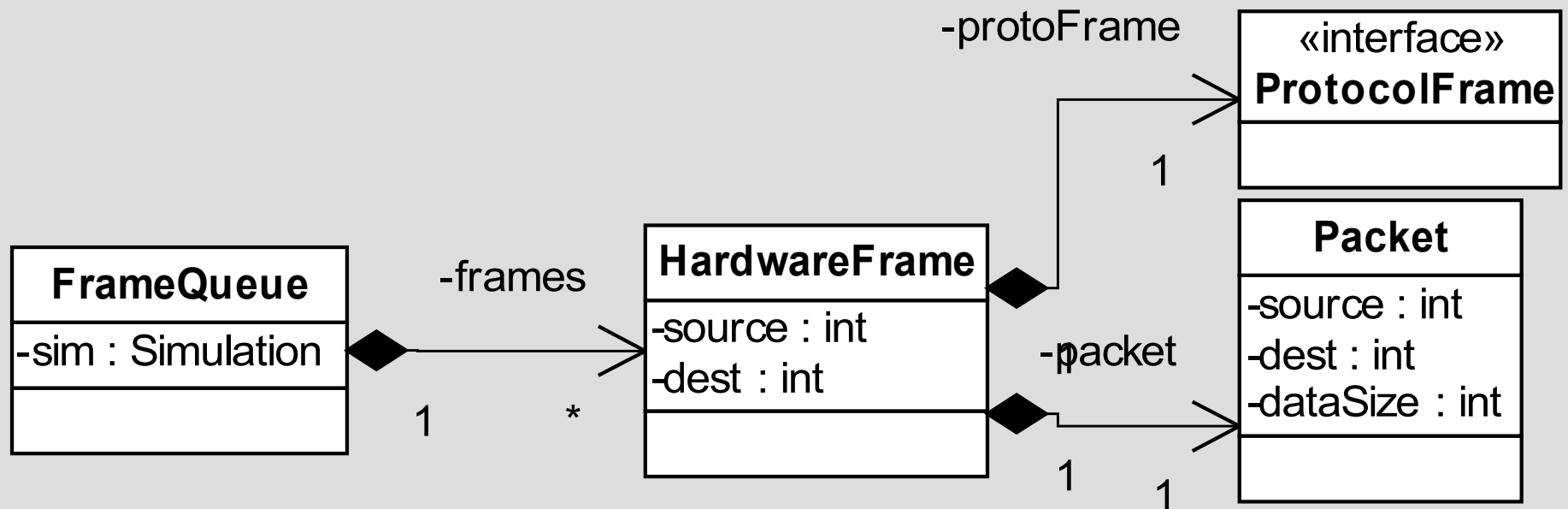
- Compare three Adhoc routing algorithms
  - DSR
  - Champ
  - GPSR
- Attempt to determine benefits and weaknesses of each algorithm
- Use metrics to determine which one works the best

# Simulation Core Design



- Discrete Event Simulation
- Builder gets parameters and creates objects
- Runner collects and compiles results

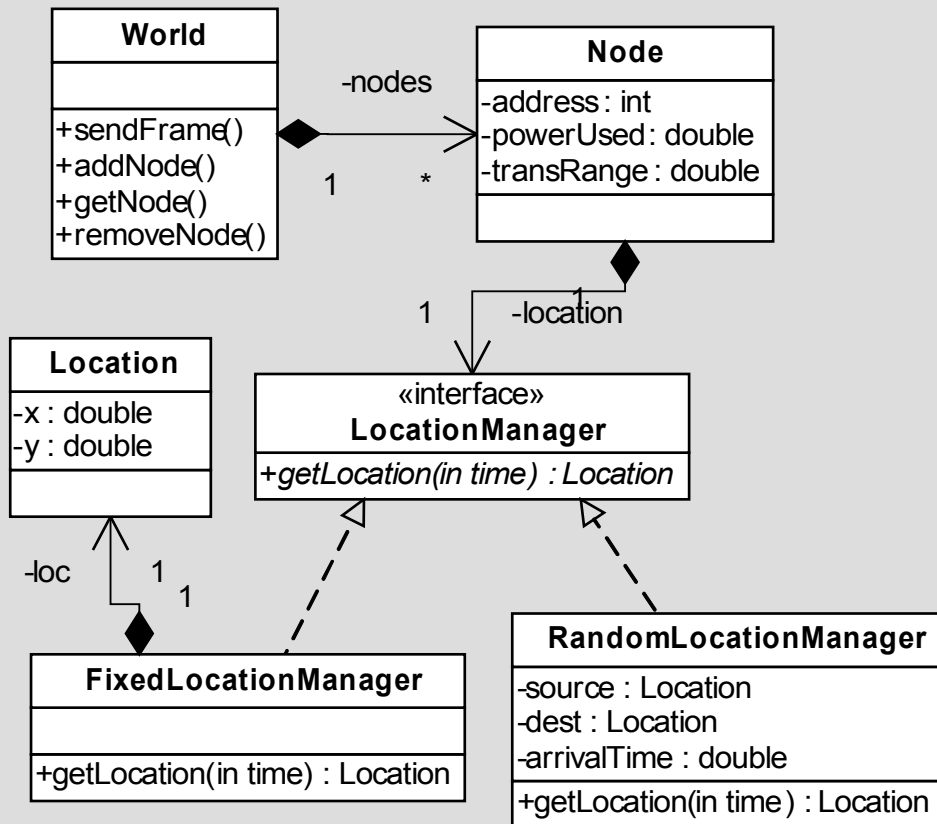
# Data Design



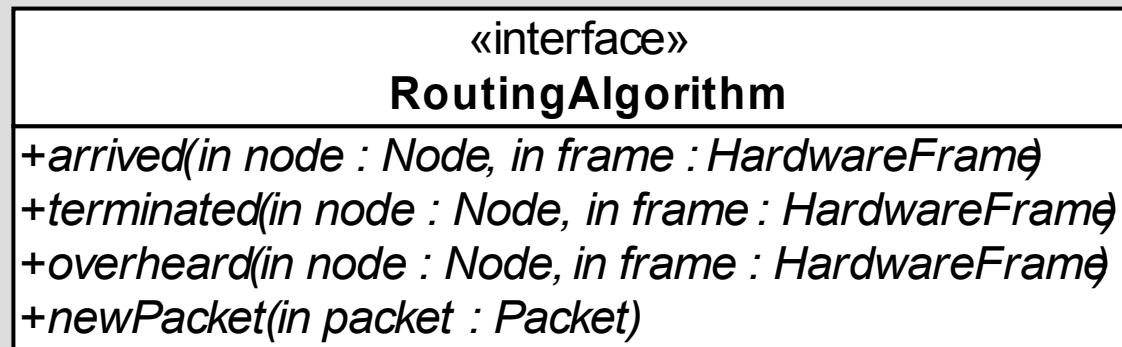
- Separation of link layer traffic and network layer traffic
- HardwareFrame fixed, ProtocolFrame defined by algorithm
- FrameQueue to send frames in sequence

# Node Design

- Node handles link layer traffic
- World holds nodes and simulates physical transmission
- LocationManager implementations allow movement over time



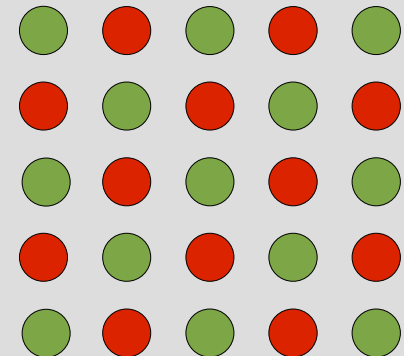
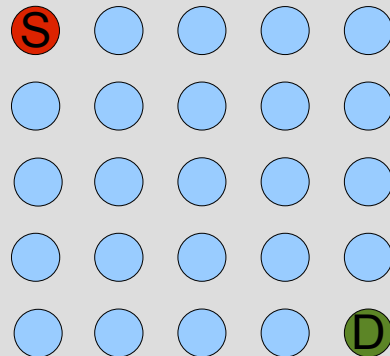
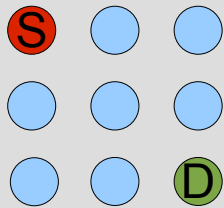
# Routing Algorithms Design



- Arrived: Packet arrives at intermediate hop
- Terminated: Packet arrives at final destination
- Overheard: Packet not meant for node arrives
- newPacket: Network layer introduces packet

# Simulation Tests

- Baseline Tests, non Adhoc related
  - 1.Simple communication
  - 2.Larger set simple communication
  - 3.Large set complex communication
- No movement

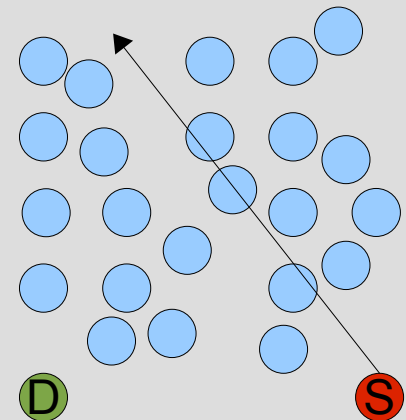
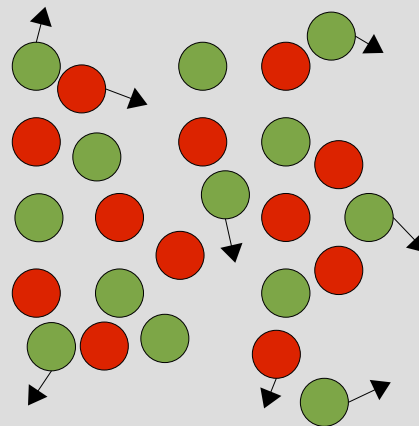
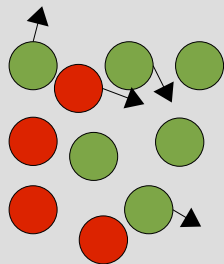




# Simulation Tests

- Ad hoc Testing

1. Random talking random movement small scale
2. Random talking random movement large scale
3. Simple communication large network limited movement



# Traffic Generator

- Will take data to create simulation.
- Tell Source nodes to send a packet and where to send it.
- Will Be able to recreate traffic for each algorithm.

# Outputs

- Number of Packets forwarded+sent
  - Crude estimate of power used for each node
- Prediction
  - Champ uses multi-paths to improve this should be better than DSR
  - Greedy Perimeter Stateless Routing may do well since it should only be sending messages in known direction of Destination
    - Beacons may make it do poorly however.

# Outputs

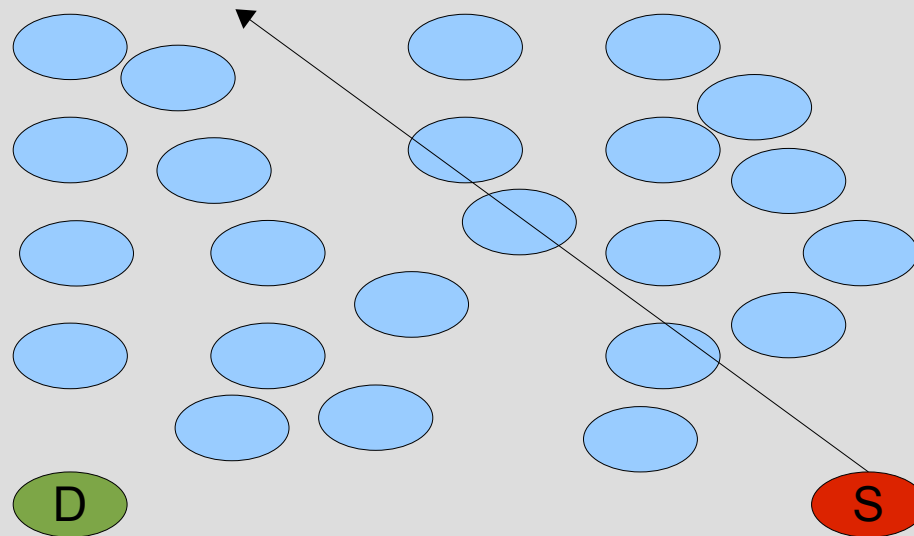
- Number of Packets Sent that actually reached Destination.
- Predictions
  - Stationary base test predicted is 100% for all.
  - The more mobile nodes get this is predicted to get worse for all.
    - Since Champ tries to do Multi-path error correction packets should get there sooner than DSR.
    - GPSR could possibly have an advantage since it uses actual locations for routing.

# Outputs

- Overhead Messages
  - Stable network with few message
    - DSR and Champ should have very few
    - GPSR will have beacons still
  - Lots of movement
    - DSR may require a lot of messages to keep asking for a new route to destination
    - Champ maybe a few messages less because of multi-pathing.
    - GPSR shouldn't have a big increase from stationary network since it should be able to “follow” nodes.

# Outputs

- Source Node through field
  - GPSR should handle this well.
  - Champ may work better then DSR but they may have similar behaviors.



# Comments/Questions



# References

- Johnson, David B., Maltz, David A., Broch, Josh. 2001. DSR: The Dynamic Source Routing Protocol for Multi-Hop Wireless Ad Hoc Networks. in Ad Hoc Networking, edited by Charles E. Perkins, Chapter 5, pp. 139-172, Addison-Wesley, 2001. Obtained from <http://www.monarch.cs.rice.edu/monarch-papers/dsr-chapter00.ps>
- ALVIN C. VALERA, WINSTON K.G. SEAH AND S.V. RAO, CHAMP: A Highly Resilient and Energy-Efficient Routing Protocol for Mobile Ad hoc Networks. In Proceedings of the 5th IEEE Conference on Mobile and Wireless Communications Networks (MWCN 2002), Stockholm, Sept 9-11, 2002.
- Karp, B. and Kung, H. T. 2000. GPSR: greedy perimeter stateless routing for wireless networks. In Proceedings of the 6th Annual international Conference on Mobile Computing and Networking (Boston, Massachusetts, United States, August 06 - 11, 2000). MobiCom '00. ACM Press, New York, NY, 243-254. DOI=<http://doi.acm.org/10.1145/345910.345953>