Application and Testing of a Cougaar Agent-Based Architecture

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Outline

I. Problem Description

II. Cougaar

- A) General Overview
- B) System-specific Overview

III. Testing (paper)

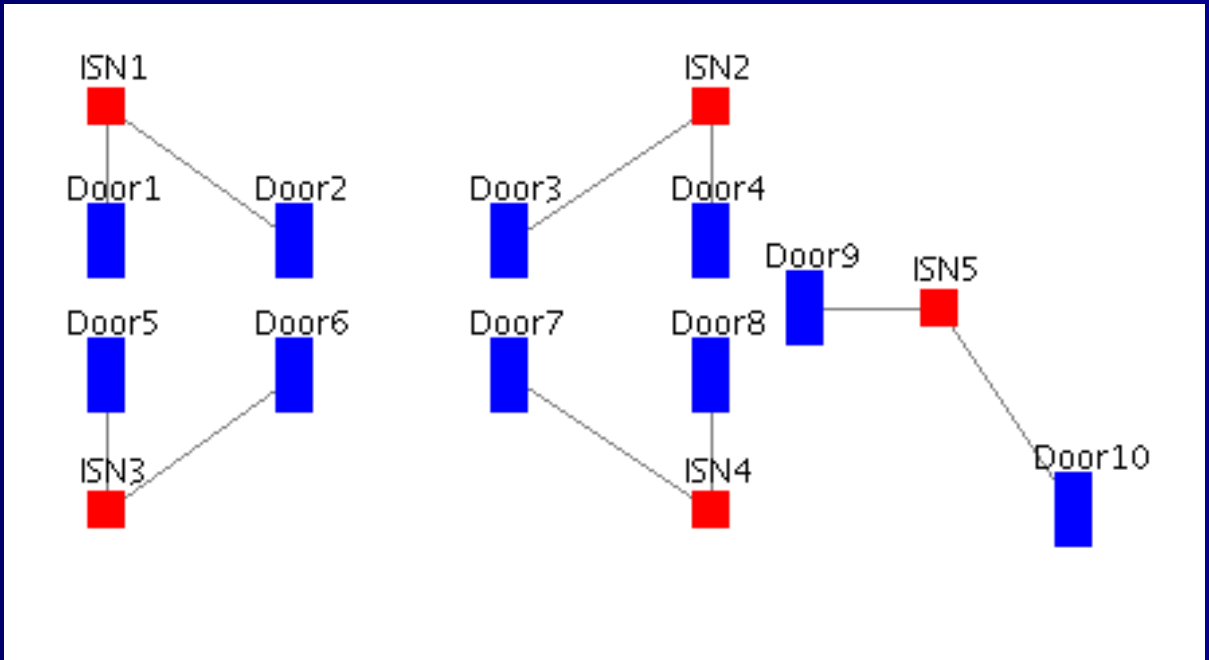
IV. Additional Testing

V. Future Directions

VI. Questions

I. Problem Description

- RAVE Technologies, TSA
- Airport door/area secure access
- Autonomous decision making at the door

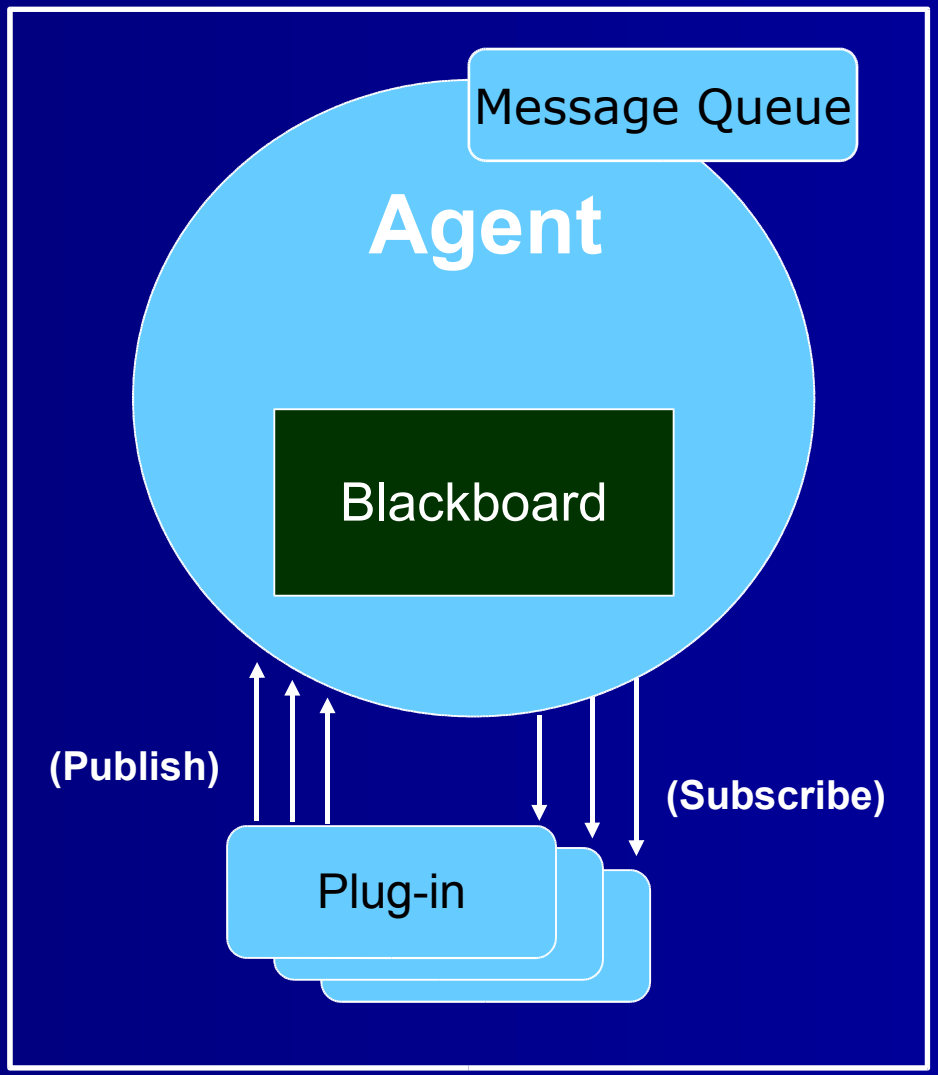


II. Cougaar

- Cognitive Agent Architecture
  - Created by BBN Technologies under DARPA sponsorship
  - Open source Java-based architecture
  - Designed for large-scale, logistics applications
    - Motivated by known equipment losses during Gulf War I

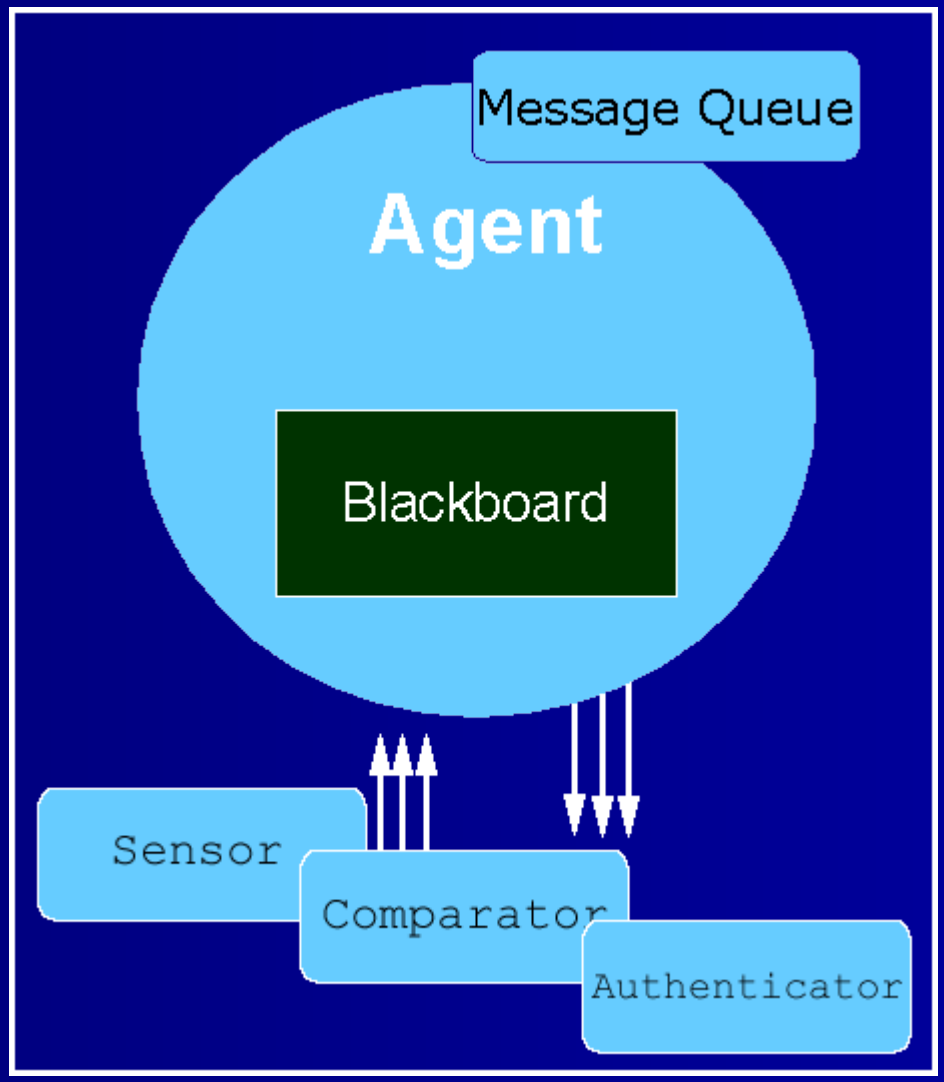
II. A. Cougaar: General Overview

- Cougaar Node:
  - Agent
  - Blackboard
  - Message Queue
  - Plug-ins

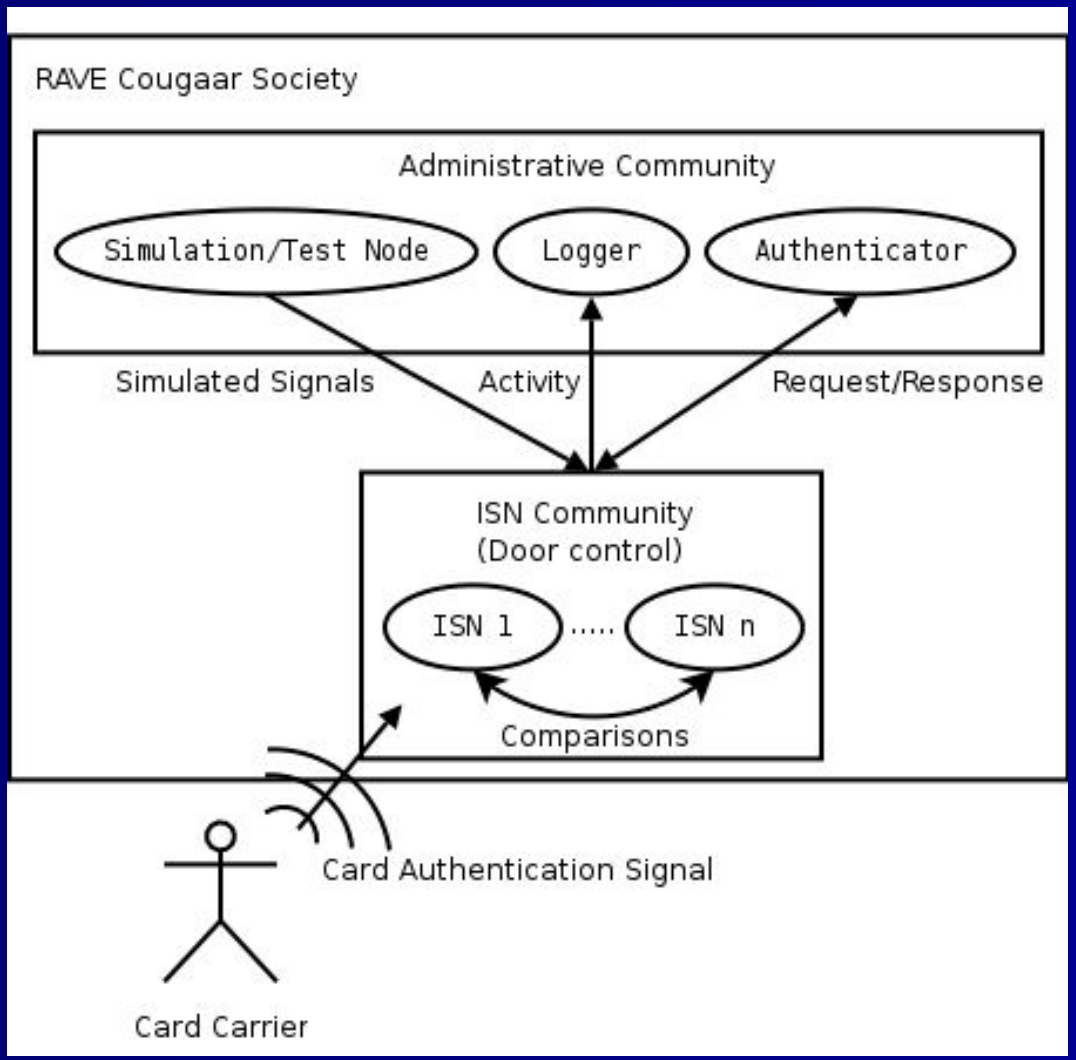


II. B. Cougaar: System-specific Overview

- Plug-ins:
  - Sensor
  - Comparator
  - Authenticator

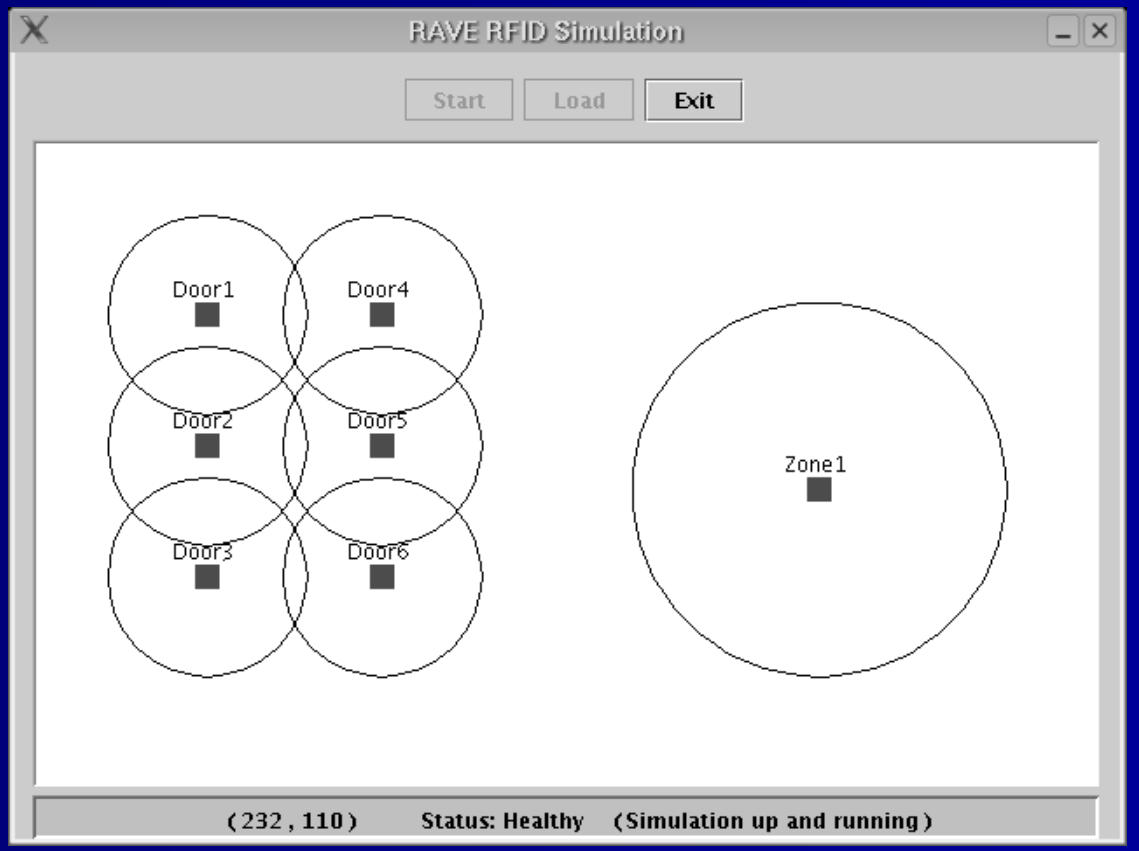


II. B. Cougaar: Community Design



III. Testing (paper): Simulation

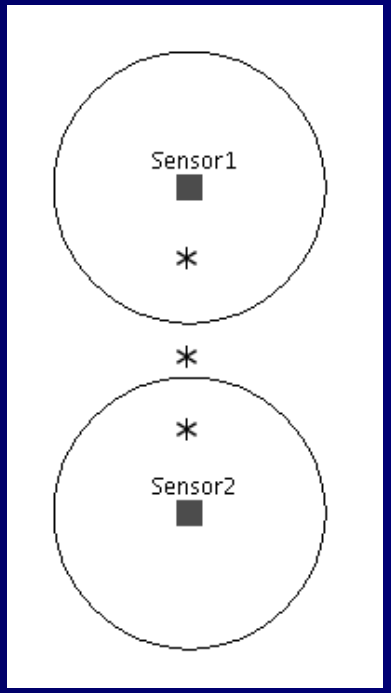
- Interactive Simulation
  - Proof of Concept
  - Preliminary Testing



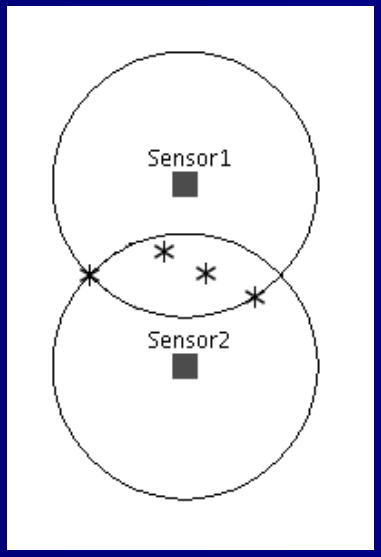
III. Testing (paper): File-based

- Fast, repeatable, and controlled
- Agent layouts:

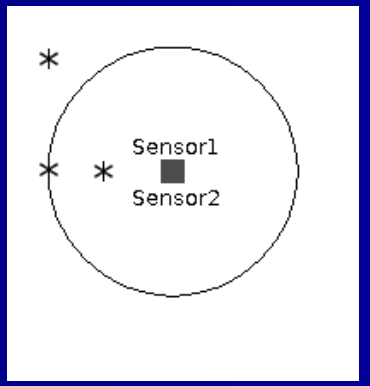
Separate



Intersecting



Overlapping



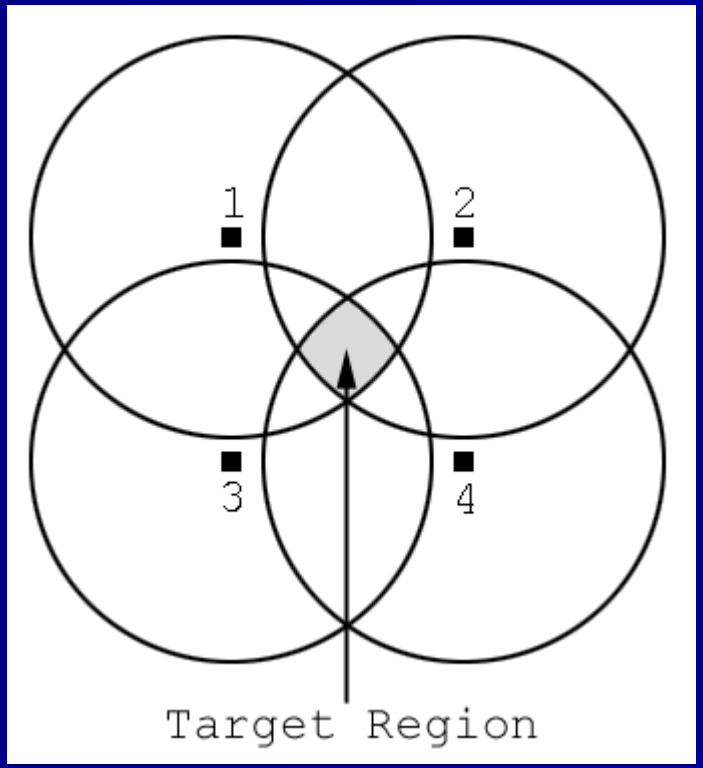
III. Testing (paper): Results

- Separate: 100%
- Intersecting: 88-96%
- Overlapping: 88-96%

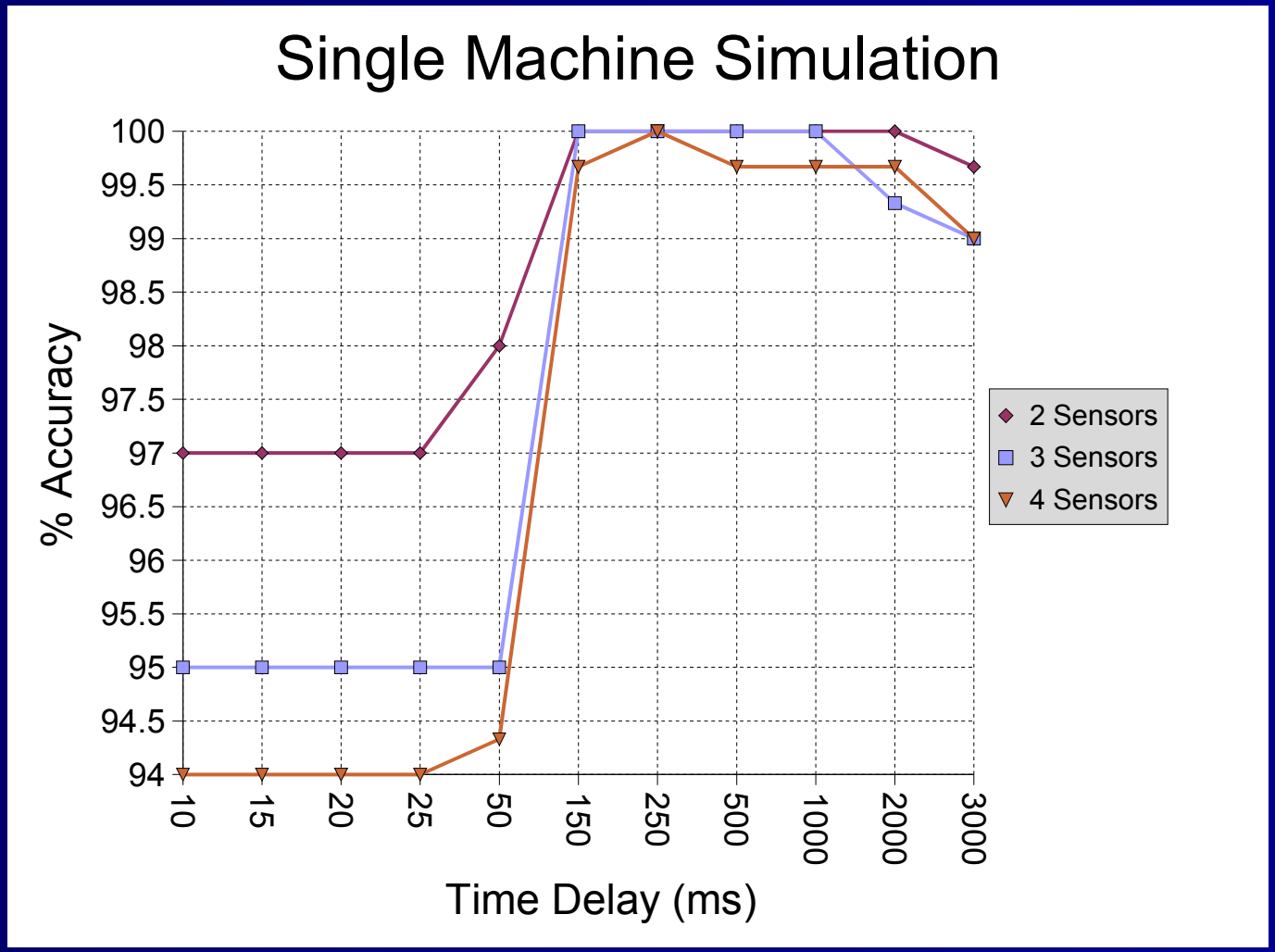
- Analysis of Error
  - Not always the same test case
  - During high CPU load
  - Increasing delay time improves result

IV. Additional Testing

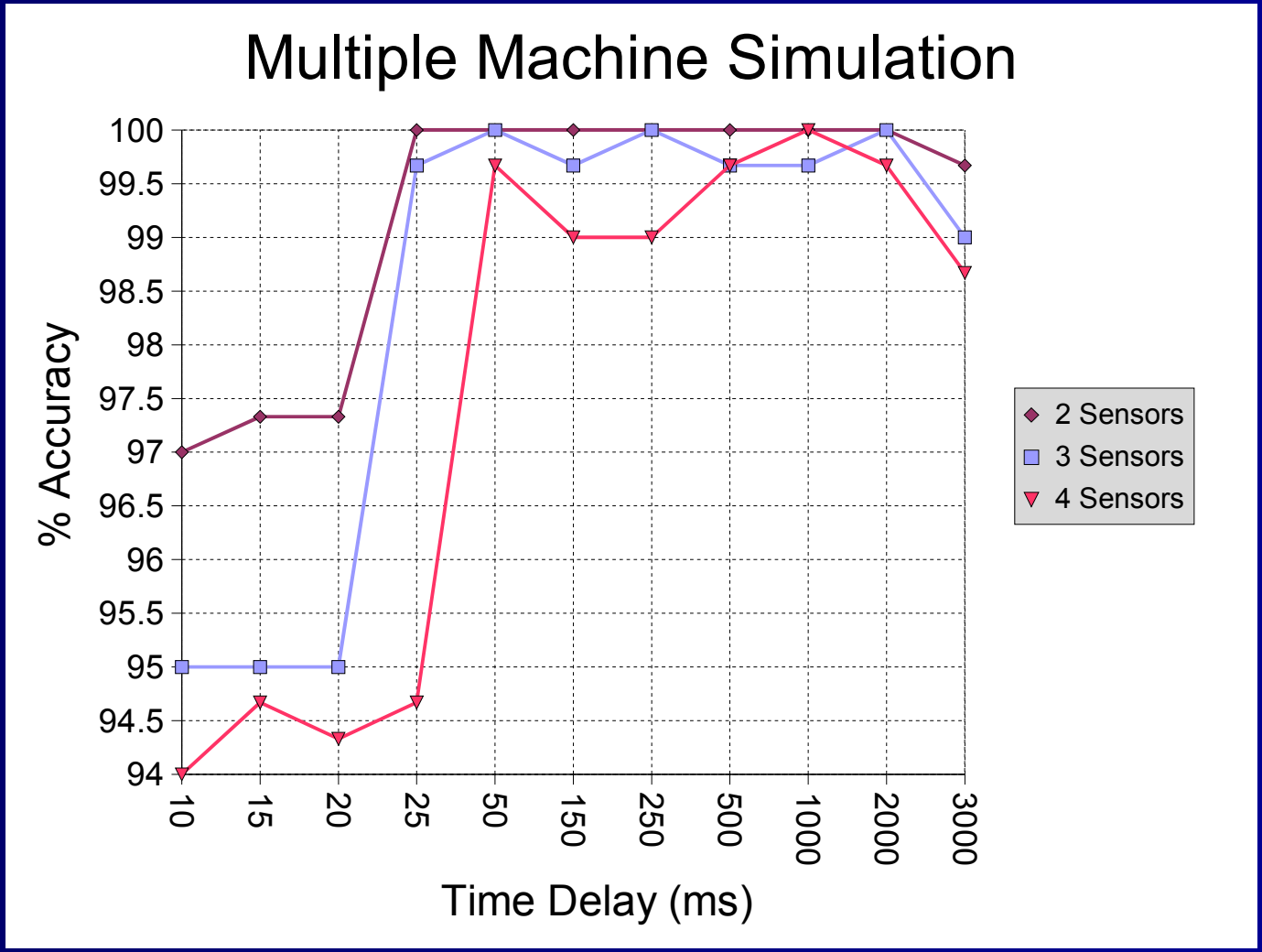
- Intersection cases only
- Randomly generated
  100 events
- Increasing delay times
  0-3000 ms
- 2-4 Nodes
- 1 machine simulation
- 5 machine simulation



IV. Additional Testing: Results on 1 machine



IV. Additional Testing: Results on 5 machines



V. Future Directions

- Analysis of decreasing performance past a certain threshold
- Further study into Cougaar
- Hardware integration

Questions?