Lecture 4: Directory Protocols and TM

- Topics: corner cases in directory protocols, lazy TM

Handling Reads

- When the home receives a read request, it looks up memory (speculative read) and directory in parallel

- Actions taken for each directory state:
  - shared or unowned: memory copy is clean, data is returned to requestor, state is changed to excl if there are no other sharers
  - busy: a NACK is sent to the requestor
  - exclusive: home is not the owner, request is fwded to owner, owner sends data to requestor and home

Inner Details of Handling the Read

- The block is in exclusive state – memory may or may not have a clean copy – it is speculatively read anyway
- The directory state is set to busy-exclusive and the presence vector is updated
- In addition to fwding the request to the owner, the memory copy is speculatively forwarded to the requestor
  - Case 1: excl-dirty: owner sends block to requestor and home, the speculatively sent data is over-written
  - Case 2: excl-clean: owner sends an ack (without data) to requestor and home, requestor waits for this ack before it moves on with speculatively sent data