# A Graph Transformation Case Study for the Topology Analysis of Dynamic Communication Systems

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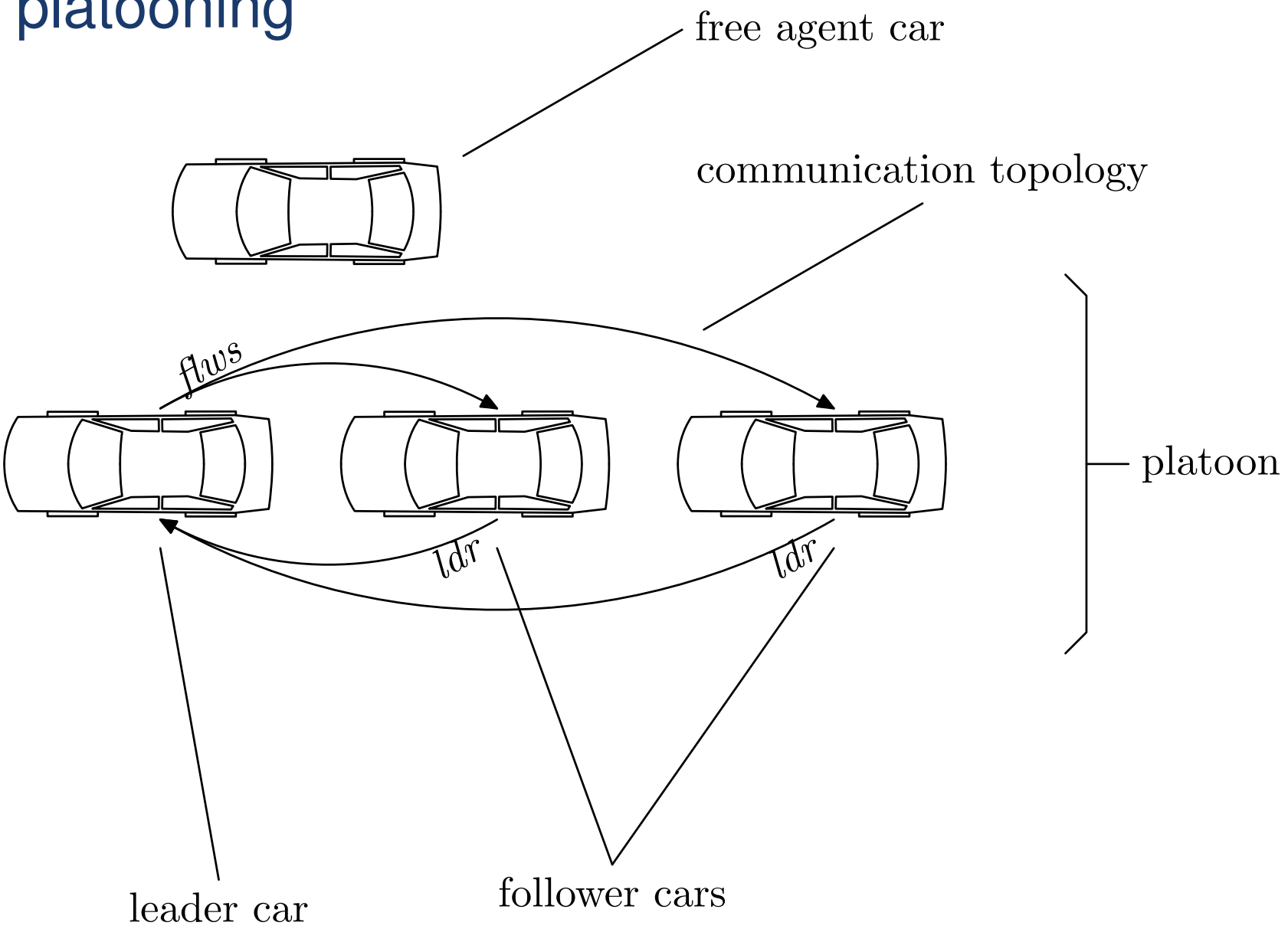
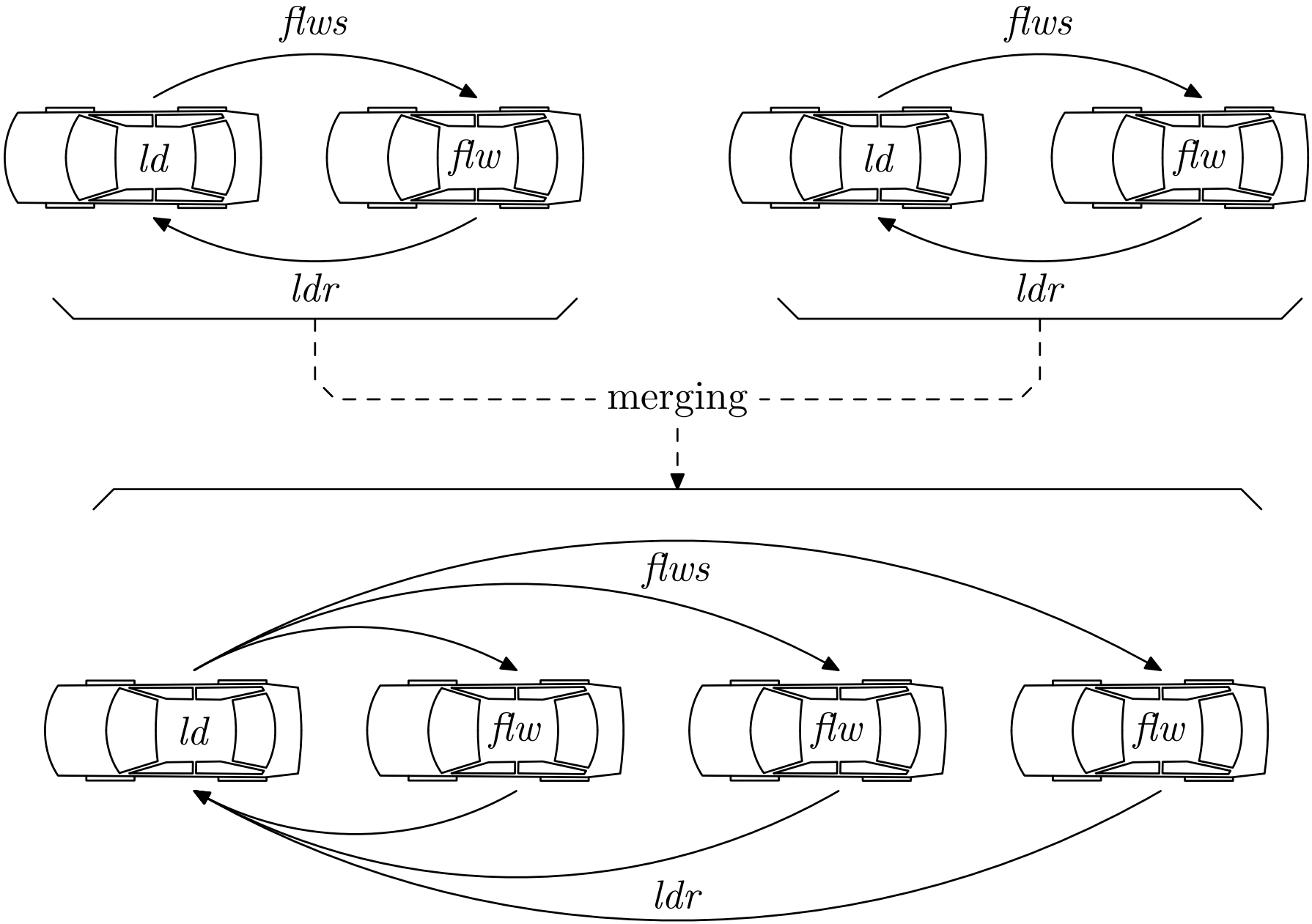
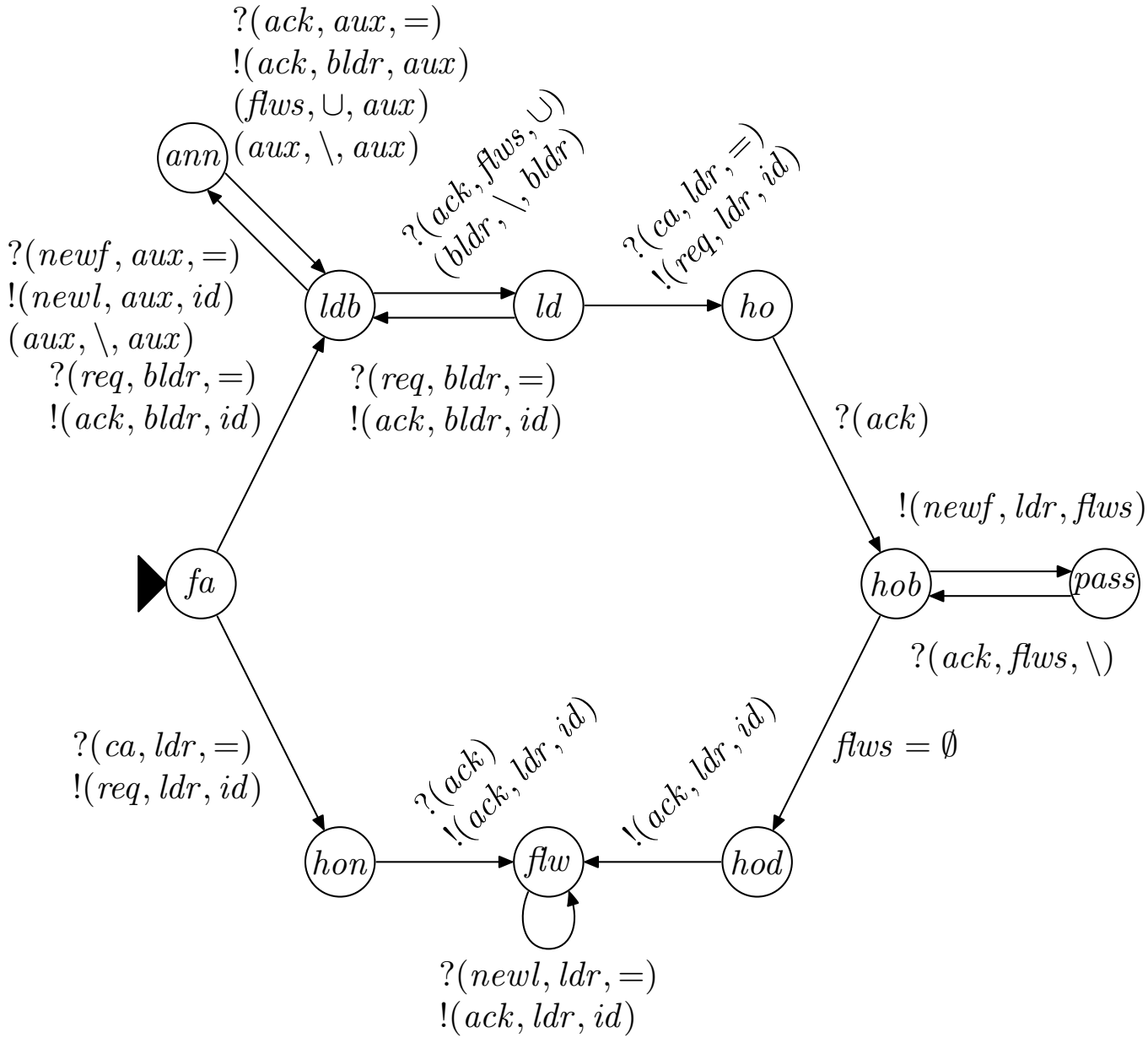
# car platooning



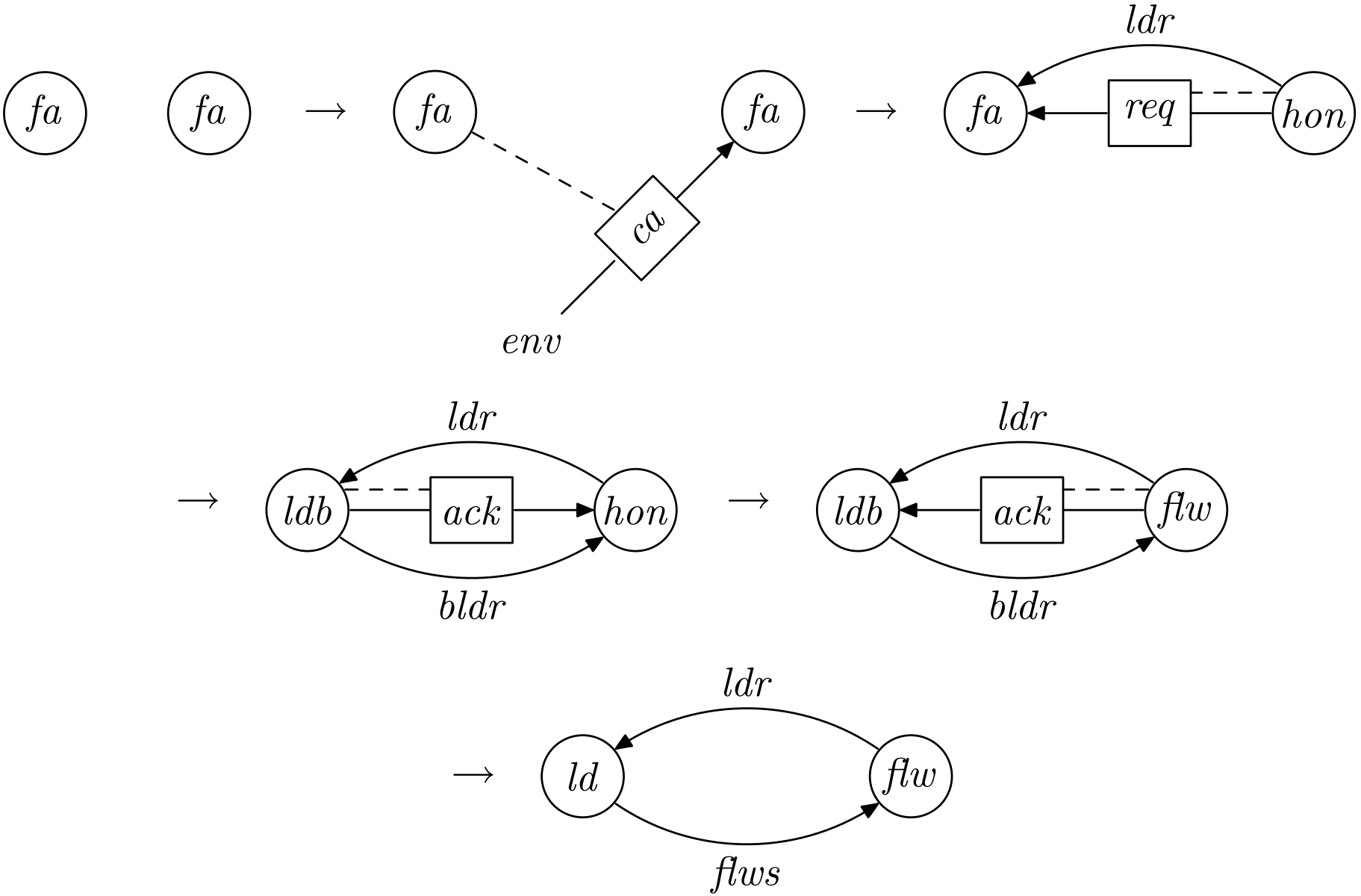
# platoon merging



# The merge protocol



# example run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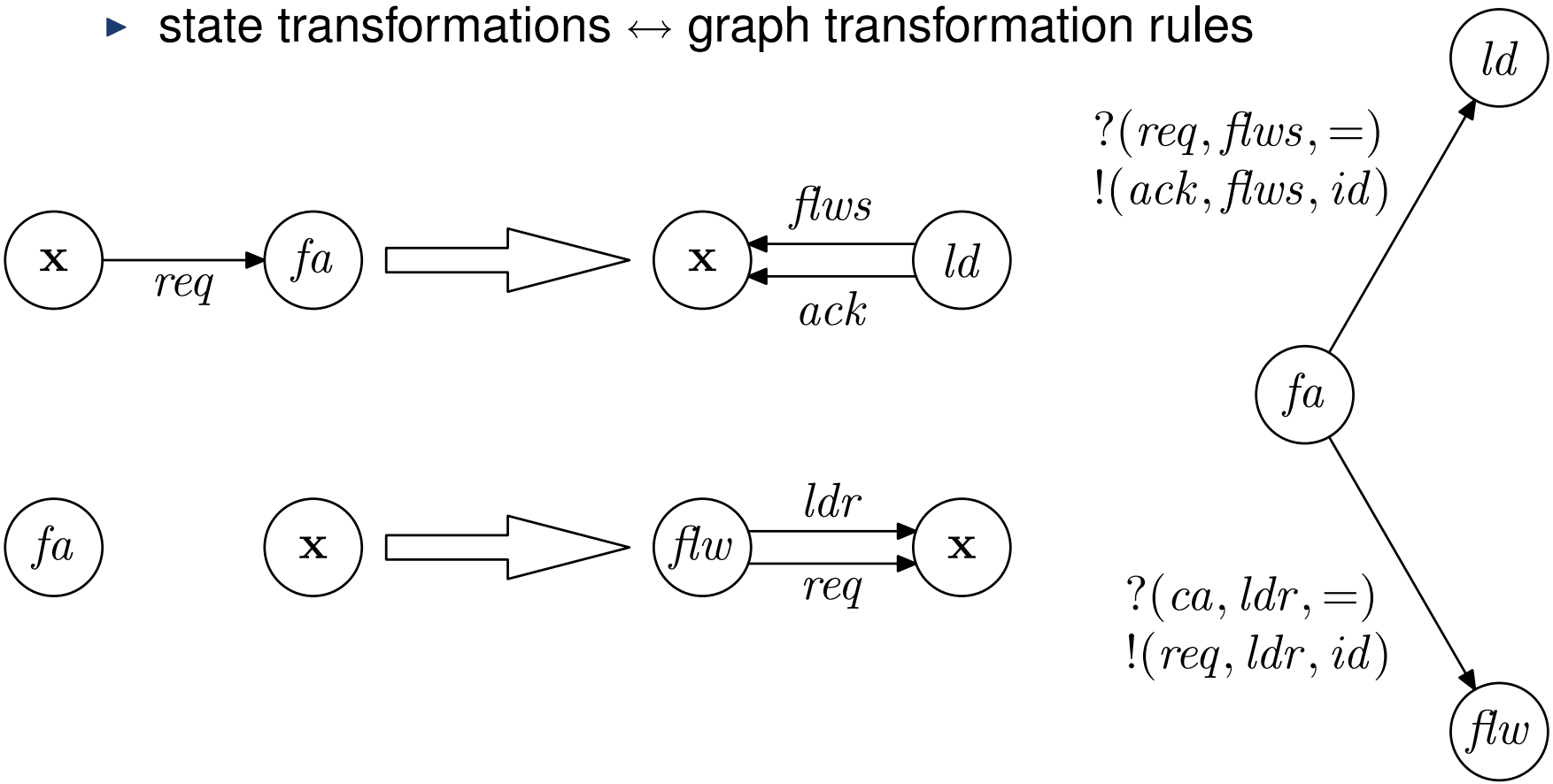
# DCS and graph transformation

- dynamic communication systems $\leftrightarrow$ graph transformation systems
  - processes $\leftrightarrow$ nodes
  - communication links and messages $\leftrightarrow$ edges
  - state transformations $\leftrightarrow$ graph transformation rules



# Goals and evaluation criteria

- Goals
  - Compute and output reachable topologies
  - Evaluate properties like “is there a node with label *a* and a node with label *b* such that an edge with label *c* points from the one to the other”
  - Filtering and displaying result
  - Extensions: Transition metagraph, queue analysis, abstraction
- Evaluation criteria
  - Completeness of analyzed system
  - Completeness of analysis (number of processes)
  - Performance of analysis
  - Flexibility of output (filtering)
  - Power of property evaluation

# Thanks

# Acknowledgement

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