Distributed Systems – Semester Project

Subheadline

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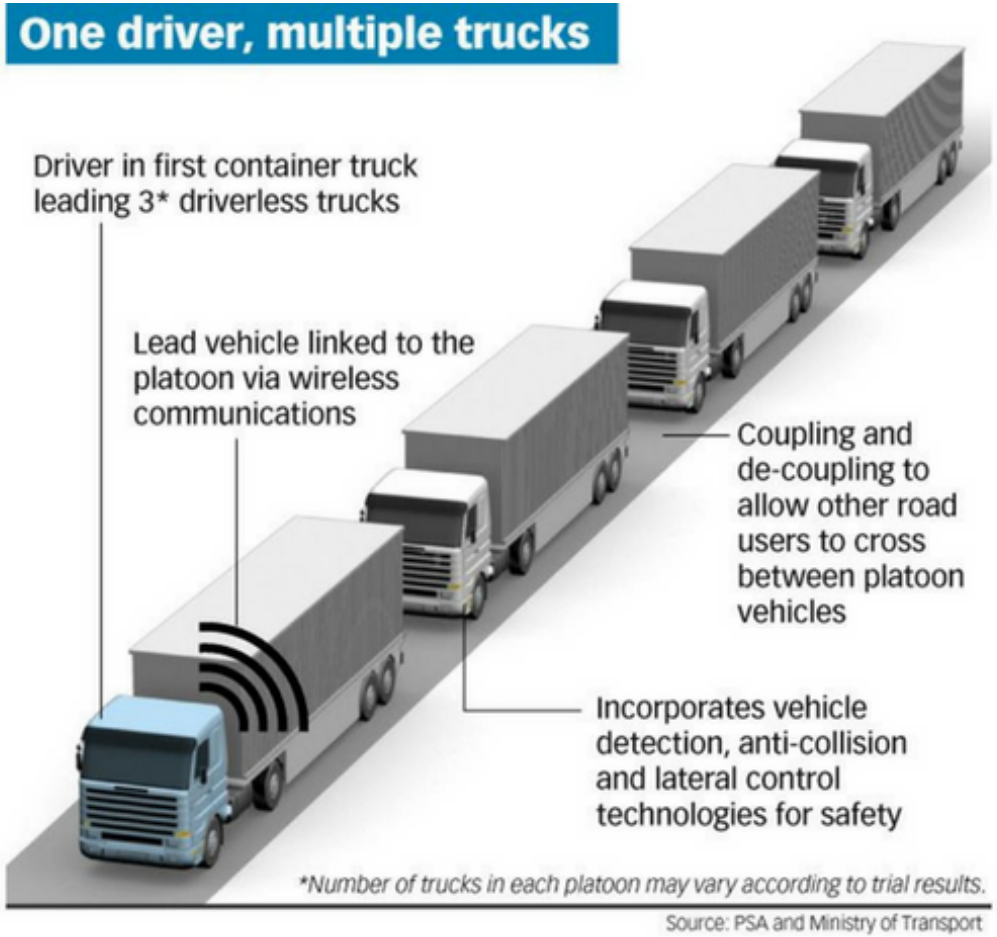
Semester project

Use Case

- Consider a truck platooning scenario



https://www.labroots.com/trending/chemistry-and-physics/7405/band-semi-trailers-truck-platooning

Truck Platooning Use Case

Tasks

1. Develop an appropriate distributed and parallel architecture
   - What requirements and characteristics must be fulfilled
     - E.g. Timing, synchronized clock, transparency, scalability, latency, …
2. Identify which data/signal/events are required for the interaction / communication between the trucks
   - Specify an appropriate protocol
3. Identify the relevant control behaviour for the trucks
   - How can the distance to the precedence truck be guaranteed
   - What happen in cases of a e.g. communication failure - > is your system robust / still stable?
4. Which implementation is appropriate for your purpose (communication, concurrency, …). Compare the known and discussed approaches. Implement the overall use case!
   - This includes the distributed communication and interaction as well as the node specific parallel implementation
   - Which parallel programming model fits best for your purpose and which hardware do you have to choose.
     - Include in your comparison an example implementation of the known different parallel programming models to identify and for the explicit representation of the differences.

- Extension
  - *following lectures

Organizational stuff

- Teamwork
  - 3 – 4 persons
  - Send informaiton to: stefan.henkler@hshl.de, subject: [DSP-Team] <Team name>, content. Name of all team members, team members in cc
  - Create a github account for collaborative team work
- Milestone 1
  - First version of tasks
  - Deadline January 10 2021
  - Use known modeling techniques (if possible)
  - Upload to: https://www.ilias.fh-dortmund.de/ilias/ilias.php?ref_id=946660&ass_id=17433&cmd=showOverview&cmdClass=ilobjexercisegui&cmdNode=v2:lh&baseClass=ilRepositoryGUI

Organization stuff

- Presentation
  - February 26, 2021, 09:00-17:00
  - 30 Min + 15 Min discussion
  - Each member should have the same presentation time

Project documentation

- One document for each group
  - Contribution of 3 to 5 pages by each team member
  - Document style: https://www.ieee.org/conferences/publishing/templates.html
  - Make responsibilities and contribution clear
- Document should include architecture models like
  - Network architecture, node architecture, …
- …ass well as relevant parts of the algorithms, protocols, and implementation (excerpts)
- The annex includes
  - Source code in detail
  - Github overview
    - Lines of code
    - Number of submits per person
    - Structure (folder hierarchy)
  - contribution in % by each member to the overall project including a coarse work estimation in h per member

Coarse document structure

- Abstract
  - Overview of document including main outcomes
- Motivation
  - Motivation for project including problem domain and requirements
- Sketch of approach
- Concept part
  - From architecture level down to algorithm and protocol level …
- Evaluation
  - (partly) implementation of system and
- Summary and outlook
- Appendix
- Affidavit

Affidavit

- We (Name < 1>, Name < 2>, …) herewith declare that we have composed the present paper and work ourself and without use of any other than the cited sources and aids. Sentences or parts of sentences quoted literally are marked as such; other references with regard to the statement and scope are indicated by full details of the publications concerned. The paper and work in the same or similar form has not been submitted to any examination body and has not been published. This paper was not yet, even in part, used in another examination or as a course performance.