HIDENETS Goals

- Develop and analyze **end-to-end resilience solutions**
  - for scalable distributed applications and mobility aware services
  - in ubiquitous communication scenarios
    - Example use-case: car2car communication with server-based infrastructure
    - assuming highly dynamic, unreliable communication infrastructures

- Planned **results** are
  - architectural and design solutions
  - communication protocol extensions and dependability middleware
  - methods for quantitative analysis and testing
  - tools for development and analysis

  for end-to-end system level resilience and dependability
  - based on standard off-the-shelf components
  - in wireless communication networks and infrastructure-based settings
HIDENETS Scenarios

- **Applications** with varying dependability requirements, e.g.
  - Platooning
  - Floating car data, hazard warning
  - Distributed black-box
  - Streaming (video/data)

- **Challenges** of the C2C/C2I scenarios
  - Dynamicity/Mobility: changing topologies and communication characteristics in ad-hoc domain and in connection to infra-structure services
  - Open systems with (C)OTS components
  - Heterogeneity: different network domains [and different node capabilities]
  - Resource limitations and strong cross-influence between system parts
  - Accidental and malicious faults, large number of nodes, privacy aspects...

HIDENETS Approach

- **Steps** (inter-linked)
  - Applications/use-cases → requirements → necessary middleware and communication layer functions
  - Network and node architecture → fault-models → detailed function/algorithm/protocol development, experimental implementation, modeling and assessment

- **Resilience solutions**: joint optimization via
  - Differentiation
    - Architectural: wormhole concept
    - Flow/packet/message treatment: scheduling/routing/etc.
  - Fault detection and recovery, as well as masking
    - Communication interfaces/links/paths: interface selection, (multi-path) routing, Gateway selection
    - Node functions: data storage, computations
  - APIs that allow for adaptive applications

While maintaining the end-to-end, holistic system view, covering
  - All nodes on the end-to-end path
  - Communication protocols as well as service middleware
Summary

- Goal: end-to-end resilience solutions for car-to-car and car-to-infrastructure scenarios
  - Communication protocols (L2-L4), middleware functions, application interfaces, application development tools
  - Mainly (but not exclusively) accidental faults: communication links and nodes (both in ad-hoc and infrastructure domain)
  - Interaction of resilience mechanisms while still keeping a layered structure
  - Assessment in analytic/simulation models, and experimental set-ups

Technical deliverables are available on web-page: www.hidenets.aau.dk
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