Automotive embedded system redesign

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Plan of the presentation

- Introduction and abstract
- Research content and impact
  - Reminder of the main constraints
  - Research content, and proposed model
  - New model market impact on shares
- Administrative details, timeline and future work
  - PhD format and involved parties
  - What's now ?

Section 1

Introduction and abstract

Presenting myself first

Jean-Baptiste Laurent

- 1 year teaching
- 3 years in research, static analysis
- 5 years in cyber-security
- 10 years in software development

Current status

- LR-Technology consultant, working for Faurecia
  - First, 6 months on the RAPIDE platform [a]
  - Now, exclusively working on the following research topic

[a] Generic software platform for car embedded systems

Involved Parties

RICHEFEU Julien

- Faurecia Clarion Electonics, Platform Software Manager
- PhD Director

MENSUEZ Bruno

- ENSTA Paris-Tech, Teacher
- PhD Co-Director

Let's make this simple

- This presentation will explain:
  - who will do what,
  - why,
  - how,
  - with whom when,
  - the role each will fill
  - and the benefits in the long run.
- We are all mostly busy, so let's only present the important bit of each
- I will hand a recap at the end.

Objective of the presentation

- Presenting this new project
- Presenting the work to be done
- Precising how this project could impact you in the long run
- Precising how you could involve yourself or your team
- Meeting each others and exchange contact for future work

The research in itself

- Analyzing the flaws and needs of modern cars embedded systems
- Designing a new architecture to build upon
- Experimentation and prototyping

Section 2

Research content and impact

Subsection 1

Reminder of the main constraints

Reminder of the main constraints

- Cost,
- Safety,
- Legal compliance,
- Time to market

Involved parties in the automotive market

- OEMs
- Car makers
- ???

Pros, and growing flaws of the current model

- Straightforward integration
- Simple, cheap, and quick to develop
- But
  - Exponentially growing complexity
  - Proliferation of proprietary solutions
  - Growing difficulty to guarantee system integrity

Subsection 2

Research content, and proposed model

The proposed model

- Heavily based on modular components
- Complete redesign, no use of outdated technologies
- Based on virtualization

Virtualization potential

- Secure and modular by design
- Extensible
- Dynamic
- Hardware abstracted
- Load balanced
- Well documented

Subsection 3

New model market impact on shares

OEMs current market model

As of today, OEMs need to:

- Produce the hardware pieces
- Design the software for it up to the communication layer
  - This requires a dialogue with the car maker
  - This forces OEMs to do third party development
  - This forces the car maker to perform a follow-up
  - A maintenance contract could be required

Communication with a third party is not always easy

This costs

- Time
- Efforts
- A lots of emails
- And sometime a good load of patience

OEMs market model changes

The concept model will

- Free OEMs from most of the software burdens
  - Less work means ECUs are cheaper with a quicker RTM (release to market)
  - Also means less legal issues, obligations, and communication
- It gives to car makers more control over the software
  - Easier to certify a code you fully own
  - More secure (one less party to trust)
  - Can respect the company coding guidelines

And finally, the AUTOSAR license

- Has to be bought, is contagious, and is required for all parties.

Everyone good so far ?

Any questions before we go to the last part of the presentation ?

- ☒ Part 1/3: Introduction
- ☒ Part 2/3: Research description and models
- ☐ Part 3/3: Administrative details, timeline and future work

Section 3

Administrative details, timeline and future work

Subsection 1

PhD format and involved parties

Research format

To be defined (Free found ?)

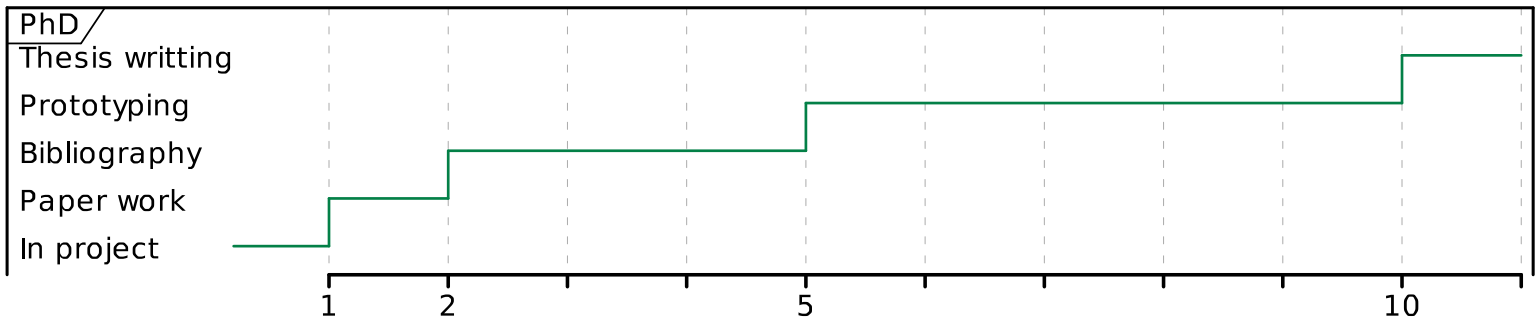
Potentially involved parties

- N/A yet

Subsection 2

What's now ?

Project timeline



Questions ?

Recap slide

- Jean-Baptiste Laurent
- Working on a new research, 1/07/2020 -> 1/07/2023
- related to a redesign of cars embedded systems
- based on virtualization technologies
- Keywords: PhD, cars, embedded systems, virtualization
- Slides link: https://github.com/JBL-PhD/Presentations/blob/gh_pages/17072020/presentation.pdf