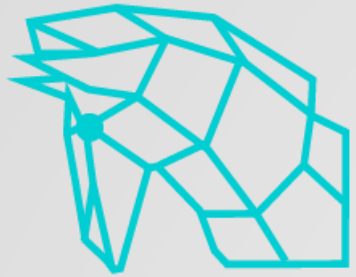


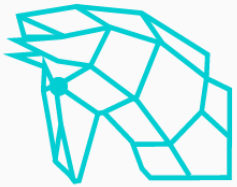
HORSE

Open Calls

Webinar

General Structure

- About the HORSE project
- High-level architecture
- High-level architecture with short insights to the technical aspects
- Options for Open Calls proposals
- HORSE cases mapping on high level architecture
- Preparing the application
- Support



The HORSE project

About HORSE

Budget 8.9 M Euro
Grant 7.9 M Euro
Start 1/11/2015
End 30/4/2020

I4MS phase 2 Innovation Action

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 680734

The Project - Core Objective

*"Think of a metal factory worker manipulating and finishing a heavy sand cast part full of **sharp edges** with a pair of gloves, a hammer and **a heavy grinder as only tools** - and imagine how a dynamically available robotic handling arm can improve this situation"*

"Think of a car factory where human workers and robots are strictly separated - and imagine how safe collaboration of both can make production much more efficient"

*"Think of a robotic production line where a **sudden robot failure brings things to a grinding halt** - and imagine how safe human take-over of its task can bring things up-to-speed swiftly"*

The Project - Objective

1

HORSE project aims to build

a new flexible model of smart factory

2

involving collaboration of

humans, robots, AGV's and machinery

to realize industrial tasks in an efficient manner.

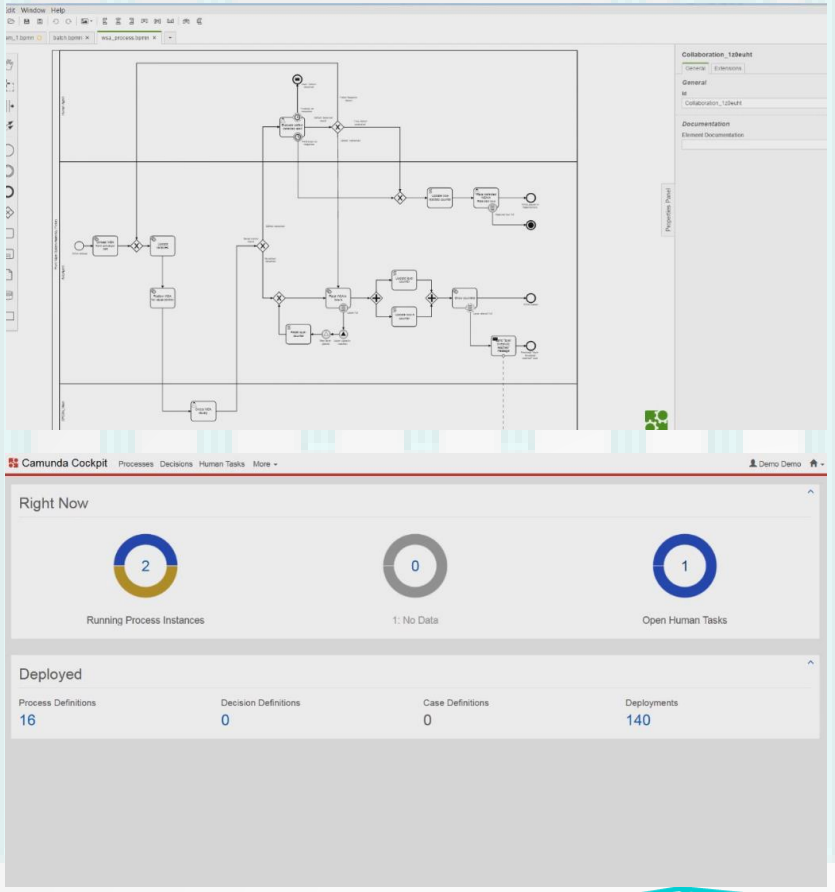
3

Robotics assistance will improve :

- **operators conditions of work,**
- **worker's safety**
- **quality and production effectiveness**

Technical Framework

- **Integrated, Process-oriented management** model for control of the production line and automatic resource allocation/dynamic reallocation (BPM)
- **OSGI based (IoT) for remote control of production resources (humans, robots)** (all resources are accessible in the same manner)
- **Multilayer safety** (from the robot to the system level) and supporting automonous and effective cooperation between robots and humans with no barriers
- **Easy and flexible teaching of new tasks** to robots



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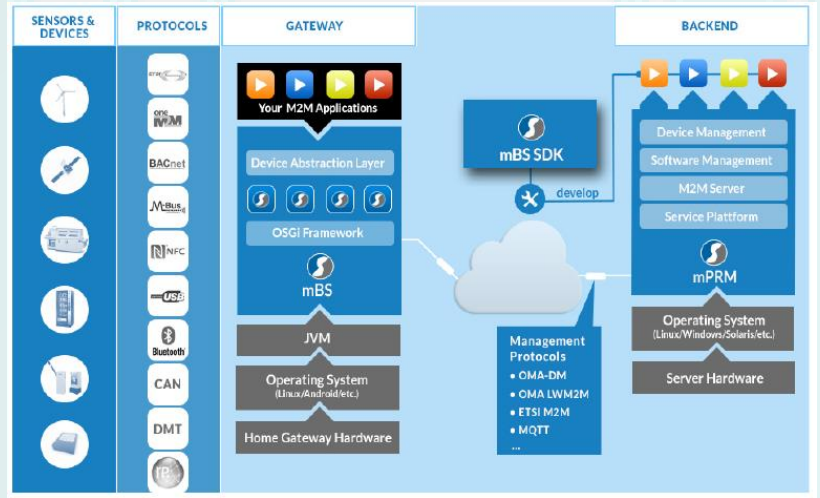

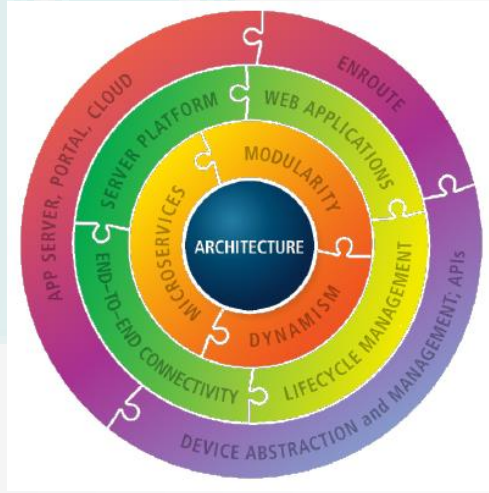

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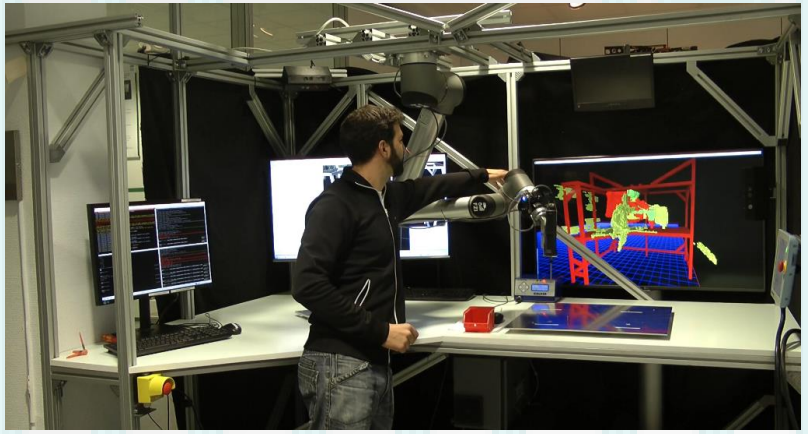

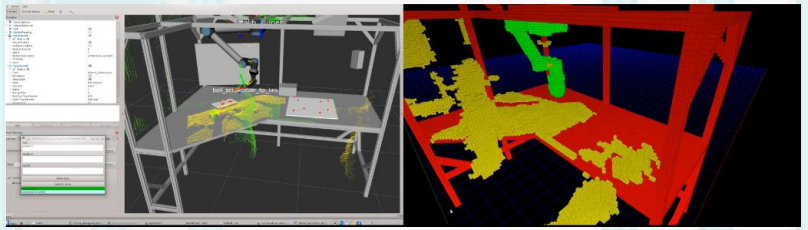

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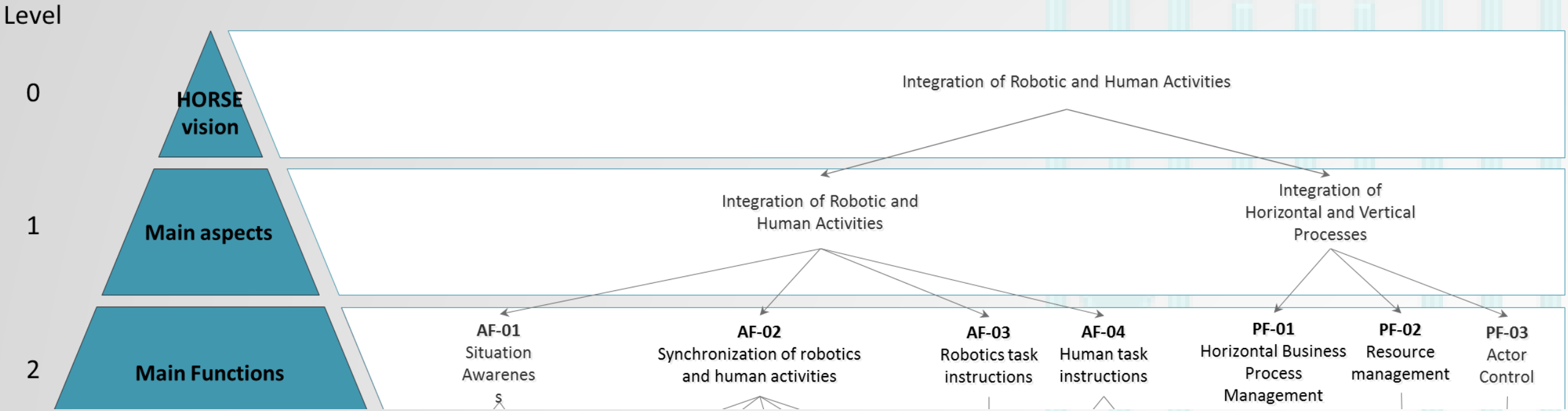
HORSE Functions



The Pilots

1

BOSCH Front Wiper Systems (Spain)

2

ODLEWNIE POLSKIE Fettling operations (Poland)

3

THOMAS REGOUT INTERNATIONAL Customized Telescoping slides (Netherlands)

The Pilots

3

2

1

BOSCH Front Wiper Systems (Spain)

- Automated **packaging** of Wiper Systems, including **artificial visual quality check** of parts, to replace current situation (manual)
- **Augmented Reality** assistance for manually **checking points on parts** that have been assessed as potentially faulty
- **Orchestration and monitoring of robotic and human tasks**, including mobile messages to workers

The Pilots

3

1

2

ODLEWNIE POLSKIE Fettling operations (Poland)

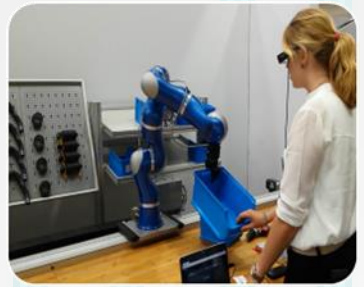
- Automated **cutting of metal castings** to replace current situation (manual)
- Enabling **flexible production** for a large number of different castings
- **Learning by demonstration** for new castings

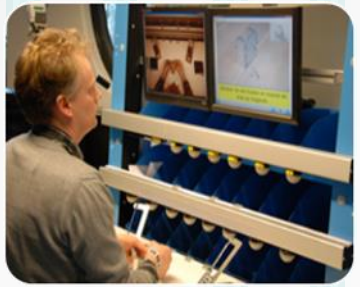
The Pilots

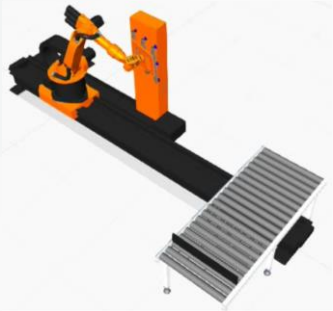
1 2 3

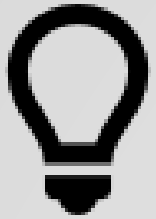
THOMAS REGOUT INTERNATIONAL
Customized Telescoping slides (Netherlands)

- Automated **placing of parts on hooks co-existing with humans** doing the same task for other kinds of parts
- **Augmented Reality** assistance to accelerate the **assembling of production tools** without the need for experience
- **Monitoring, Orchestration and planning support** to enable flexible and effective production









Innovation Hubs

They are an effort to expand the I4MS regions.

HORSE funds and mentors 4 Innovation Hubs:

Serbia (HUBTECS)

Spain (HUB4MANUVAL)

Croatia (CROBOHUB)

Czech Republic(DIGIMAT)

and funds 1 Innovation Hub Ukraine (HULIT).

They investigate digital needs of the regions, implement 3 feasibility studies for experiments in their region and will pave the way for the HORSE open calls.

Centers of Competence

What are they?

- Settings representative of manufacturing installations: France, Germany, Netherlands, Slovenia
- Robot and supplies used in production lines.

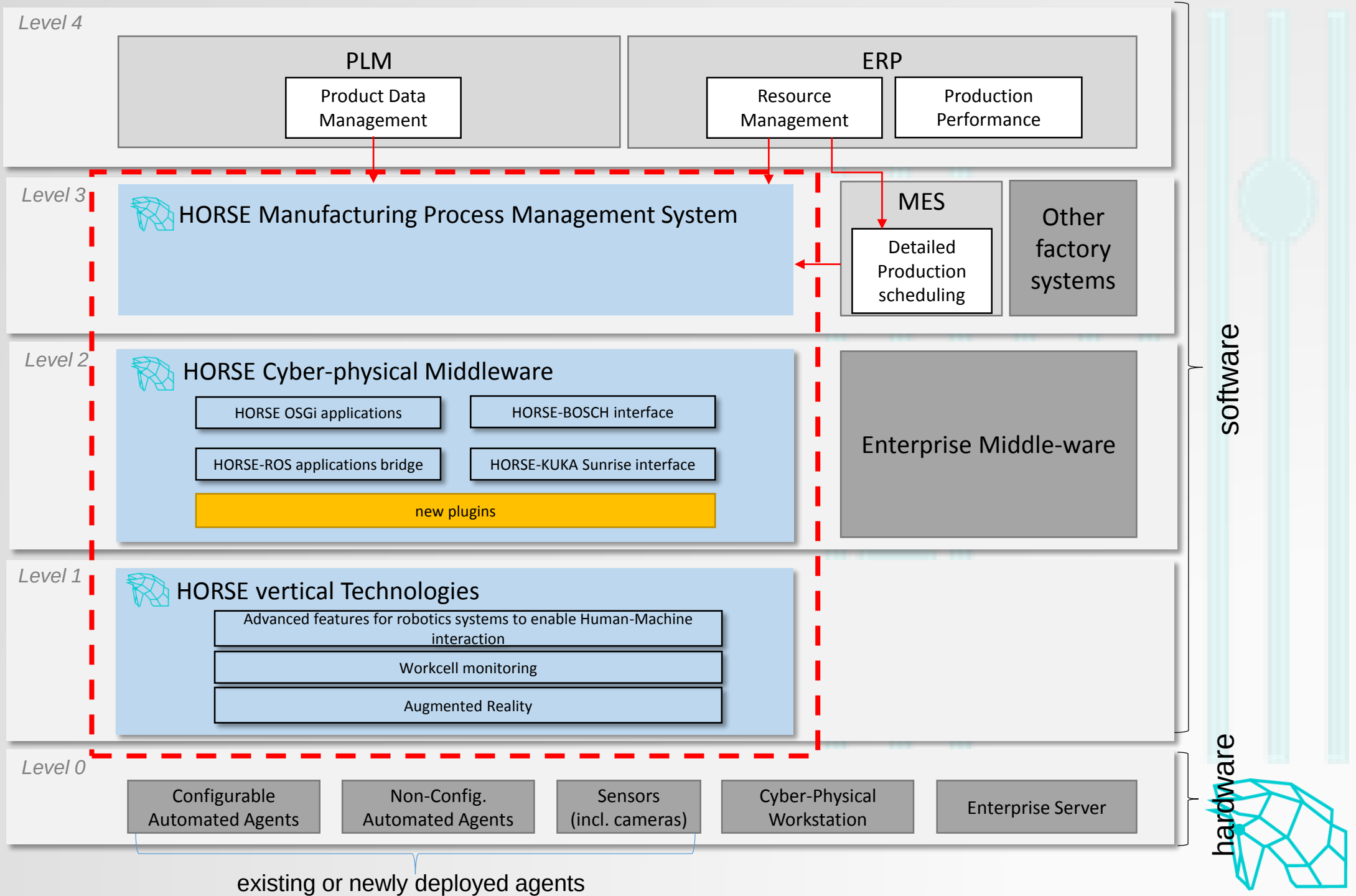
Their role?

- Simplify usage and facilitate access to robotics by European industry and especially first users SME.
- Offer expert support for advising on deployment and fast assessment of robotics solutions in manufacturing.
- Capitalise lessons learnt and best practices.

Their scope?

- Capturing the industrial ecosystem in each region and addressing real industrial challenges

HORSE framework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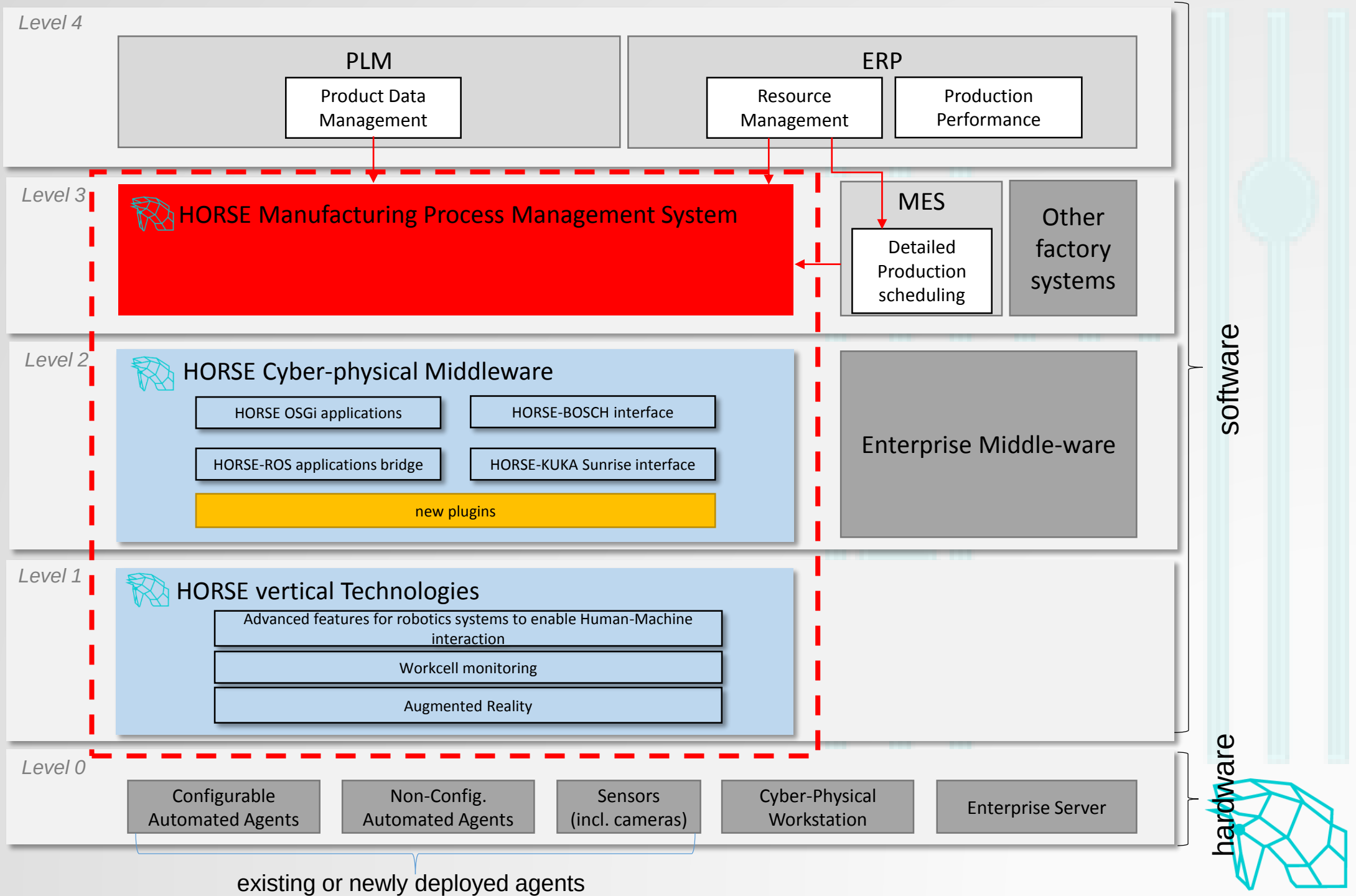
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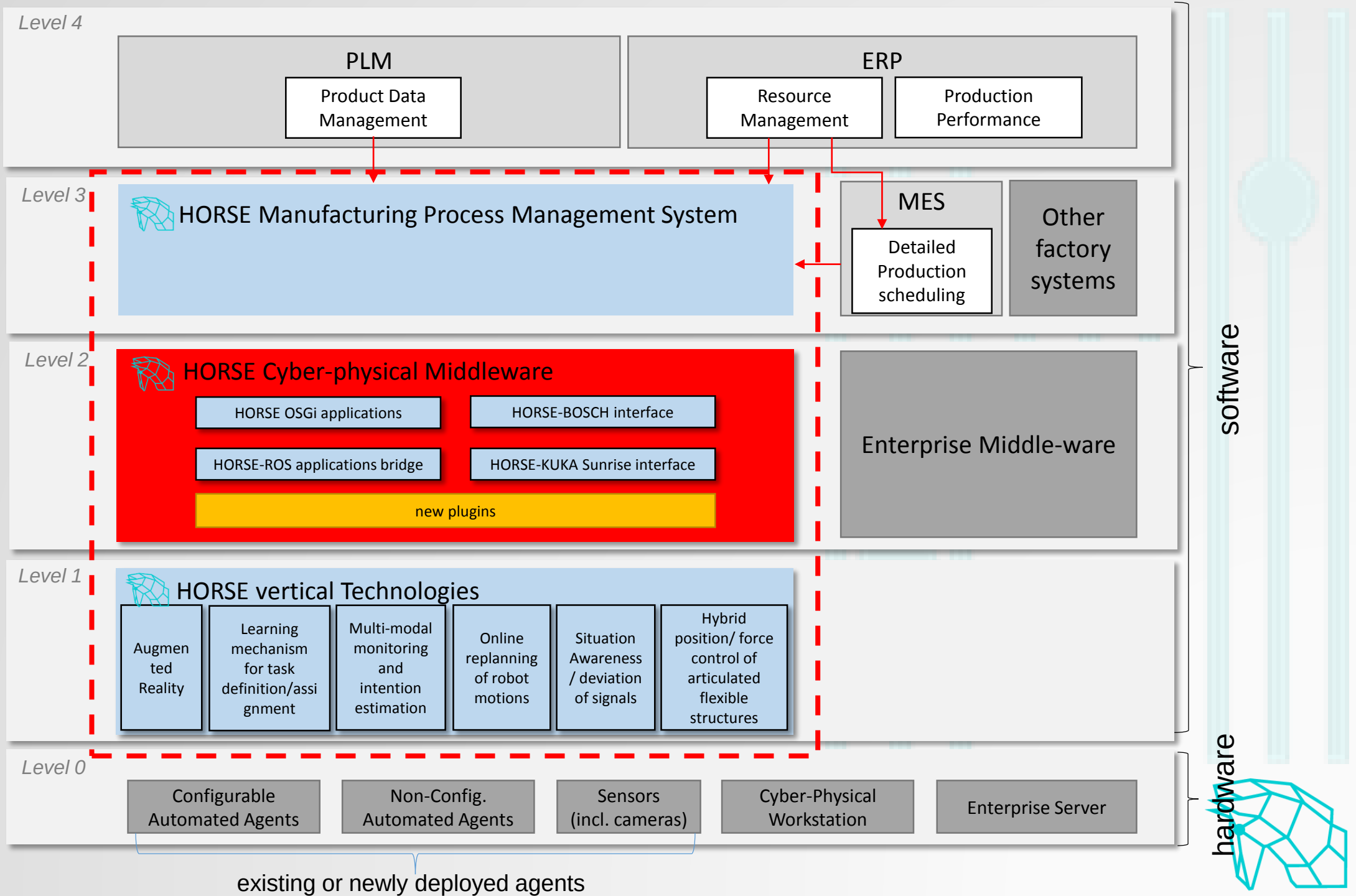
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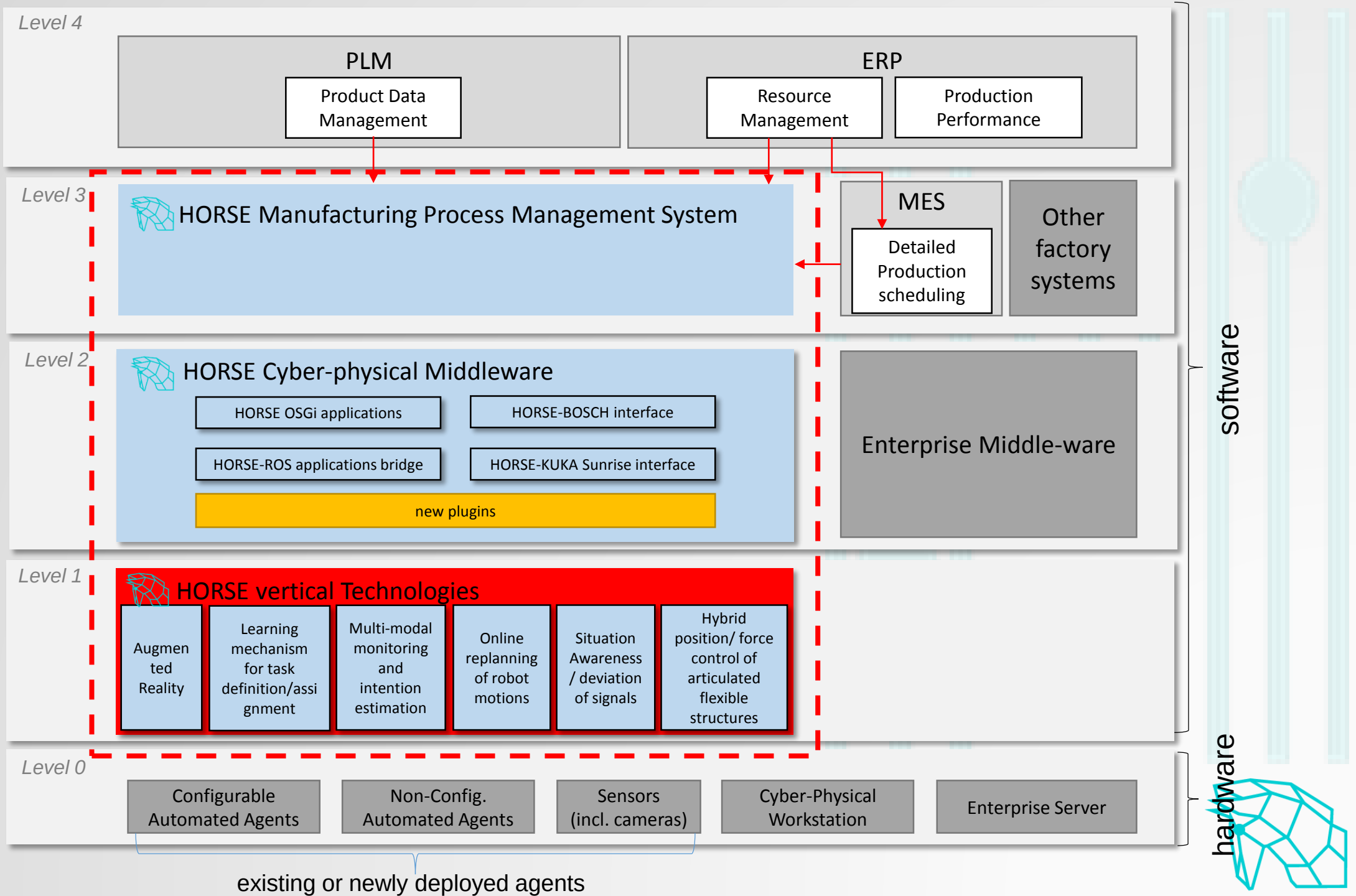
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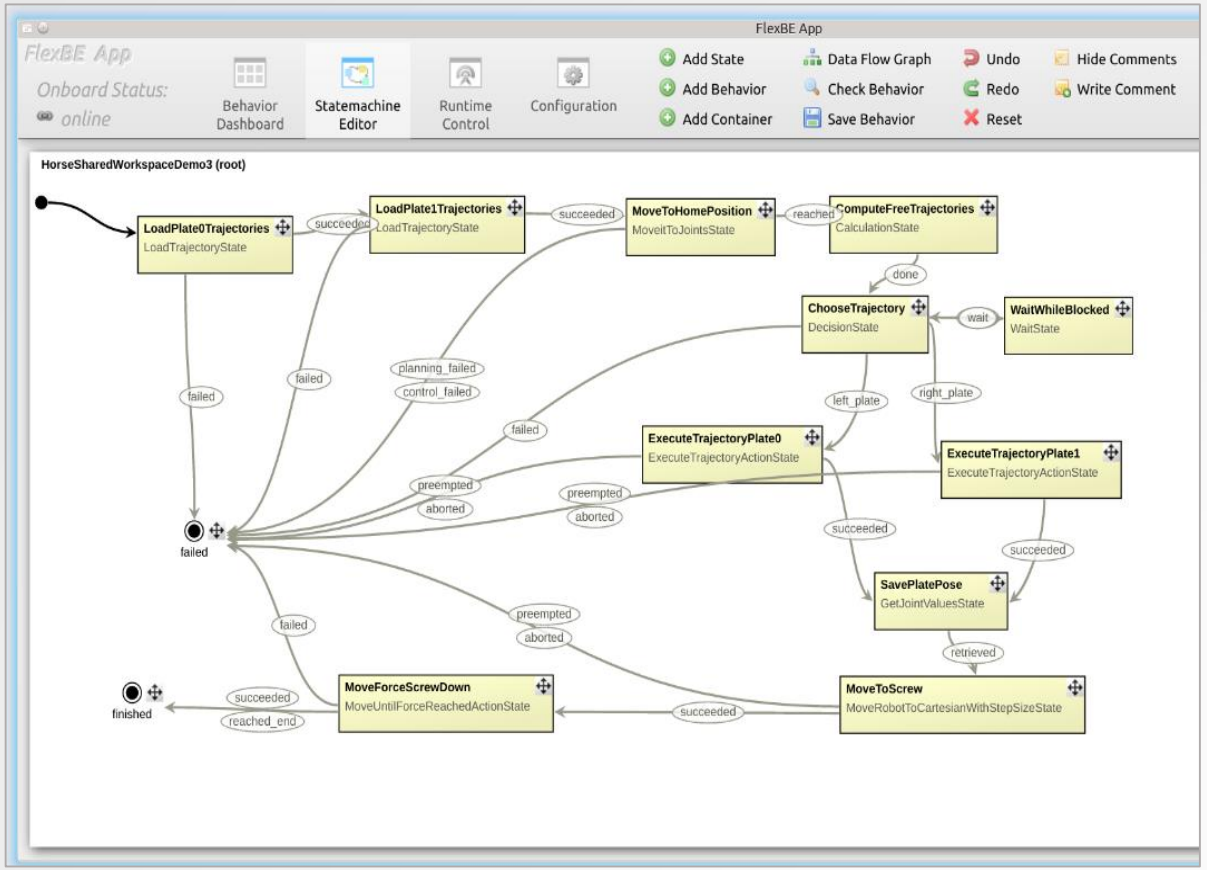
Augmented reality

- Projecting the assembly instructions
- Projection of safety zones
- Projection of points of interest on the parts held by robot

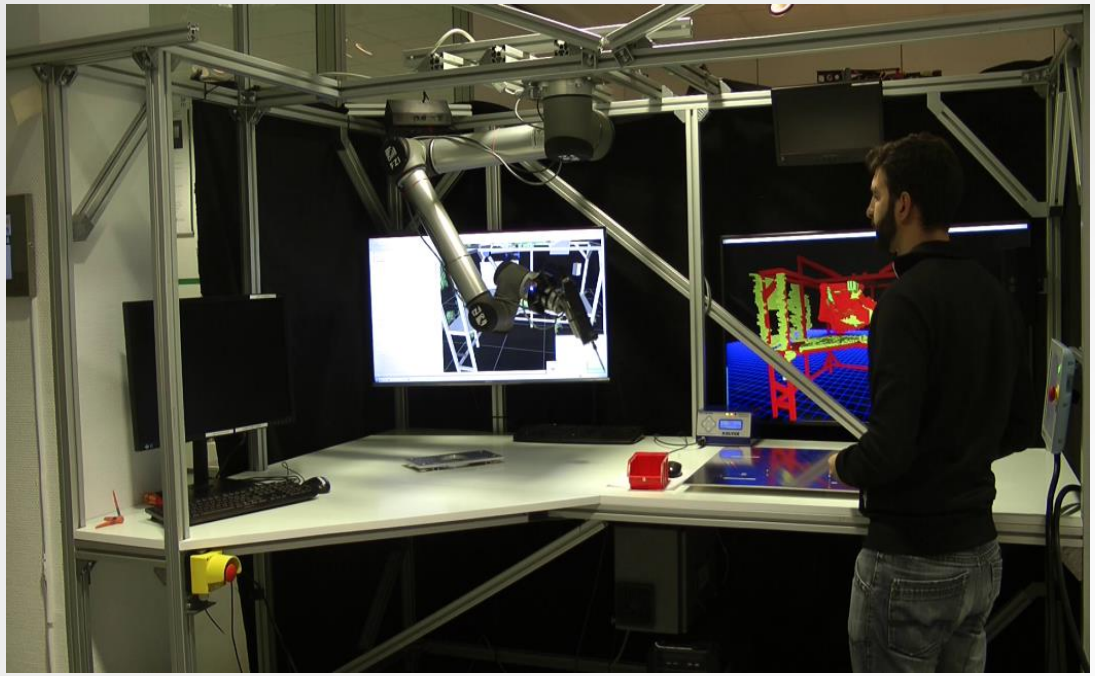
Learning mechanism for task definition

- Easy way of defining tasks for the robot as a state machine
- Based on the FlexBe system



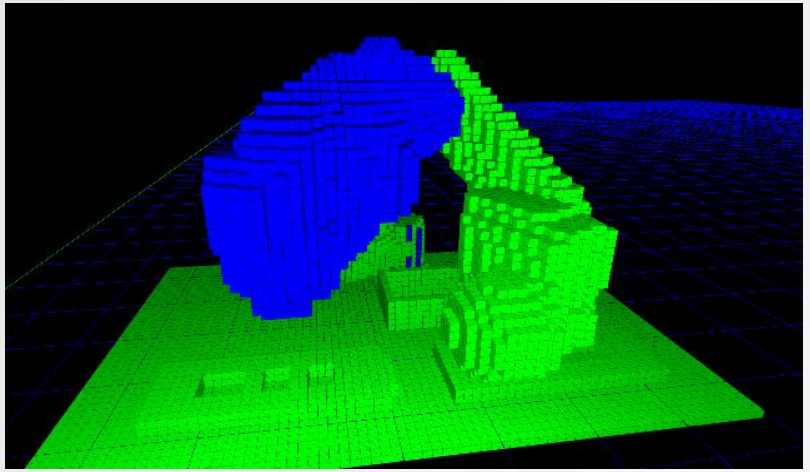
Collision detection and avoidance

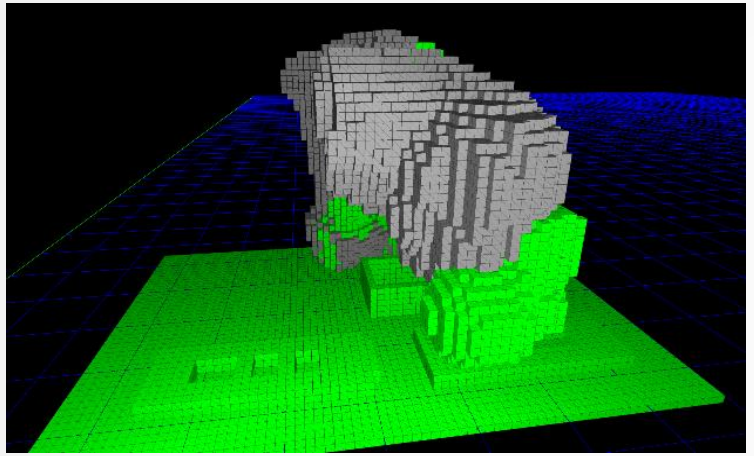
- Multi-modal system for monitoring robot's workspace
- Evaluation of possible trajectories and collision prevention



Trajectory replanning

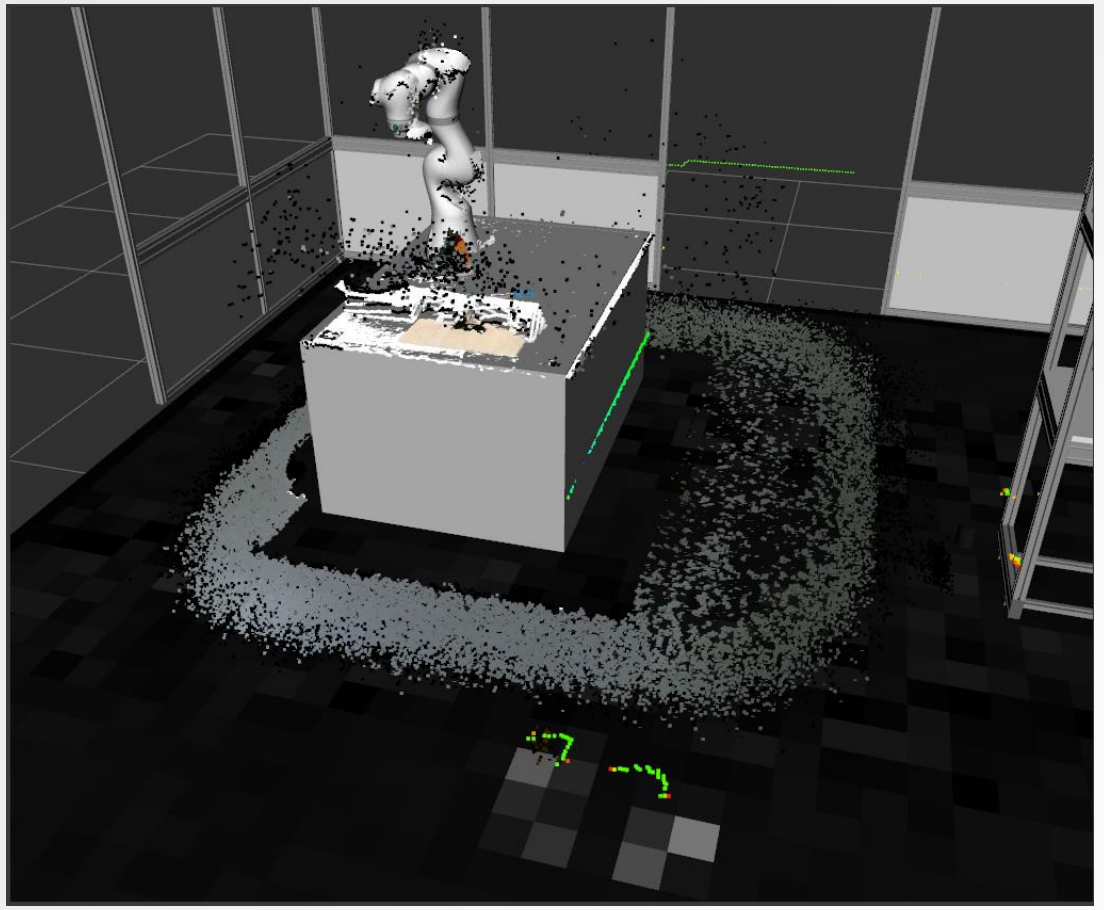
- Online replaning of trajectories if a potential collision is detected
- Combined with the previous module

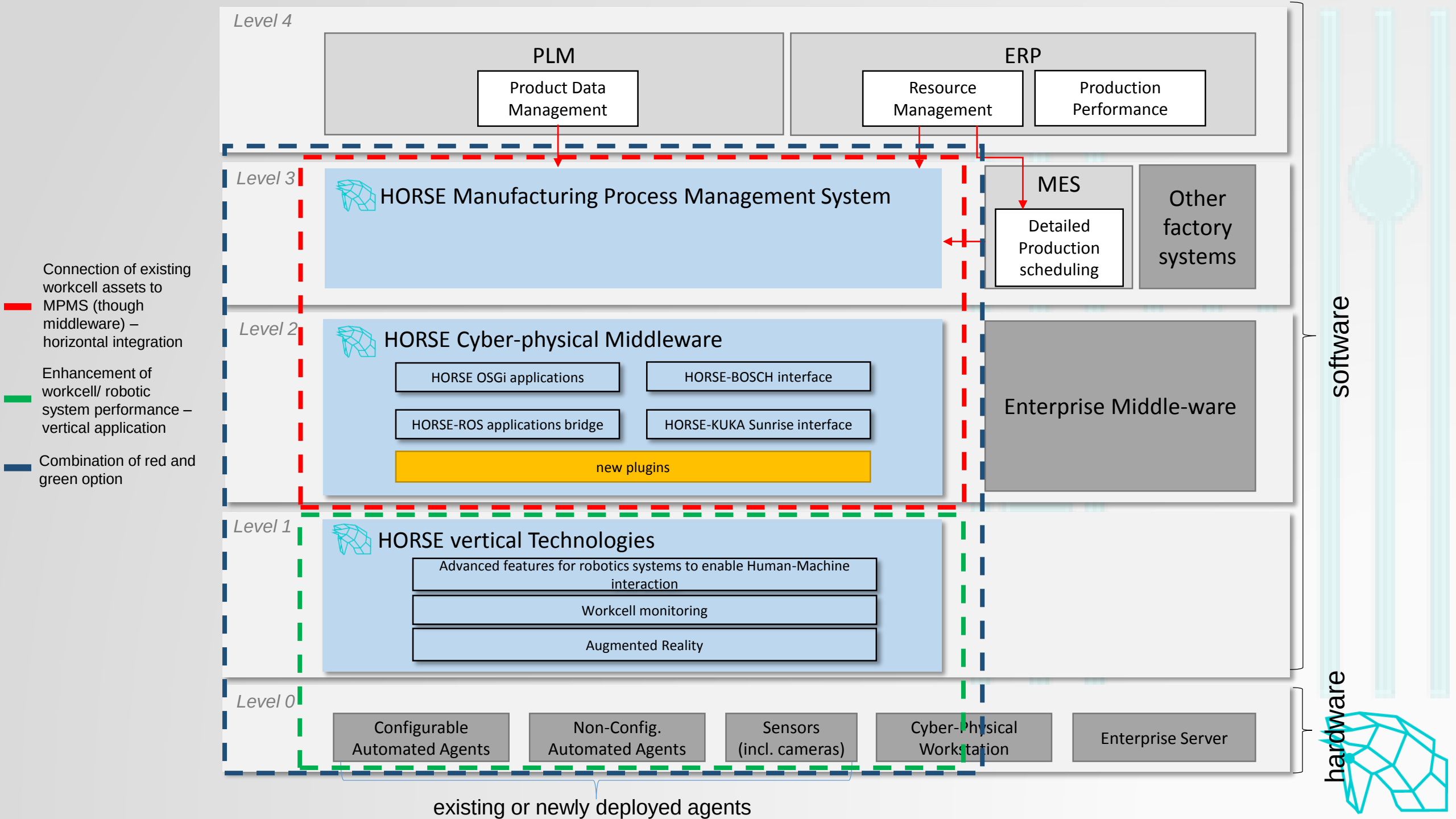




Situation awareness

- Fusion of detections from different sensors to detect intrusions
- Integrated with the robot controller to quickly intervene

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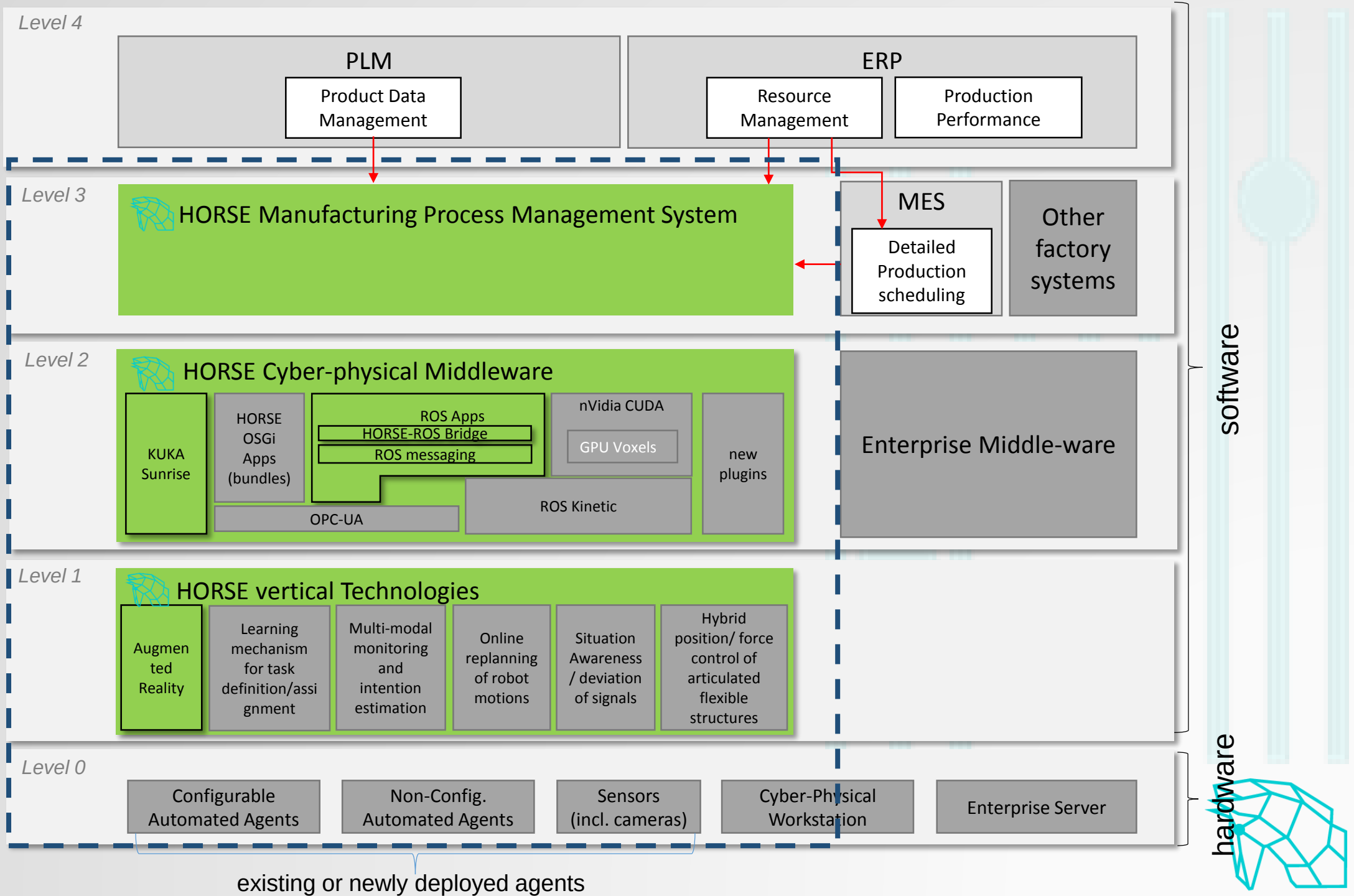
Connection of existing workcell assets to MPMS (though middleware) – horizontal integration
Enhancement of workcell/ robotic system performance – vertical application
Combination of red and green option

BOSCH case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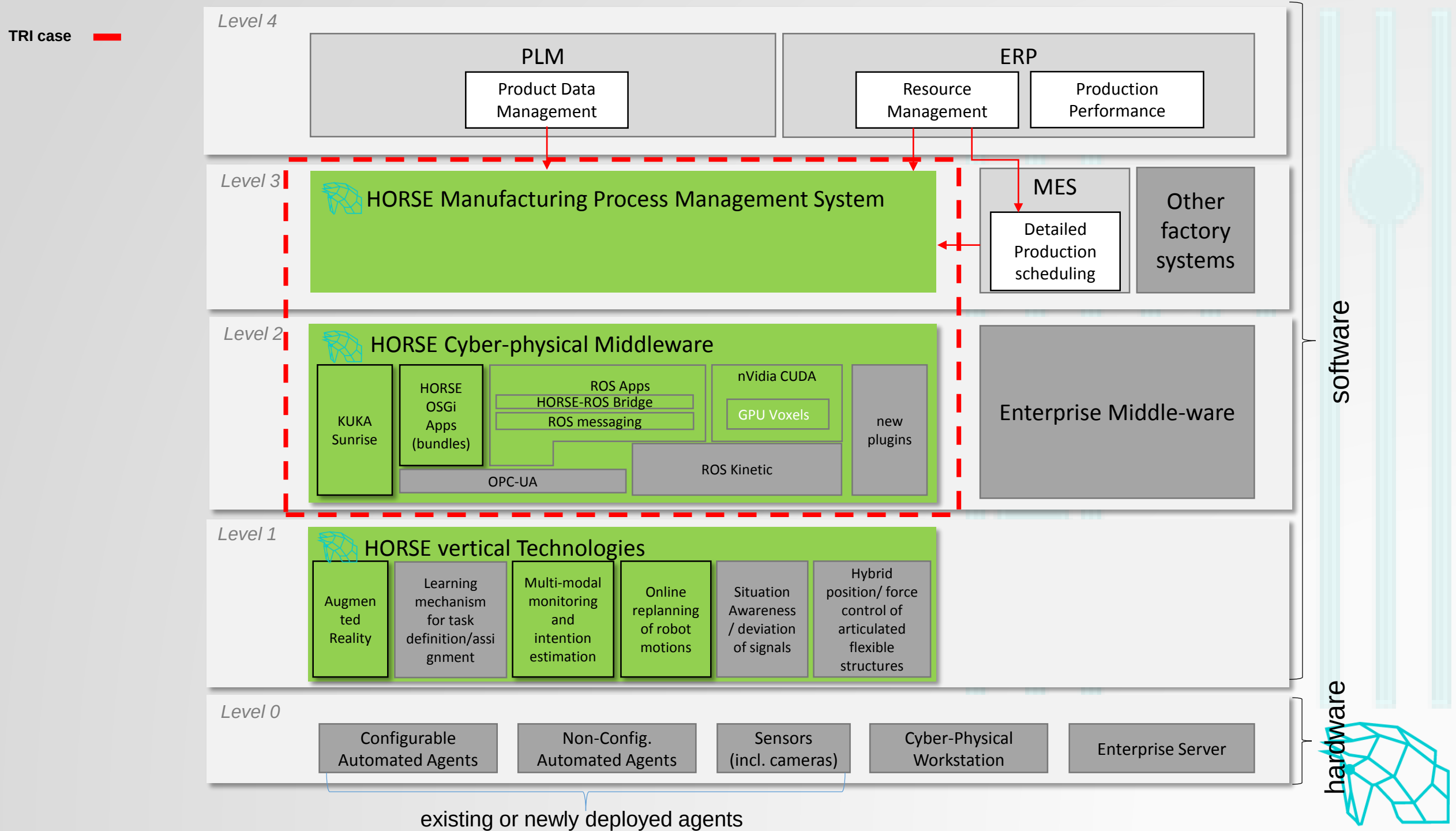
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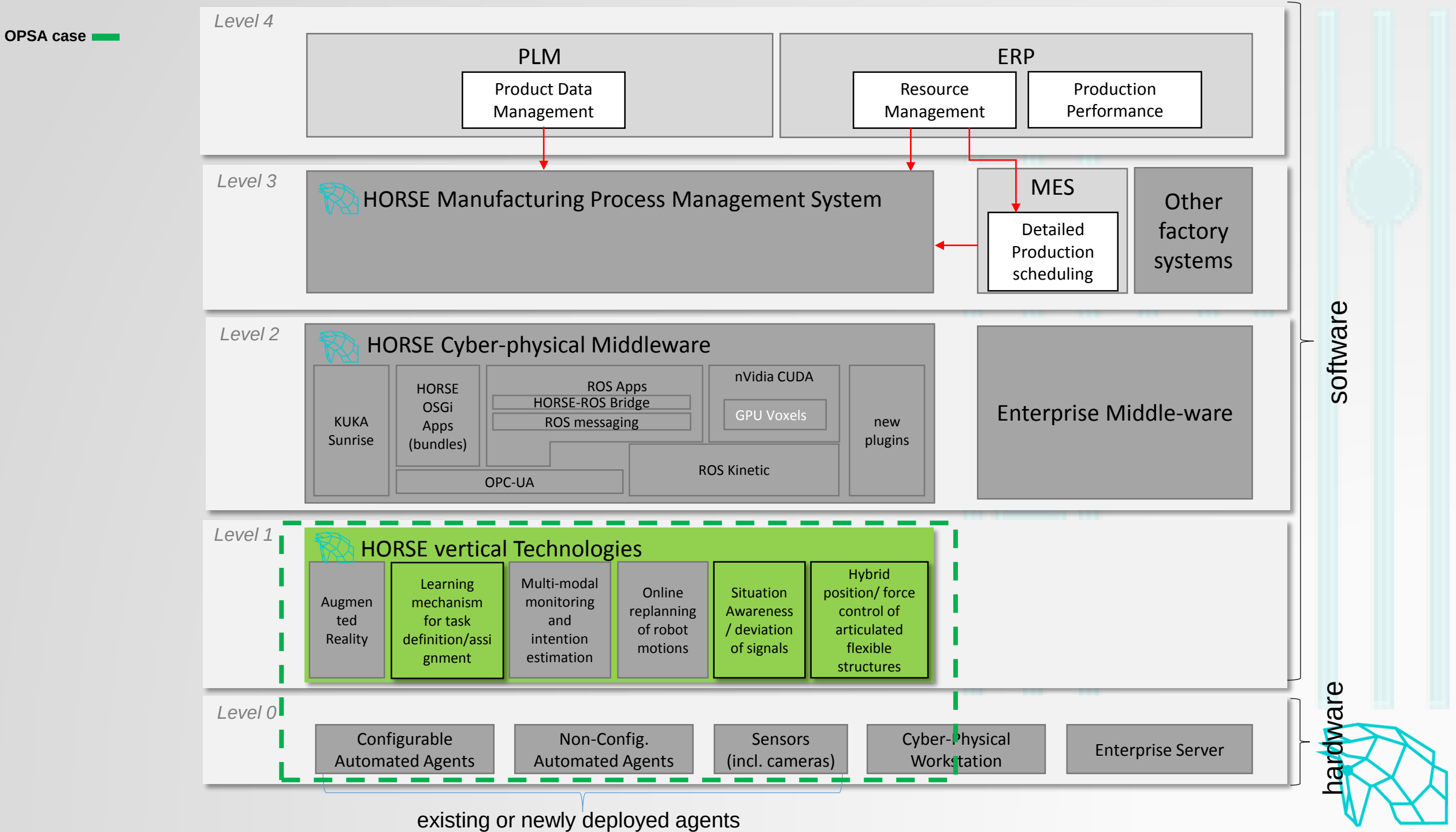
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Preparing applications

Call details

Opening date: 01.12.2017

Closing date: 28.02.2018, at 17:00 (Brussels time)

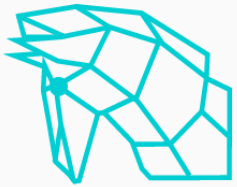
Call information: http://horse-project.eu/Open-Calls

Submission platform: http://opencalls.horse-project.eu

Total budget: €1,400,000

Maximum funding per proposal: €200,000

Duration of the experiments: 9 months



Financial details

- Maximum support per proposal: €200,000
- Maximum support per party: €150,000 (REGARDLESS OF NUMBER OF PROPOSALS)
- Funding rates: 100% for non-profit, 70% for for-profit
- Indirect costs: 25%
- Prefinancing: 25%
- Interim payment: up to 35%

Eligible costs

- Mostly personnel costs and travel
- Up to 20% for equipment and consumables
- Purchasing a robot or other machinery is not eligible, only renting or leasing
- 10% for subcontracting – clearly justified and not for the core activities
- Consistency between the costs and the expected work is a part of the evaluation!

Eligible entities

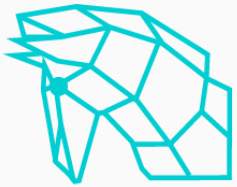
- Any legal entity possessing a validated PIC (can be provisional at the moment of submission)
- Support can be given to natural persons, public or private bodies, research organizations, non-profit organizations, SMEs, international organizations established in EU Member State or Associated Country

Preferred consortia

- Consortia should have complementary, multi-disciplinary competences
- Encouraged composition:
  - The end user (a manufacturing company, preferably SME)
  - Depending on the needs:
    - System integrators
    - Hardware providers
    - Research institutes

Proposal elements

- Excellence (4 pages):
  - Context of the experiments
  - How the framework is going to be used
  - Benefits for HORSE (new components, new hardware, validation)
- Impact (2 pages):
  - Helping the end-user
  - Validating the framework
  - Promotion
  - Extension of the framework



Proposal elements cont.

- Implementation (4 pages):
  - Task lists (with timing, efforts, role of partners)
  - Deliverables list
  - Milestones list
  - Consortium as a whole
  - Risk management
- List of KPIs (1 page)
- Management of knowledge and IP (1 page)
- Ethical issues

Evaluation criteria

1. Expected impact	**Weight: 35%**
• End-user's performance, efficiency, quality or/and production flexibility increase due to adaptation of the framework • Potential to address future/wider applications within the targeted industry or in general. • Increased functionalities of the framework (software and hardware components) • Impact assessment approach and KPIs	Score: ? / 10 (Threshold: 8/10)
2. Technical excellence	Weight: 35%
• Clarity of the adaptation/integration/extension of the framework • Technical quality of the framework extensions – new hardware and software • Clear added value to the validation of the framework	Score: ? / 10 (Threshold: 8/10)
3. Quality of the workplan	Weight: 30%
• Coherence, appropriateness, effectiveness of the overall implementation and integration approach • Workplan appropriateness and scheduling • Risk management • Coverage of the necessary competences	Score: ? / 10 (Threshold: 8/10)
Remarks	
Ethical implications and compliance with applicable international, EU and national law	Essential
OVERALL SCORE	Score: ? / 10 (Threshold 8/10)

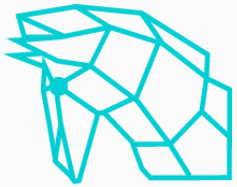
Proposal submission

- Proposal submission via a web platform at: http://opencalls.horse-project.eu
- Proposal consists of:
  - Completed and uploaded proposal template
  - Completed web forms
- The last version submitted before the deadline will be considered for evaluation
- Submissions are confirmed by an acknowledgment e-mail

Support for application execution

General help

- FAQ on the http://horse-project.eu/Open-Calls website
- For questions not covered in FAQ: opencalls@horse-project.eu
- Webinars:
  - December, 13th 10:00 CET http://i4ms.eu/webinar/horse_webinar_registration.php
  - Next one in January



HORSE Brokerage Tool

- If you are looking for partners with different needs or expertise – register at http://horse-project.eu/Open-Calls-Brokerage

Pre-proposals

- Can be submitted during the first 9 weeks of the call via the submission platform
- A member of the consortium will verify if the proposal fits the scope and how it can be improved
- It is not mandatory to submit a preproposal and it does not influence the evaluation of the full application

Project implementation

- Shaping the KPIs and exact scope during the contracting phase
- Technical support in adapting and configuring the existing components
- Support in developing new components
- Up to two weeks of support and initial testing in the HORSE CCs

Q&A

- FAQ: http://horse-project.eu/Open-Calls
- Email support: opencalls@horse-project.eu
- Webinar: http://i4ms.eu/webinar/horse_webinar_registration.php
- Brokerage: http://horse-project.eu/Open-Calls-Brokerage