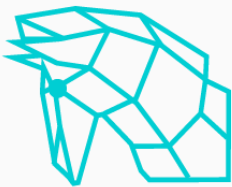


# Open Calls

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

# *i* About HORSE

Budget 8.9 M Euro

Grant 7.9 M Euro

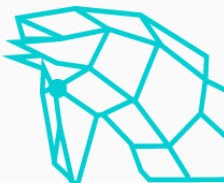
Start 1/11/2015

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*



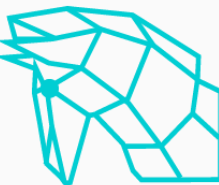


# The Project - Vision

“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**

involving collaboration of

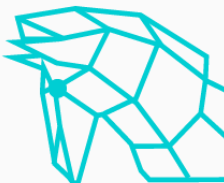
2

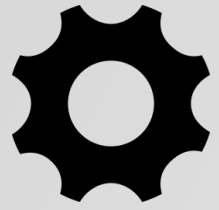
**humans, robots, AGV's and machinery**  
to realize industrial tasks in an efficient manner.

3

Robotics assistance will improve :

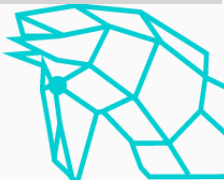
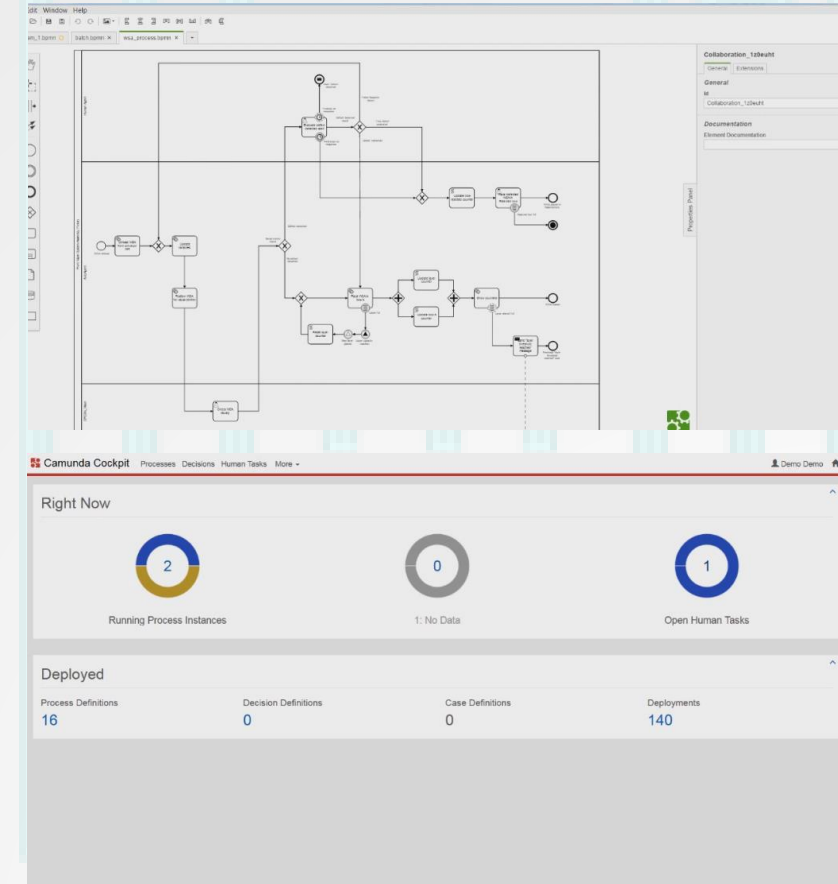
- **operators conditions of work,**
- **worker's safety**
- **quality and production effectiveness**

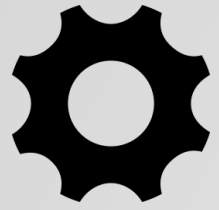




# Technical Framework

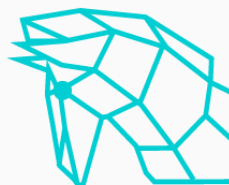
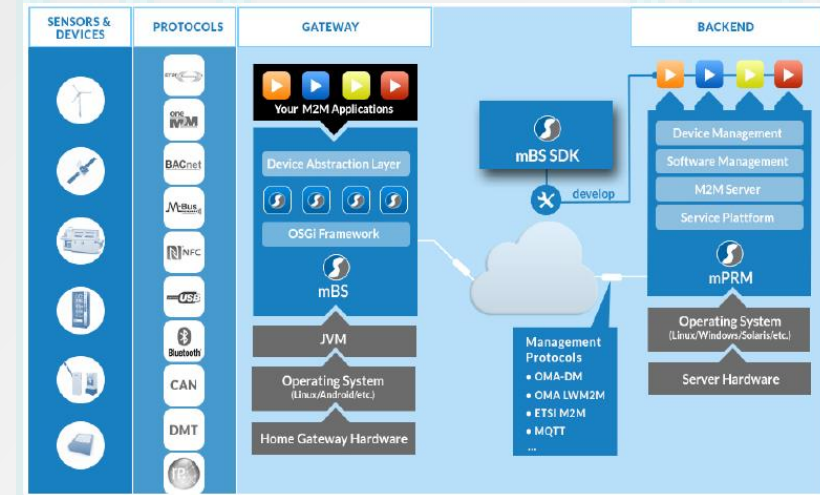
- **Integrated, Process-oriented management** model for control of the production line and automatic resource allocation/dynamic reallocation (BPM)
- **OSGI based (IoT) for remote control of production resources (humans, robots)** (all resources are accessible in the same manner)
- **Multilayer safety**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



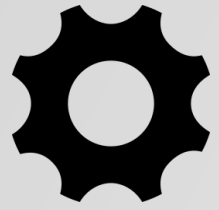


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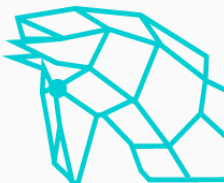
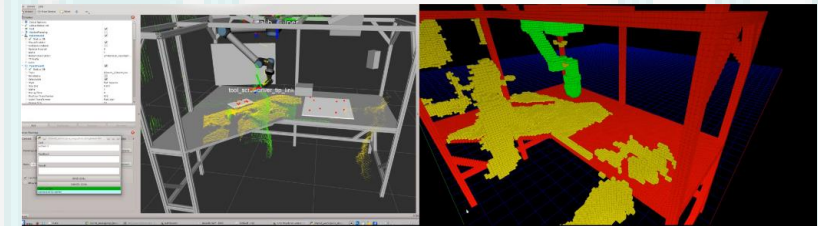
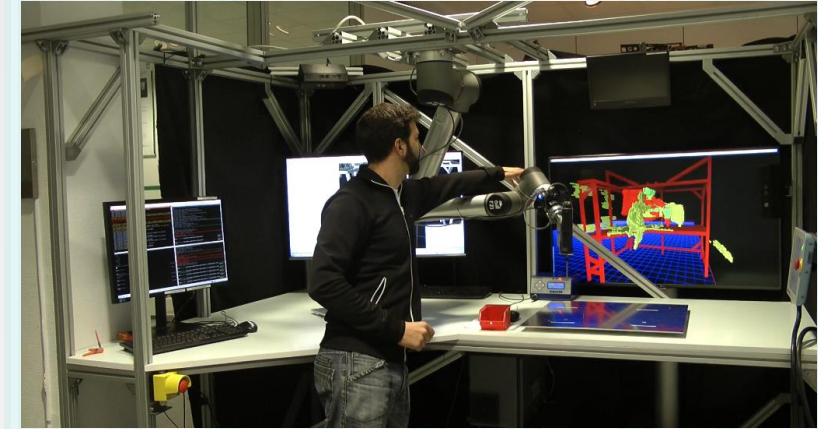


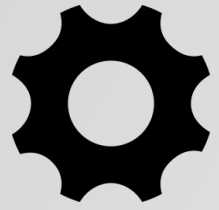




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# HORSE Functions

Level

0

**HORSE  
vision**

Integration of Robotic and Human Activities

1

**Main aspects**

Integration of Robotic and  
Human Activities

Integration of  
Horizontal and Vertical  
Processes

2

**Main Functions**

**AF-01**  
Situation  
Awareness

**AF-02**  
Synchronization of robotics  
and human activities

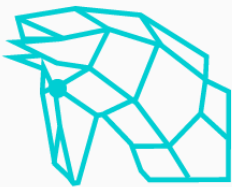
**AF-03**  
Robotics task  
instructions

**AF-04**  
Human task  
instructions

**PF-01**  
Horizontal Business  
Process  
Management

**PF-02**  
Resource  
management

**PF-03**  
Actor  
Control



# The Pilots



1



**BOSCH Front  
Wiper Systems  
(Spain)**

2



**ODLEWNIE  
POLSKIE  
Fettling  
operations  
(Poland)**

3



**THOMAS REGOUT  
INTERNATIONAL  
Customized  
Telescoping  
slides  
(Netherlands)**

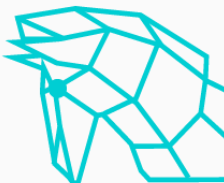


# The Pilots



**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



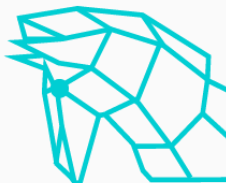


# The Pilots



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



123



THOMAS REGOUT  
INTERNATIONAL  
Customized  
Telescoping  
slides  
(Netherlands)

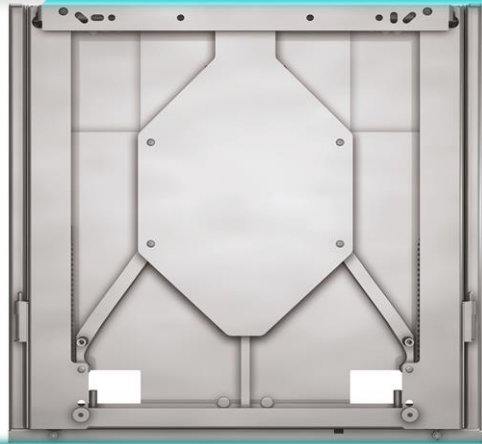
- Automated **placing of parts on hooks** **co-existing** **with humans** doing the same task for other kinds of parts
- **Augmented Reality** assistance to accelerate the **assembling of production tools** without the need for experience
- **Monitoring, Orchestration and planning support** to enable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



# The Pilots

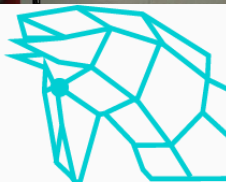
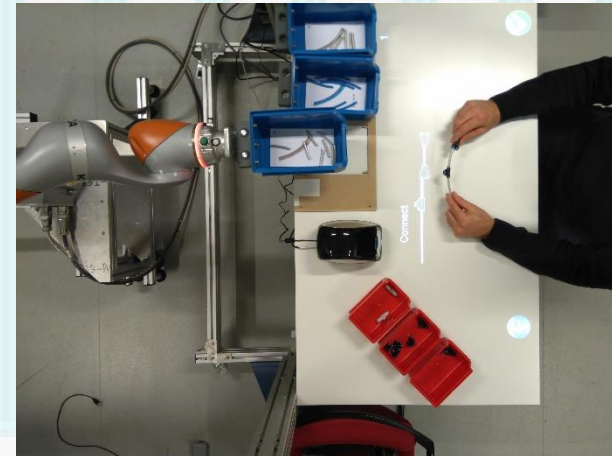
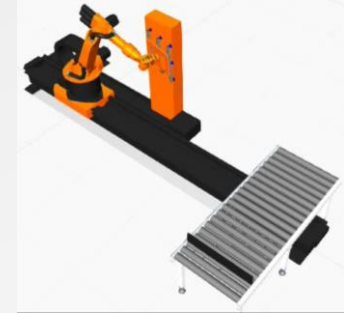


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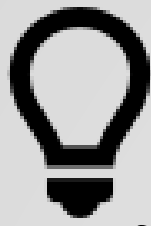


THOMAS REGOUT  
INTERNATIONAL  
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# Innovation Hubs

They are an effort to expand the I4MS regions.

HORSE **funds and mentors** 4 Innovation Hubs:

Serbia (HUBTECS)

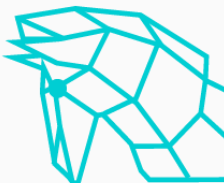
Spain (HUB4MANUVAL)

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?

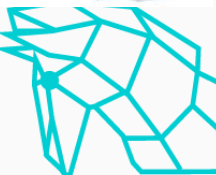
- Settings representative of manufacturing installations: France, Germany, Netherlands, Slovenia
- Robot and supplies used in production lines.

## Their role?

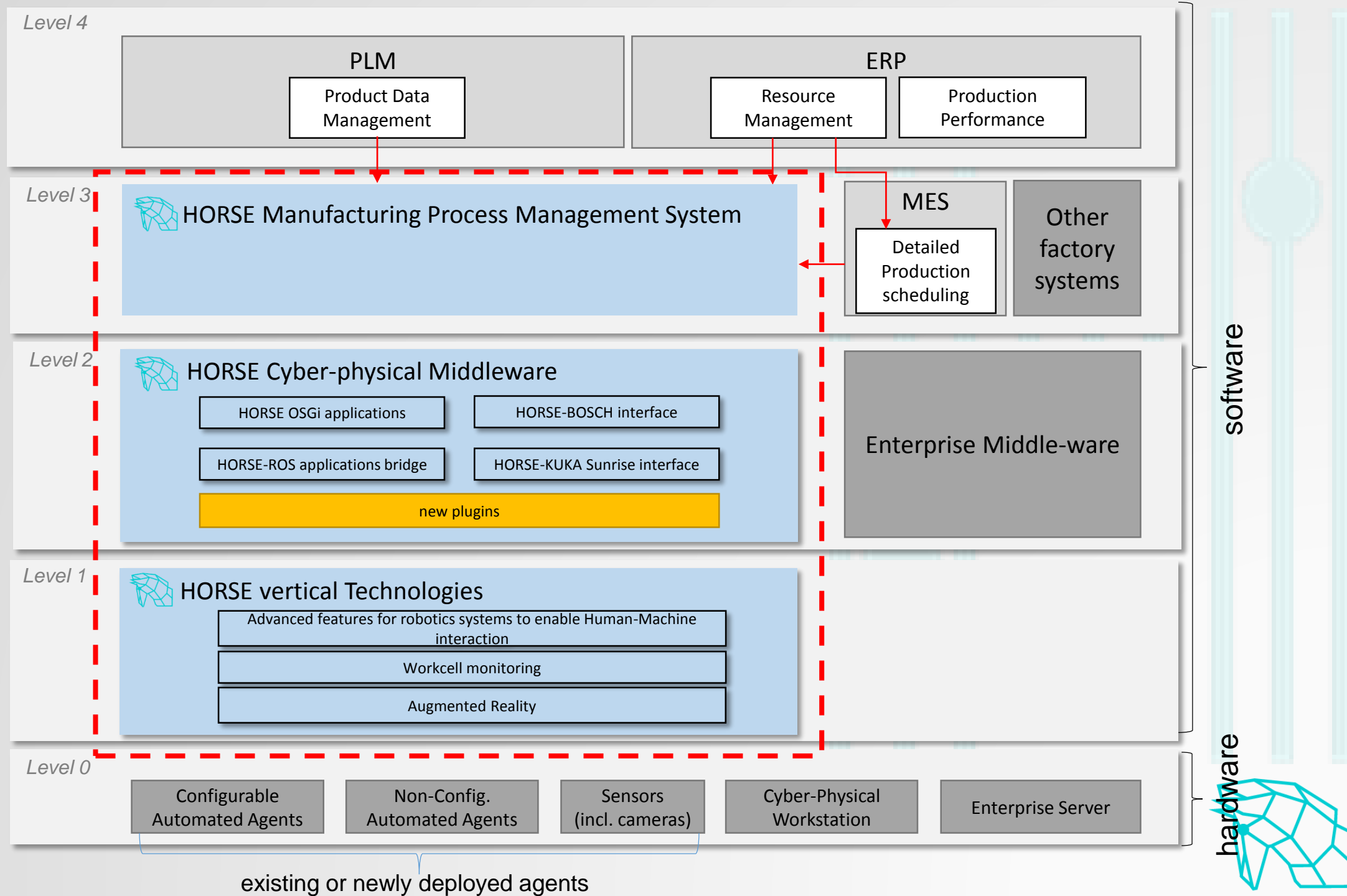
- Simplify usage and facilitate access to robotics by European industry and especially first users SME.
- Offer expert support for advising on deployment and fast assessment of robotics solutions in manufacturing.
- Capitalise lessons learnt and best practices.

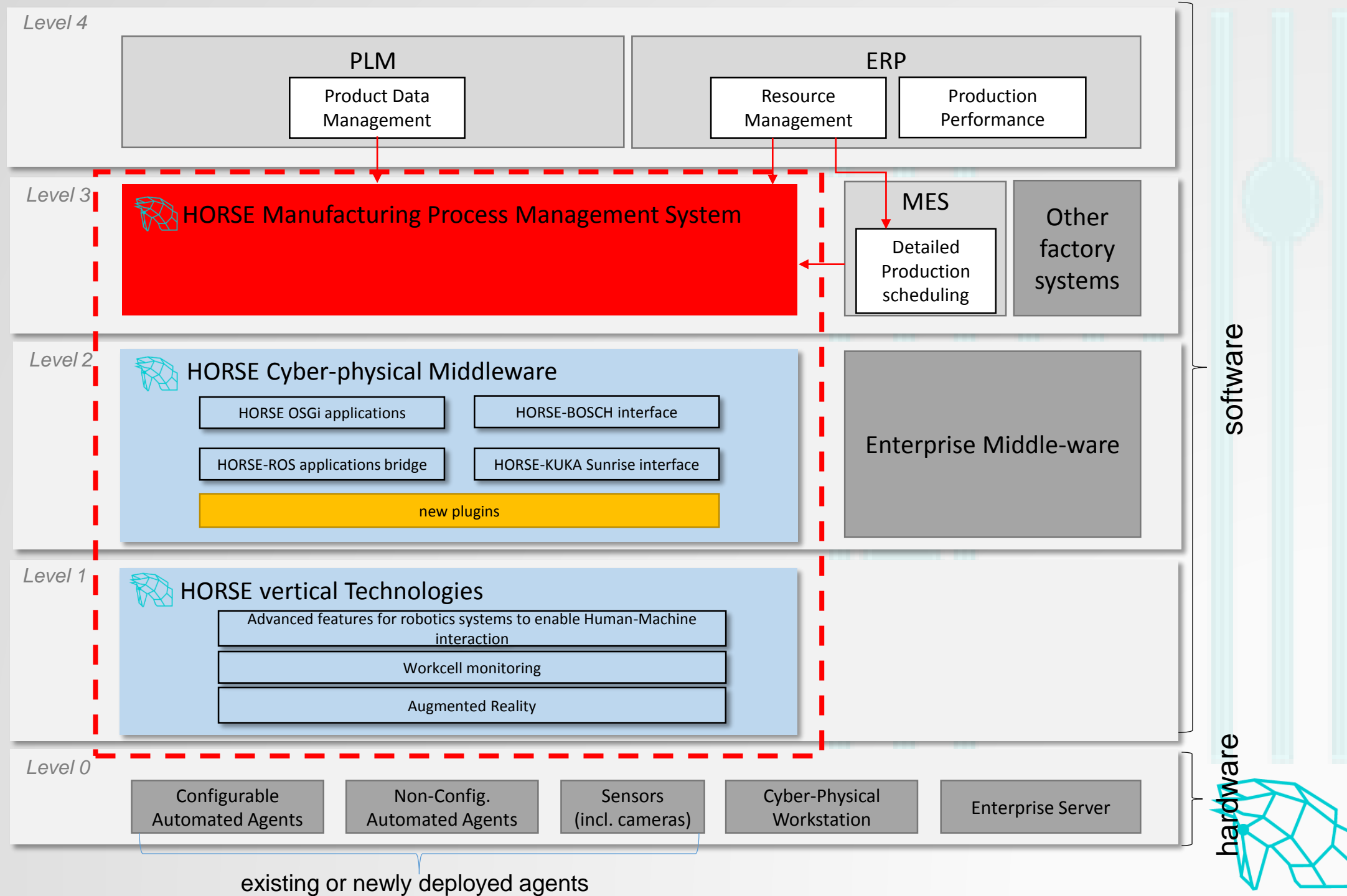
## Their scope?

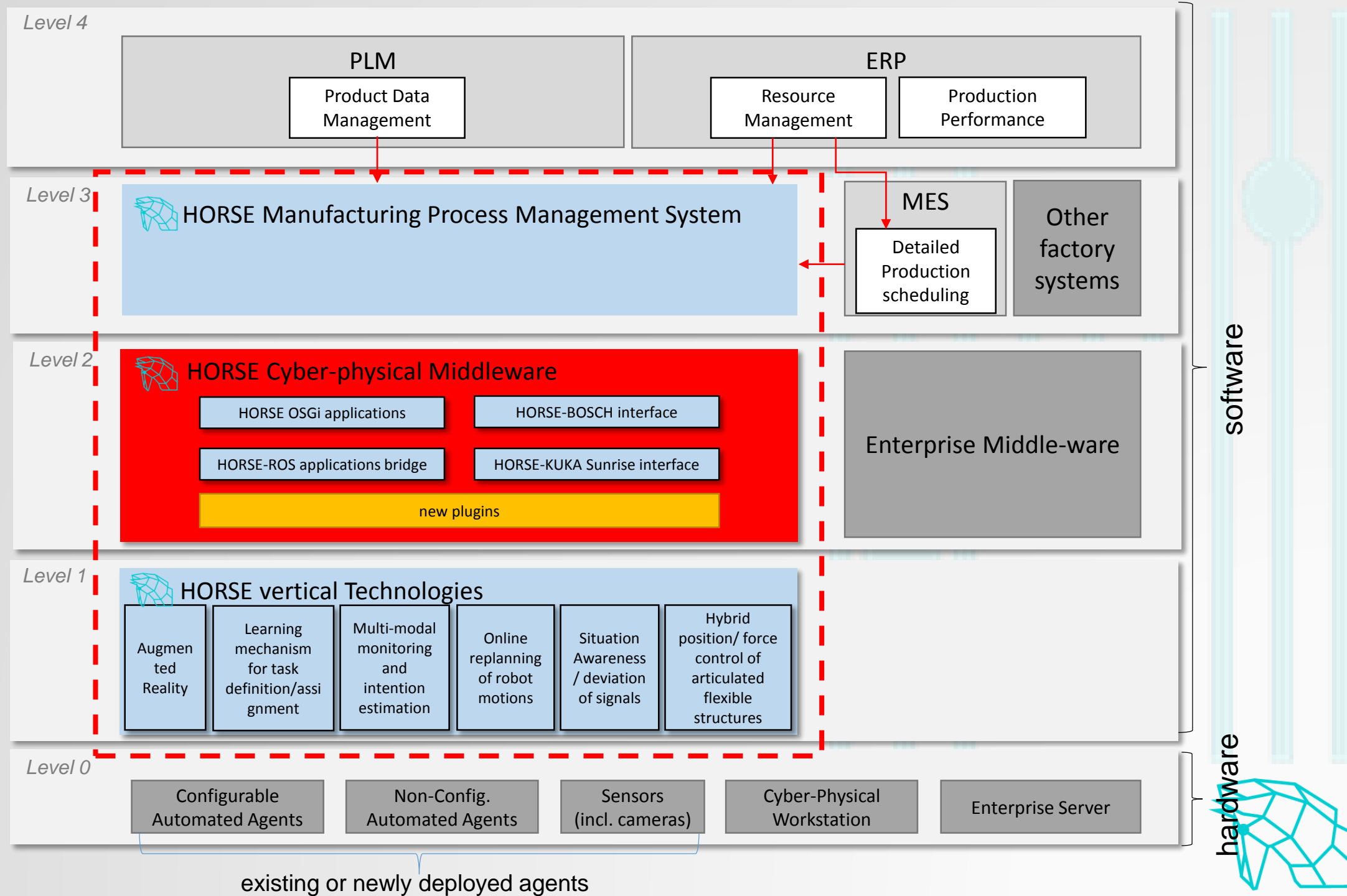
- Capturing the industrial ecosystem in each region and addressing real industrial challenges

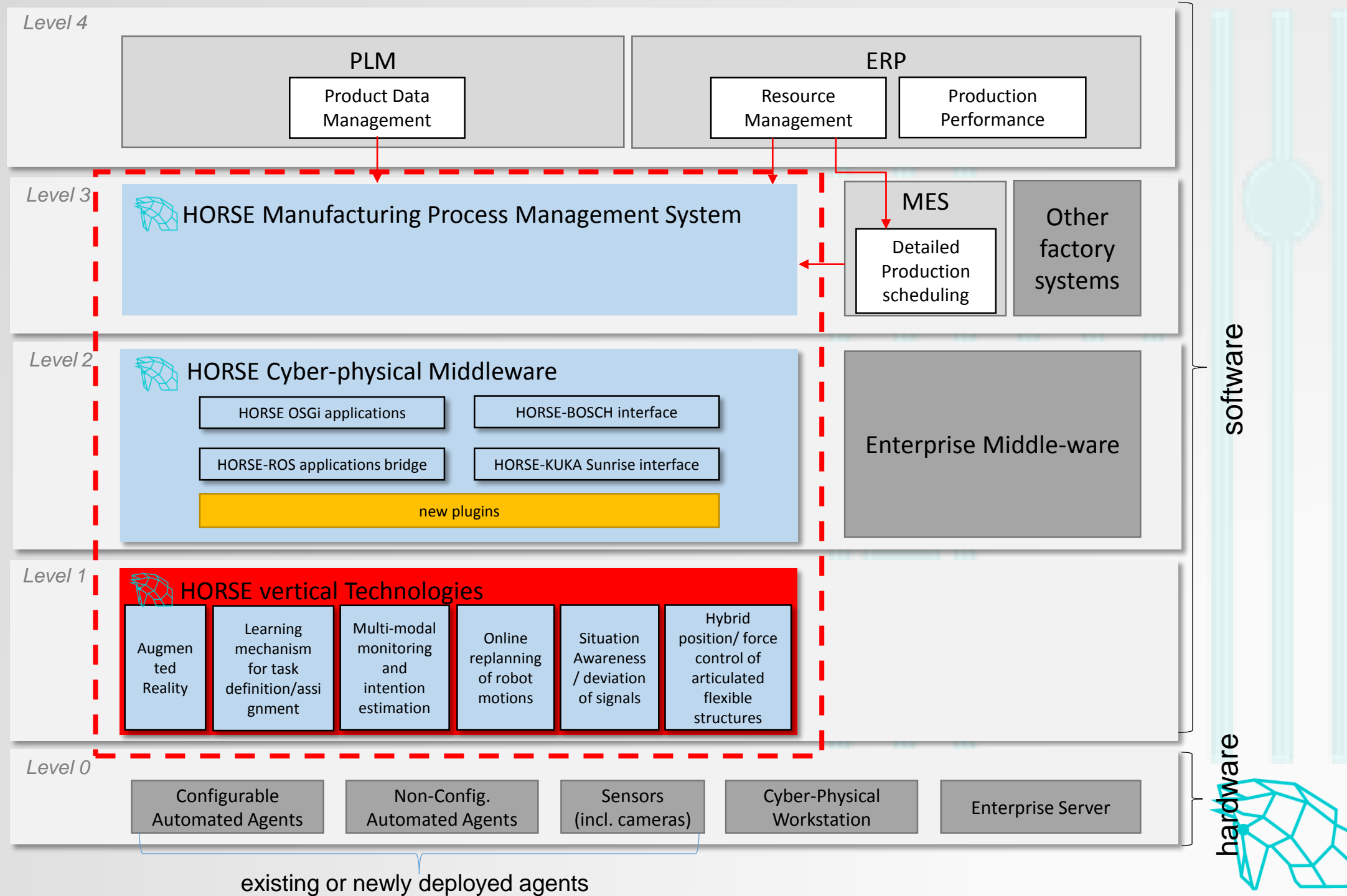


# HORSE framework









# Augmented reality

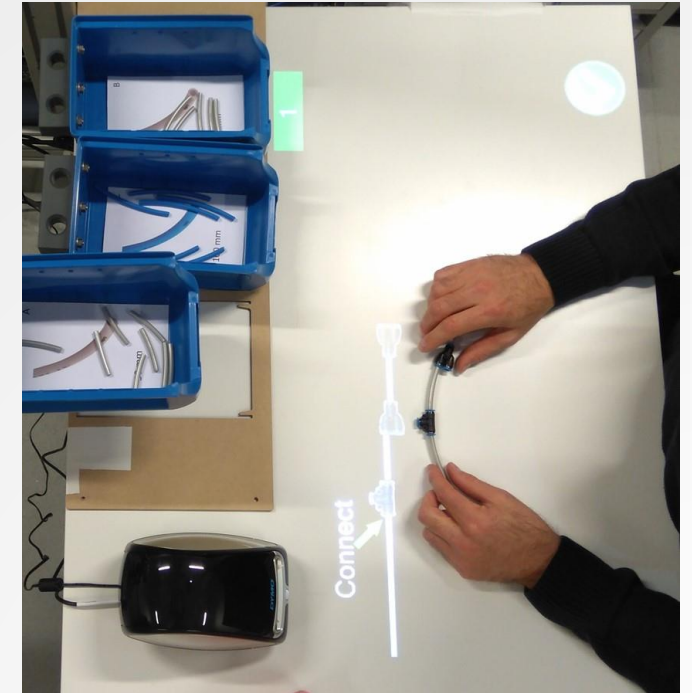
- Projecting the assembly instructions
- Projection of safety zones
- Projection of points of interest on the parts held by robot





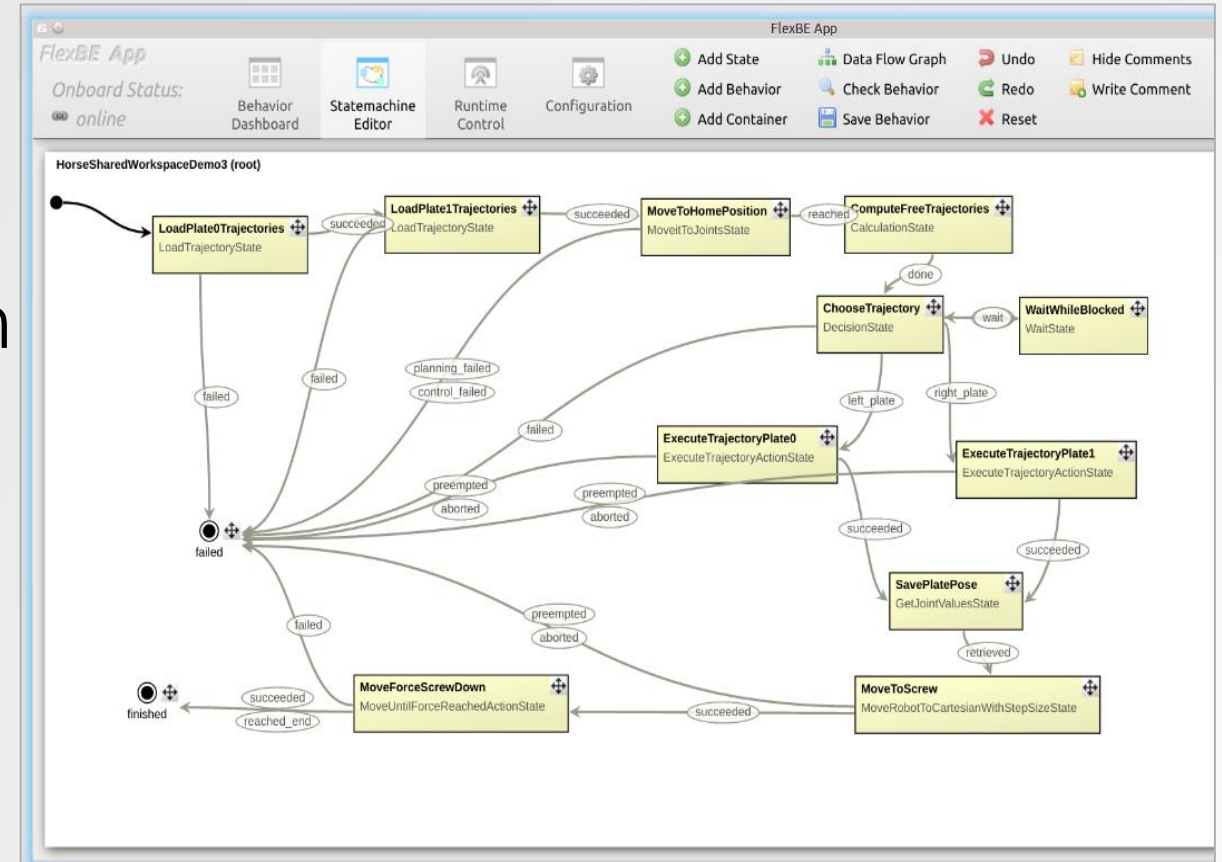
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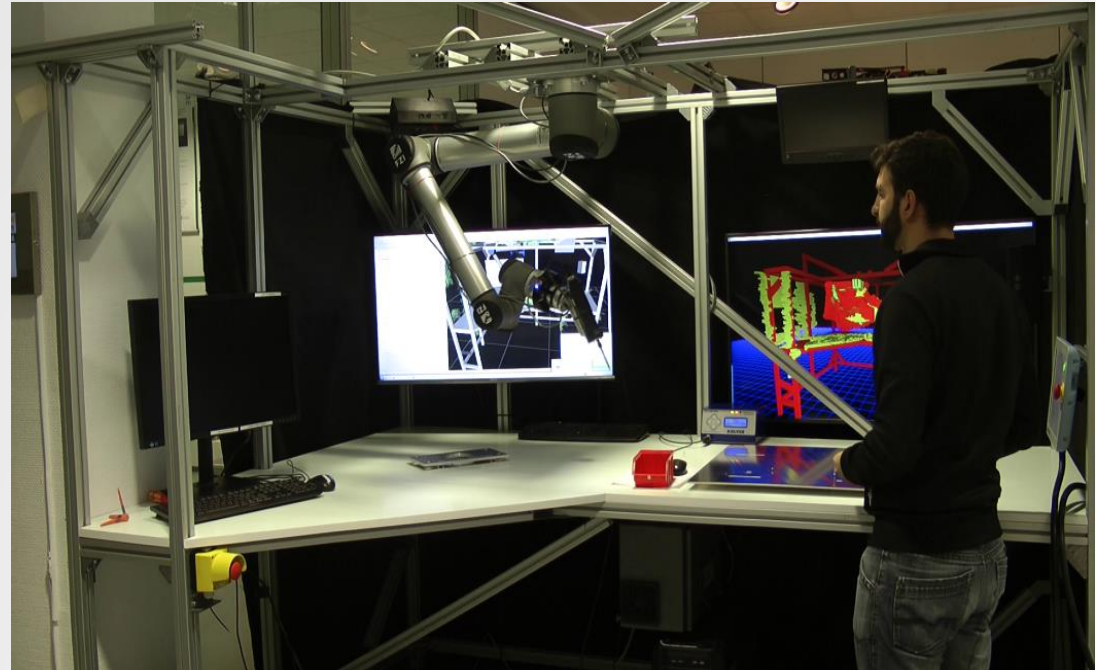
# Learning mechanism for task definition

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



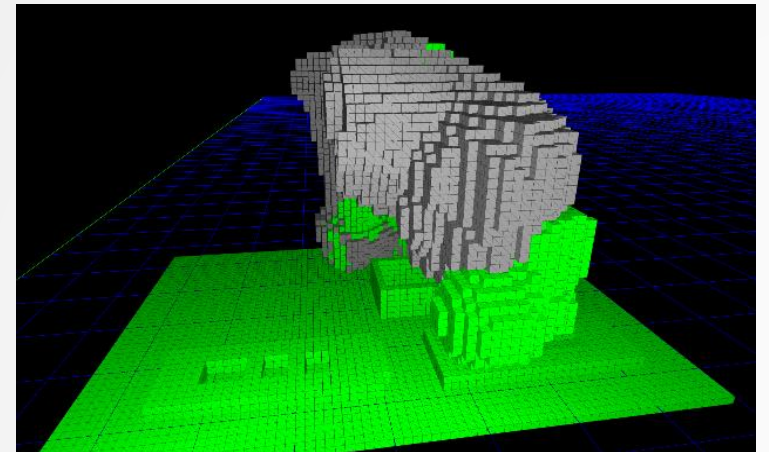
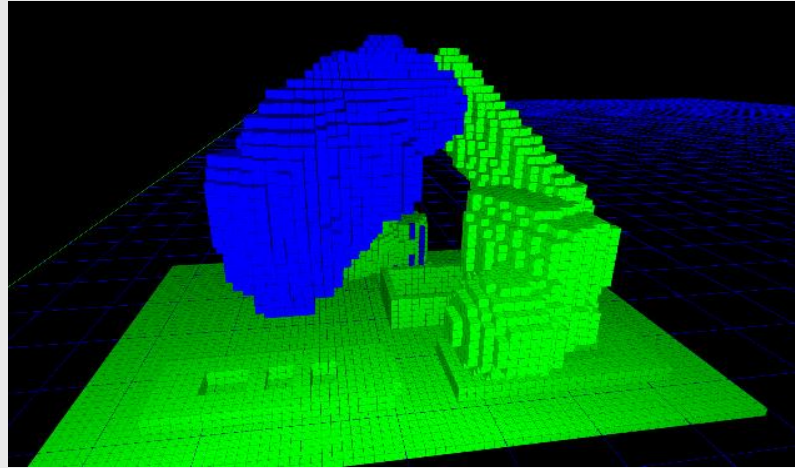
# Collision detection and avoidance

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



# Trajectory replanning

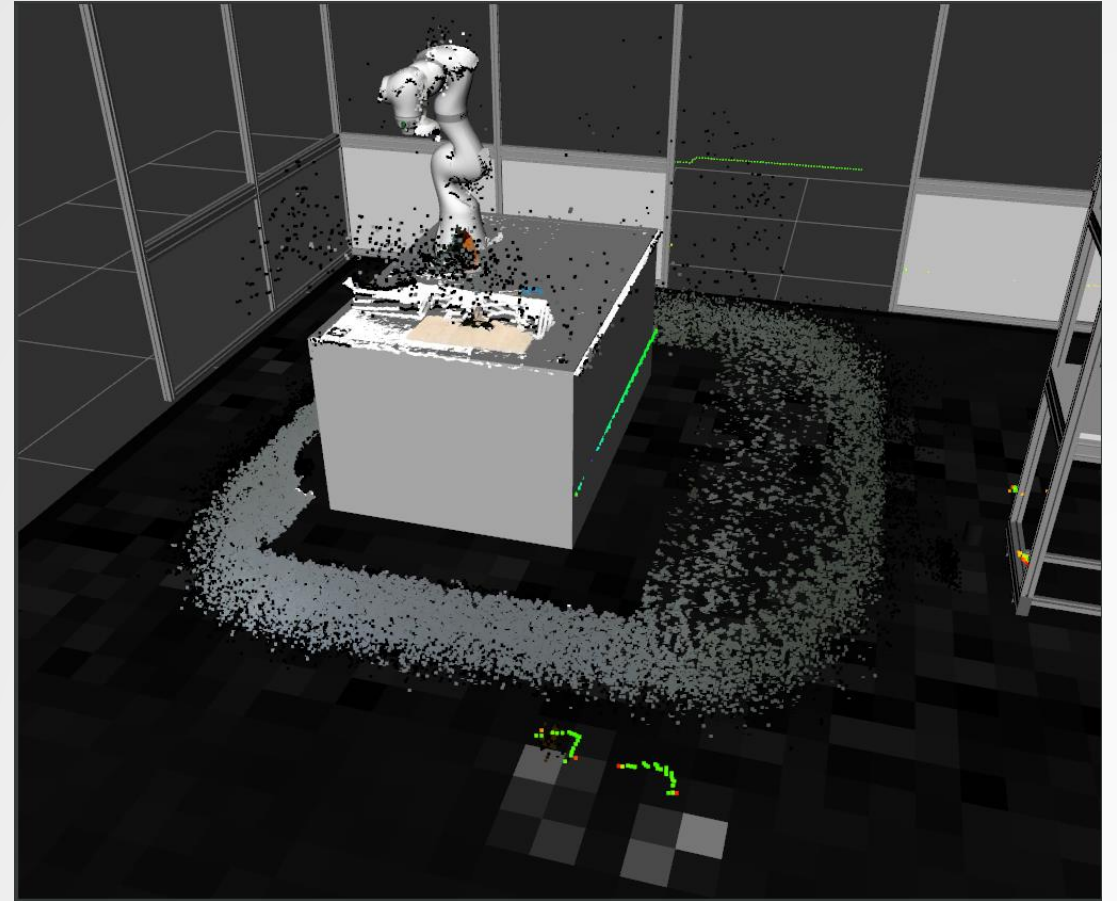
- Online replanning of trajectories if a potential collision is detected
- Combined with the previous module

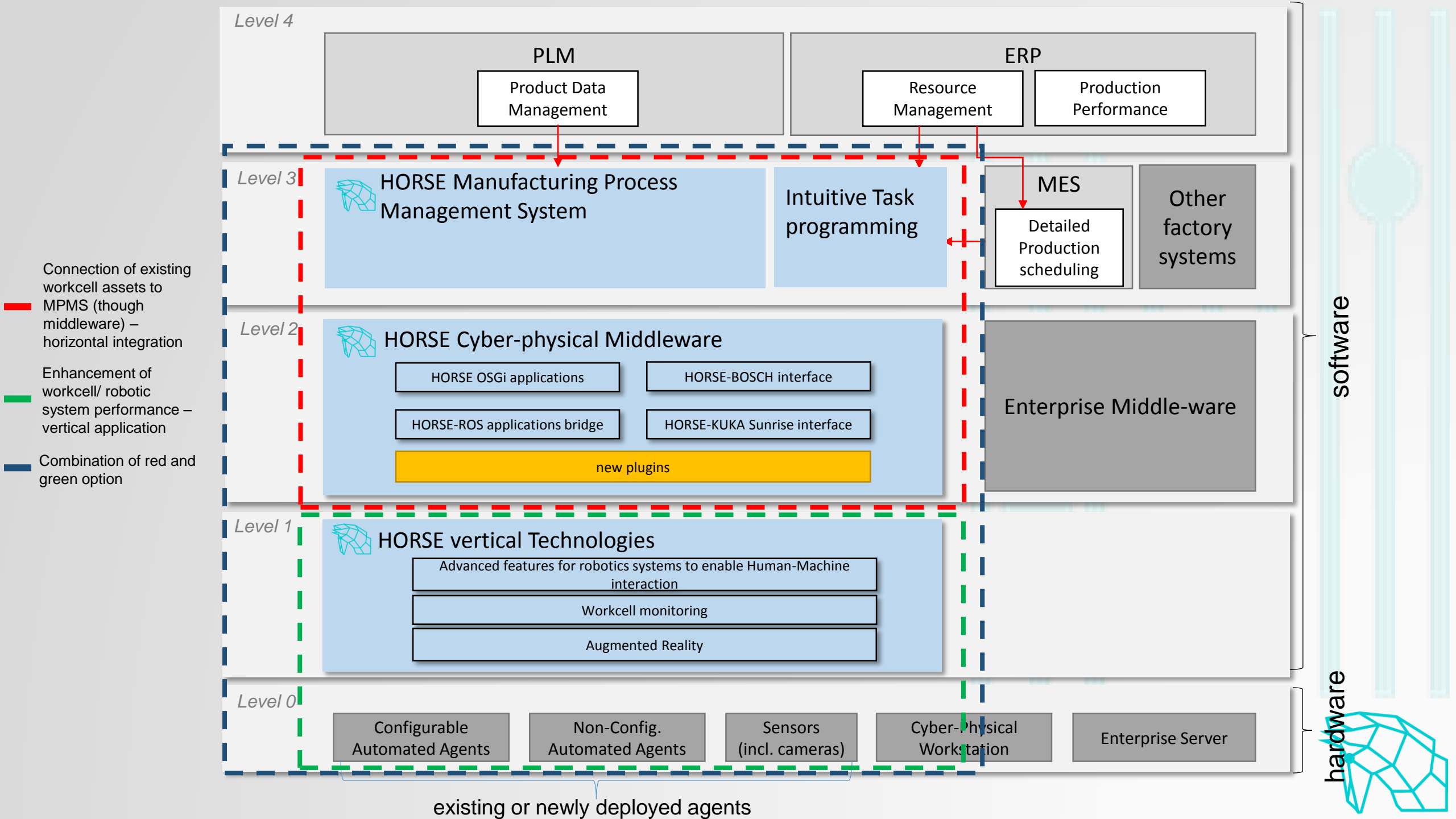


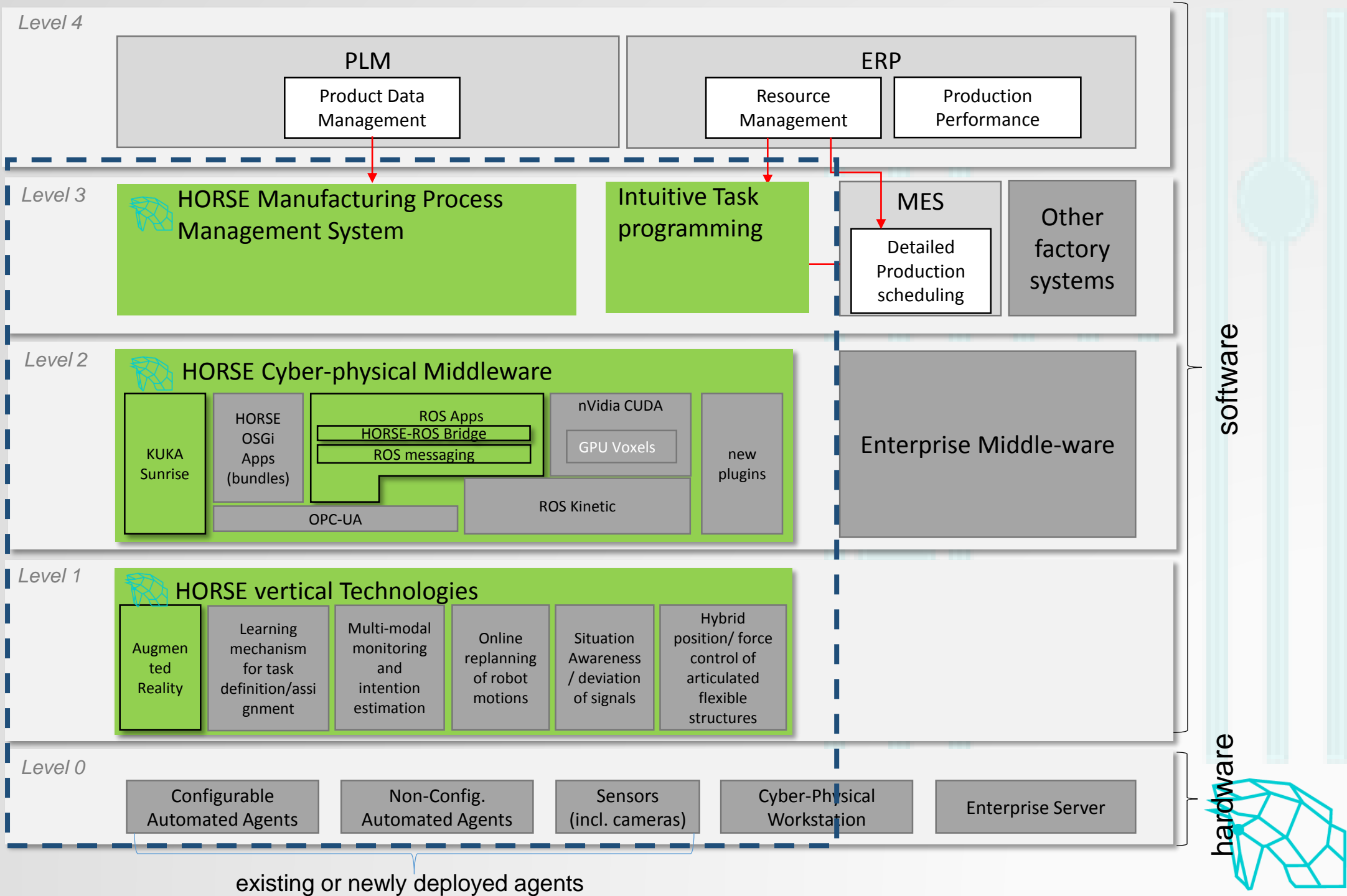


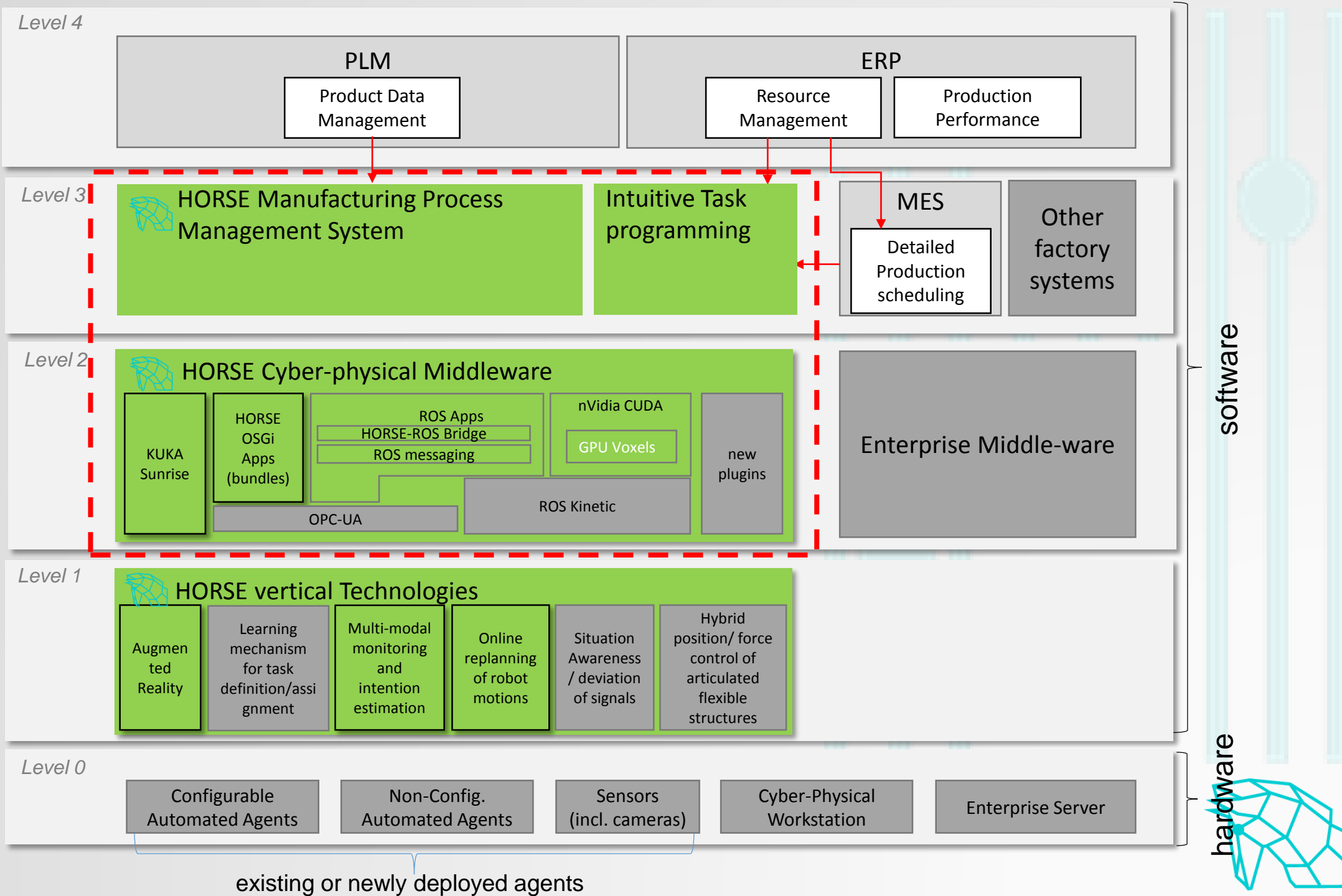
# Situation awareness

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

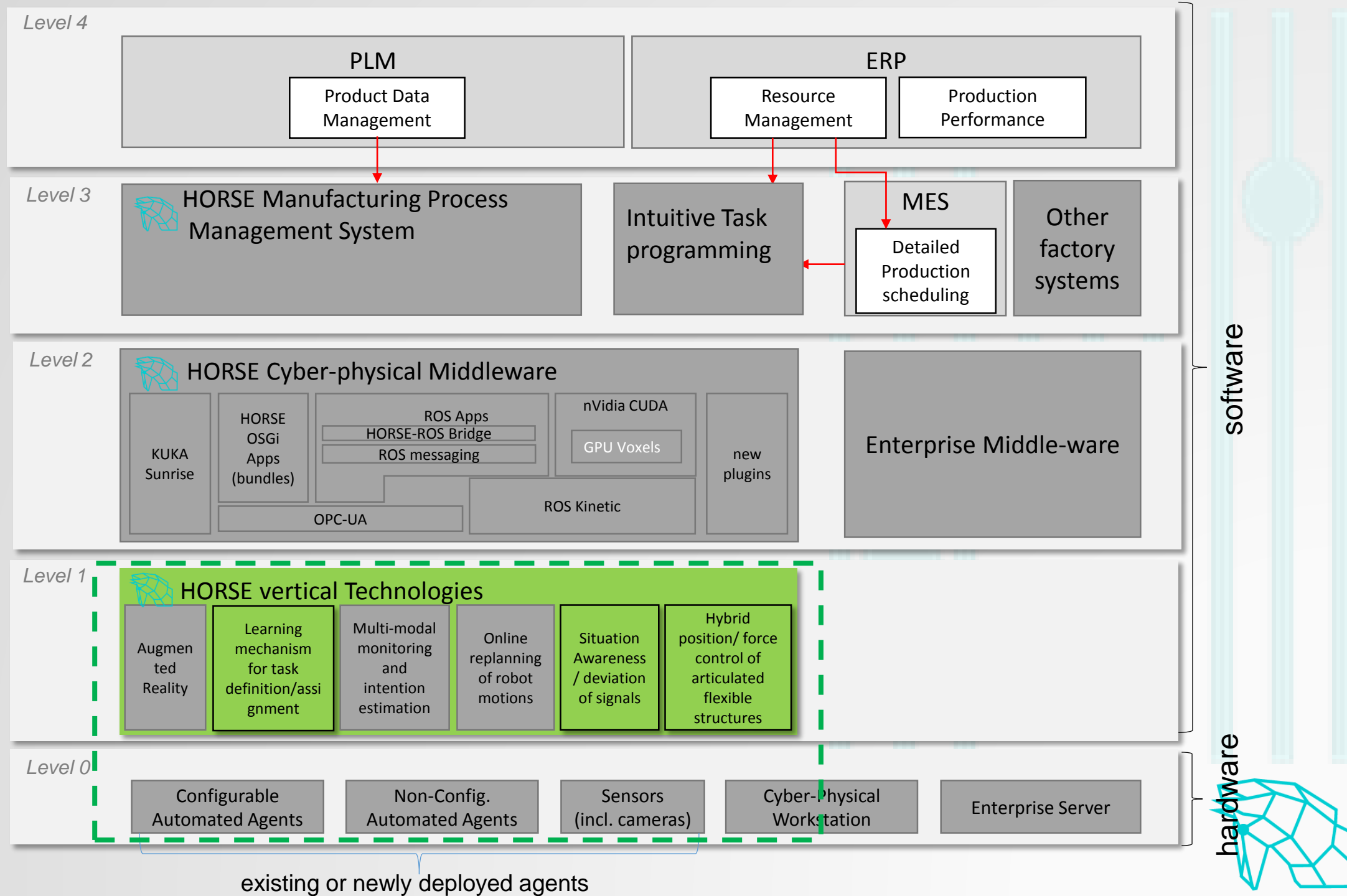












Preparing applications

# Call details

Opening date: 01.12.2017

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

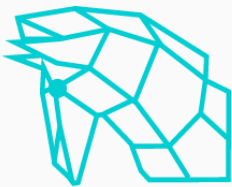
Call information: <http://horse-project.eu/Open-Calls>

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!



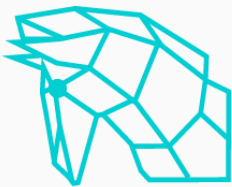
# Eligible entities

- 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

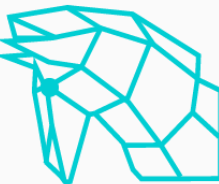
- Excellence (4 pages):
  - Context of the experiments
  - How the framework is going to be used
  - Benefits for HORSE (new components, new hardware, validation)
- Impact (2 pages):
  - Helping the end-user
  - Validating the framework
  - Promotion
  - Extension of the framework





# 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



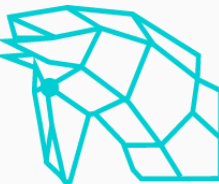
# Evaluation criteria

1. Expected impact	Weight: 35%
<ul style="list-style-type: none"> <li>End-user's performance, efficiency, quality or/and production flexibility increase due to adaptation of the framework</li> <li>Potential to address future/wider applications within the targeted industry or in general.</li> <li>Increased functionalities of the framework (software and hardware components)</li> <li>Impact assessment approach and KPIs</li> </ul>	Score: ? / 10 (Threshold: 8/10)
2. Technical excellence	Weight: 35%
<ul style="list-style-type: none"> <li>Clarity of the adaptation/integration/extension of the framework</li> <li>Technical quality of the framework extensions – new hardware and software</li> <li>Clear added value to the validation of the framework</li> </ul>	Score: ? / 10 (Threshold: 8/10)
3. Quality of the workplan	Weight: 30%
<ul style="list-style-type: none"> <li>Coherence, appropriateness, effectiveness of the overall implementation and integration approach</li> <li>Workplan appropriateness and scheduling</li> <li>Risk management</li> <li>Coverage of the necessary competences</li> </ul>	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

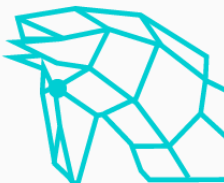
- Proposal submission via a web platform at: <http://opencalls.horse-project.eu>
- Proposal consists of:
  - Completed and uploaded proposal template
  - Completed web forms
- The last version submitted before the deadline will be considered for evaluation
- Submissions are confirmed by an acknowledgment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



Support for application  
execution

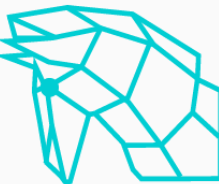
# General help

- FAQ on the <http://horse-project.eu/Open-Calls> website
- For questions not covered in FAQ: [opencalls@horse-project.eu](mailto:opencalls@horse-project.eu)
- Webinars:
  - December, 13<sup>th</sup> 10:00 CET  
[http://i4ms.eu/webinar/horse\\_webinar\\_registration.php](http://i4ms.eu/webinar/horse_webinar_registration.php)
  - Next one in January



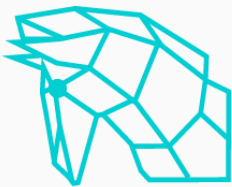
# HORSE Brokerage Tool

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



# Pre-proposals

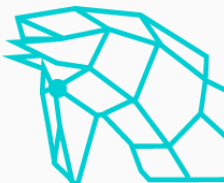
- Can be submitted during the first 9 weeks of the call via the submission platform
- A member of the consortium will verify if the proposal fits the scope and how it can be improved
- It is not mandatory to submit a preproposal and it does not influence the evaluation of the full application





# 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](mailto:opencalls@horse-project.eu)
- Webinar: [http://i4ms.eu/webinar/horse\\_webinar\\_registration.php](http://i4ms.eu/webinar/horse_webinar_registration.php)
- Brokerage: <http://horse-project.eu/Open-Calls-Brokerage>