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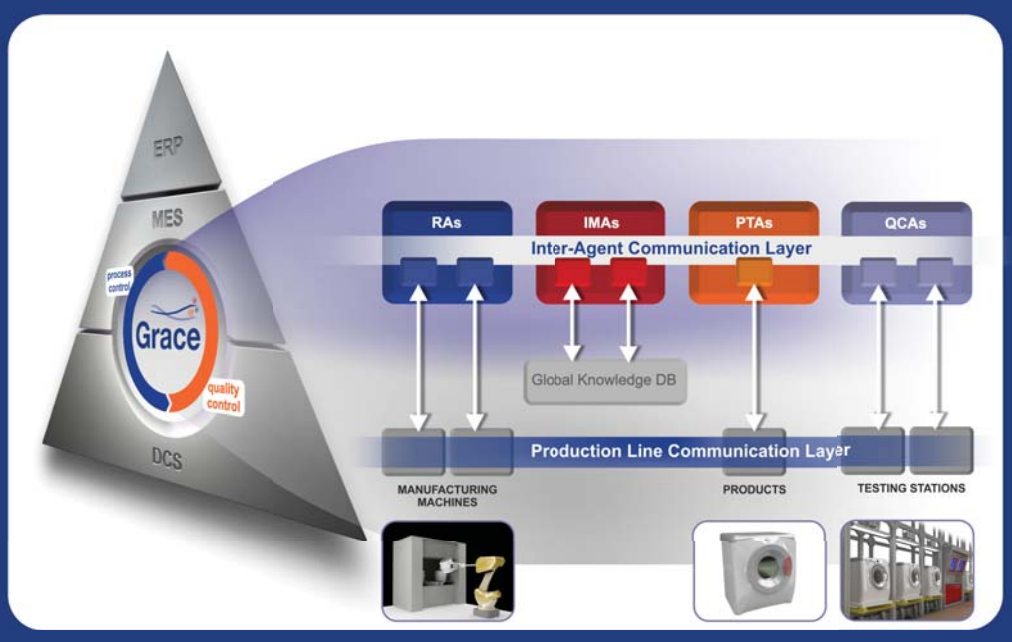
Grace

inteGration of pRocess and quAlity Control using multi-agEnt technology

The main objective of GRACE is to develop and validate a collaborative Multi-Agent System (MAS) which operates at all stages of a production line.
This new vision of the production system leads to a full integration of the process control with quality control at local and global levels.
The approach will be demonstrated on a real case study, by implementing GRACE MAS architecture on a washing machines production line.

Peculiarity of this project is to consider adaptability, self-optimization and self-learning at different levels: manufacturing processes and assembly processes, measurement processes in charge of quality control, and also the product under test.



Main entities defined within the architecture

Resource Agents (RA) which perform the supervisory control of the physical devices they are associated with.

Quality Control Agents (QCA) which are associated to the quality control functions and are dedicated to implement the testing/quality control on parts and on the final product.

Product Traceability Agents (PTA) which are associated to each product being produced in the factory plant. They will interact with resource agents for process control and with quality control agents for the quality control.

Independent Meta-Agents (IMA) which will implement a global supervisory control, optimized planning and decision-making mechanisms. They receive data, features and decisions of all individual agents, and also feed data to the Global Knowledge Data Base.

GRACE architecture can be applied to different areas of manufacturing, leading to benefits in terms of

- Fast integration of GRACE architecture in case of upgrading of a production line
- Flexibility to desired variation of process set points and process variables
- Self adaptability to unplanned fluctuations of process/product parameters
- Improvement of final product quality
- Maximization of production efficiency (more efficient management of resources)
- Improvement of factory level decision making strategies
- Dynamic reconfiguration of the production process and quality control stations (plug-and-participate philosophy)

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