

DISTRIBUTION OF SOFTWARE BETWEEN RECONFIGURABLE MANUFACTURING SYSTEMS

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The scientific-technical problem is to organize the device manufacturing process using reconfigurable manufacturing systems software. Controlled with a software machines are the unit of reconfigurable plant. It is received to classify the machine software according to its place in a reconfigurable plant. Autonomous, remote, virtual and distributed software for reconfigurable manufacturing systems (RMS) is described. Autonomous component software is placed inside the RMS itself. Remote component software is placed in the RMS physical server. Virtual component software is placed the RMS cloud server. Distributed component software is placed simultaneously in all infrastructure components of a RMS with its own hardware. The functional schemes are received for the hardware and software RMS in the two level: physical and virtual.

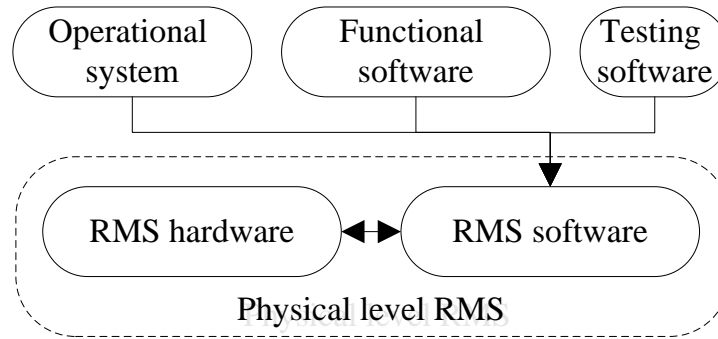


Figure 1. Autonomous software components functional scheme in the RMSs.

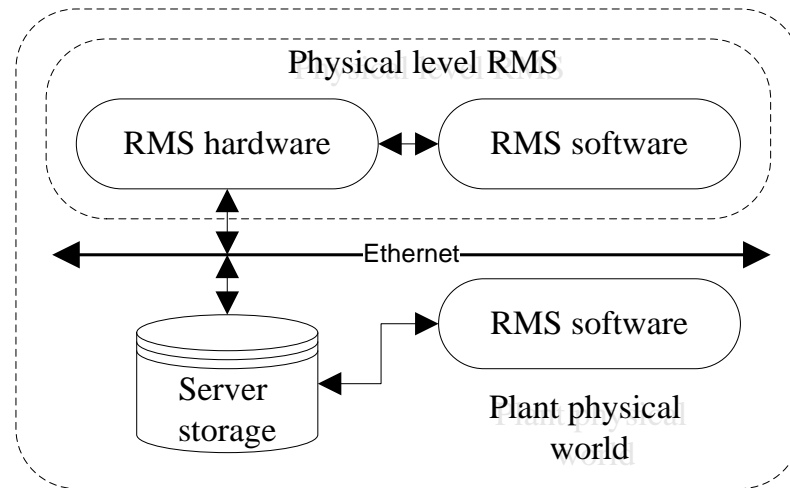


Figure 2. Remote software components functional scheme in the RMS.

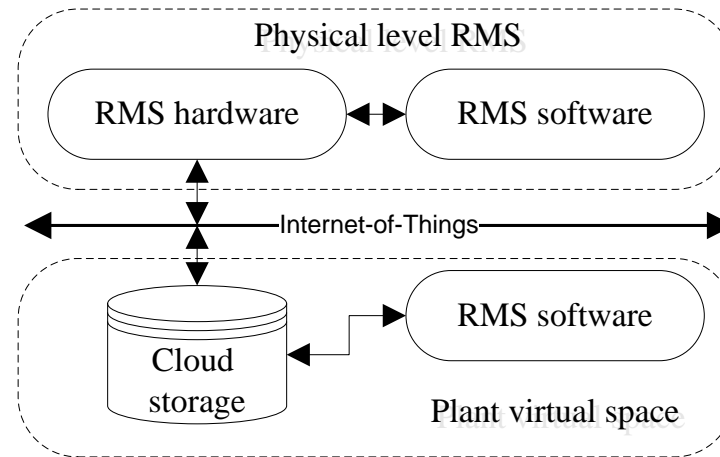


Figure 3. Software virtual components functional scheme in the RMS.

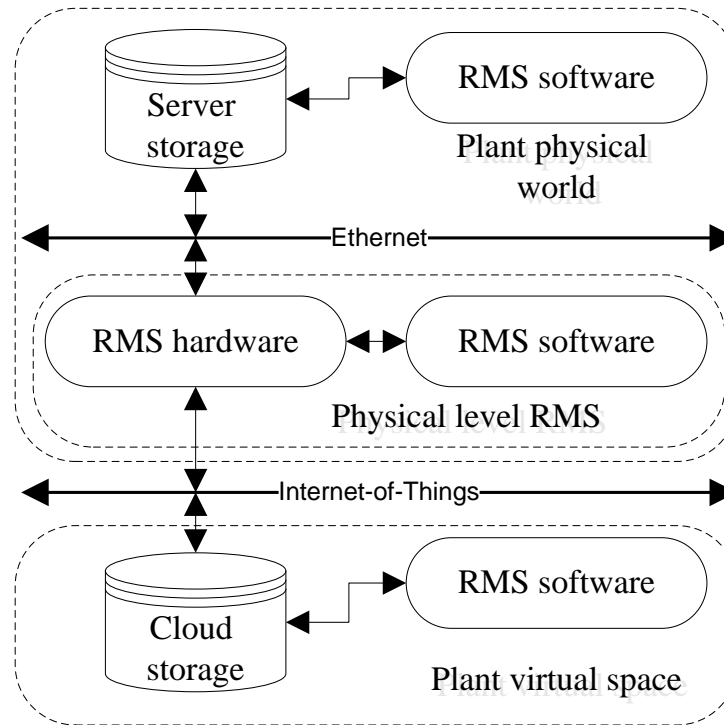


Figure 4. Distributed software components functional scheme in the RMS.

The projection of RMS plants based on automatic reconfigurable robotic workcells helps to show a number of properties among, which the most important for the project solution are:

- multi-processing, which means each component of the reconfigurable plant engaged in the device manufacturing completion has a calculation platform functioning with a software;
- multi-link, which means all RMSs, server and cloud, the plant warehouse and mobile RMS are united with communication calculation environment of the plant data transition;
- multi-devices, which means all RMSs are narrowly specialized and to organize a manufacturing of device it is required several autonomous RMSs;
- multi-image, which means that all RMS elements have an image in the physical RMS and an equivalent image in the cloud RMS.

So reconfigurable plant is a complex of physical RMSs and software RMSs for technological and computer components with open architecture. RMS highly-productive computer resources, high-level RMS programming languages, high-speed channels of information data exchange among RMSs and plants cloud are key components and necessary methods to create a perspective reconfigurable plant.

To organize plants process of a device manufacturing the most perspective scheme of software placement in a RMS is a distributed scheme. The distributed software helps to create exchange of plant data and to organize a computer process in a plant with the rules of open specifications, which gives the projection perspective of scaled automatic reconfigurable factory. A scaled reconfigurable plant may integrate new RMSs or entire industrial lines without significant change of the existing plant in the company, in the hardware and in the software level.