



Bosch presents concept for vertical integration

Rule-based machine integration to IT services for Industry 4.0

At Hannover Fair Bosch Software Innovations and Bosch Rexroth present a new concept for vertical integration. This allows users to trigger business processes in production without any programming knowledge.

Rule-based data management

Vertical integration, from the machine and the device level up to the business process and planning level is an essential component for the digital factory.

The interaction of the control platform IndraMotion MLC and the Business Rules Management component of Bosch IoT Suite offers new potentials and freedom for users to interlink machine events and IT processes by means of rules and services. The machine user can model the required rules using graphic tools and port them via the Open Core Interface to the control. The rules run in parallel to the classic PLC program directly on the control.

Business process decisions are made based on analyzed machine data, quality and process data. Machine optimizations or defined actions like sending e-mails and call IT services can be triggered automatically in depending on the individual machine state.

Dynamic evaluation of data

During the entire service life of the machine, the user can flexibly make alterations: He can change existing rules at any time, model new rules and transmit them to the control during operation without changing the machine program.

This concept provides ease of integration of plants into the environment of Industry 4.0 and stands for a paradigm shift in mechanical engineering: From programming to the orchestration of services based on re-usable rule models. Thus, the solution allows a user-friendly entry into the world of networked production through open interfaces and ease of operation.

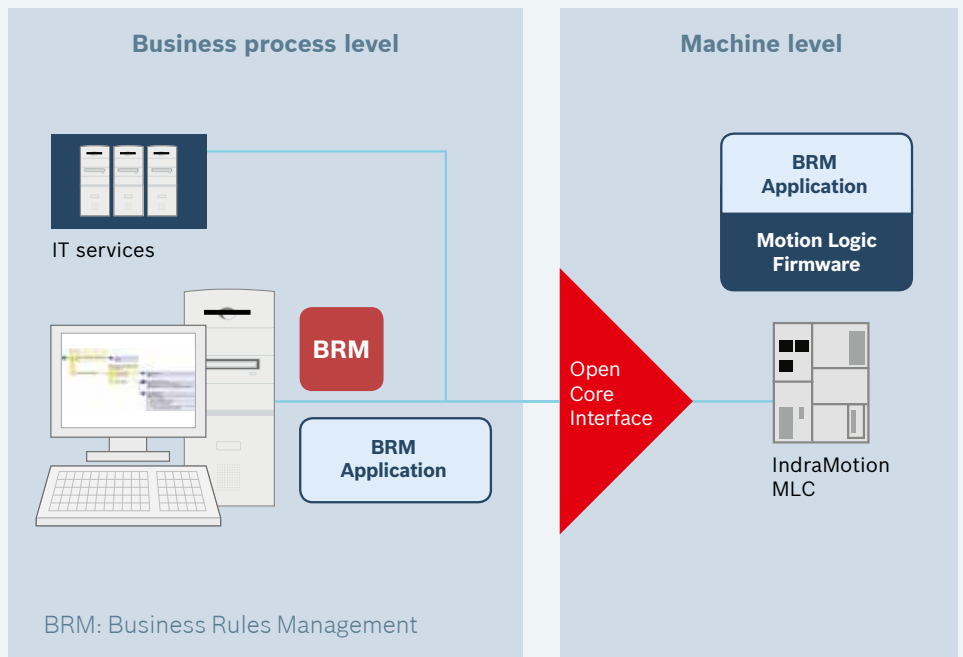
Driven by Industry 4.0, business software evaluates more and more data from the production process. To this end, the Java-based Business Rules Management easily connects to the control.

Highlights

- ▶ Creation of business rules by means of the Business Rules Management component of Bosch IoT Suite
- ▶ Plug-and-play with vertical integration on the basis of Open Core Engineering
- ▶ Rule-based analysis of machine data and derivation for the business processes (e.g. automatic material supply)
- ▶ No programming knowledge required
- ▶ Adaptation of rules possible during operation without having to change the machine program



For this, Bosch Rexroth offers a library for the creation of Java applications on external devices. Thanks to the Open Core Interface users get direct access to shared machine data. The Java applications run in parallel on a Java Virtual Machine within an OSGi framework on the control IndraMotion MLC.



The combination of Business Rules Management and IndraMotion MLC allows to run the customer specific BRM-application either on a PC or on the control hardware itself.

Rule-based machine integration at Hannover Fair 2015

The new concept of rule-based machine automation developed in a cooperation project of Bosch Software Innovations and Bosch Rexroth is presented for the first time at Hannover Fair 2015:

**Joint booth
in hall 7/E04**



- ▶ Simple implementation and change of technical business rules
- ▶ Trigger cycle time analysis by means of Business Rules Management
- ▶ Use Case: Re-ordering of spare parts
- ▶ Access to control variables

**Booth of the Smart Factory KL
in hall 8/D20**



- ▶ Machine twitters its state
- ▶ Calling of the Twitter service by means of BRM on the basis of machine data
 - ▶ Twitter as an example of any IT service
- ▶ Notifications on the production status
- ▶ Multi-touch HMI with Twitter webpage

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