Modeling & Simulation
Virtual commissioning
**Integration.** The generated code is seamlessly integrated into B&R’s entire hardware and software portfolio. The virtual model can be used to perform every aspect of software development, from function testing to virtual commissioning.

**Code generation.** From the model, it is possible to automatically generate an entire program or individual function block in C, C++ or any IEC 61131-3 language. This ensures a high level of reusability and flexibility throughout hardware-in-the-loop (HiL) testing, rapid prototyping and series production.

**Commissioning.** Virtual commissioning accelerates and streamlines the process of commissioning the actual machine. It minimizes risk and ensures that project deadlines and quality targets are met reliably.

**Verification.** Testing performed during virtual commissioning can range from simple logical sequences to complex, critical scenarios to ensure the overall efficiency and quality of the machine’s hardware and software.

**Requirements.** During the requirements phase, the scope and level of detail needed for the simulation are defined. Though it is generally enough to model only certain parts of the machine, in some cases a full model of the machine is required – including infrastructure and material transport.

**Conceptual design.** A simulation concept is developed to meet the defined requirements, which determines which simulation tools will be used. B&R offers an array of tools for different types of simulation.

**Modeling.** The scope of a model can vary greatly – from a simple control loop to a mechatronic machine unit or even a full simulation of an entire production process.

**Simulation.** The model is tested by simulating a variety of defined scenarios. Through an iterative process of testing and verification supported by diagnostic tools and 3D graphics, the model is continually refined as components are sized.
Open interfaces

An open solution is a future-proof solution. Open standards and interfaces let you to work with the tools you are most comfortable using. They enable machines to communicate effortlessly with external systems, and by allowing you to reuse existing software for future solutions, they free up valuable time to get your product to market faster. B&R offers openness on all levels and in all products.

- **Seamless integration**
  - IEC 61131, C, C++, OPC

- **Simulation**
  - MATLAB, MapleSim, ISG, FMI, industrialPhysics

- **E-CAD systems**
  - Round-trip engineering with EPLAN Electric P8

- **Fieldbus systems**
  - POWERLINK, Modbus, CANopen, DeviceNet, Ethernet/IP, PROFINET, Profinet

With mapp Technology, B&R shortens software development times by an average of two-thirds. This is made possible by intelligent software blocks that encapsulate frequently occurring basic functions. Your software engineers will be able to dedicate much more time to optimizing the core process. Since B&R takes on the responsibility for ongoing maintenance of these blocks, you’ll enjoy both improved software quality and reduced maintenance costs.

**Basic functions covered by mapp components include:**
- User and role management
- Alarm management
- Parameter management
- Load/save XML, CSV and text files
- Data recorder for temporary recording

3-times faster development

- **Simulating servo axes**
  - Simulate ACOPOS axes
  - Independently of hardware
  - Drive simulation
  - Switch seamlessly between simulation and real hardware
  - Support for all B&R ACOPOS systems
  - Enables safe, early testing

- **Automation Runtime simulation – ARSim**
  - Simulate all B&R target systems
  - Independently of hardware
  - Comprehensive diagnostic functions
  - Switch seamlessly between simulation and real hardware
  - Integrated client and service interfaces
  - OPC UA client and server interface

- **Virtual Network Computing – VNC**
  - Visualization with no additional work
  - HMI application on the intranet
  - Various user profiles, views, user levels
  - Password-protected access
  - Platform-independent implementation of the VNC viewer for all standard operating systems

**Modeling and simulation**

Find out more about simulation with B&R at www.br-automation.com/modeling-simulation
Simulation on many different levels

In the age of Industrial IoT, simulation has become an indispensable tool in the development of automation technology. With seamless interaction between development tools, simulation facilitates a high degree of flexibility and efficient resource management. These qualities make it ideal for achieving optimal utilization of development resources and reducing commissioning times by up to 80%. B&R fully integrates simulation at all levels of its solutions.

Automatic generation of Simulink code

Automation Studio Target for Simulink offers an interface for automatic code generation from MATLAB/Simulink for B&R target systems. The MATLAB/Simulink and Automation Studio simulation and development tools allow you to move from developing a model to generating high-quality program code in a matter of minutes. The languages C, C++ and Structured Text (specified in IEC 61131-3) are supported. Model-based development using MATLAB and Simulink improves production quality and reduces development times.

Scalability+

01 Your machine technology

- Machine options as plug-ins
- Choice of programming language
- Powerful mechatronics libraries

02 Our technology packages

- Ultrafast automation
- Extensive closed-loop control libraries
- Integrated robotics and CNC functions

03 Integrated automation

- Modular application software
- Hardware-independent software development
- Integrated web-based diagnostics
- The perfect hardware for each application
- Cost-effective, high-performance solutions

Functional Mock-up Interface

Plug and model – that is the principle behind the Functional Mock-up Interface (FMI). FMI is an independent industry standard. It enables models to be exchanged and simulated using various development tools. B&R offers a mechanism for importing Functional Mock-up Units (FMU) in accordance with the FMI 2.0 standard. FMUs are seamlessly integrated as function blocks in Automation Studio.
Integrated automation
Global presence
Solid partnership