

Simulation vs. Emulation – what is what?

**A compact overview for everyone
who plans production and logistics
processes digitally.**

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What is simulation?

Simulation analyzes systems using digital models.

Behavior is simulated realistically to understand processes, identify bottlenecks, and compare scenarios.



What is emulation?

Emulation replaces real controllers with a virtual model. The model "talks" to real software like a physical system – ideal for PLC testing and commissioning.



When does simulation make sense?

- **Variant comparison**
- **Capacity planning**
- **Layout evaluation**
- **Risk-free tests before implementation**

When does emulation make sense?

- **Virtual commissioning**
- **PLC tests without hardware**
- **Debugging of control logic**
- **Reduction of downtimes**

Similarities and differences

Simulation = analysis tool

Simulations analyze processes and compare variants without interfering with ongoing operations. They support decisions regarding investments, layouts, and capacities.

Emulation = test environment

Emulations depict system behavior so realistically that controllers can be directly connected and tested – often even before actual commissioning.



When is what used?

Simulation is usually used in the early planning phase when processes need to be designed, variants compared, or investments secured.

Emulation comes later, typically from the moment when controllers are developed or commissioning is prepared. It supports the technical implementation.

Practical example:

A new logistics system is first simulated to optimize the layout and later emulated to test the control software.

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Simulation and emulation pursue different goals, which is precisely why they complement each other so well. Combining both methods in a targeted manner creates the basis for sound decisions and a smooth transition to implementation.

Would you like to learn more?

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