Modeling for Reliabilty Engineering

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Abstract

Reliability engineering may gain from using executable models such as simulations. However, core in achieving reliability is understanding of the system, and its behavior in its actual context. This requires conceptual models complementing executable models.

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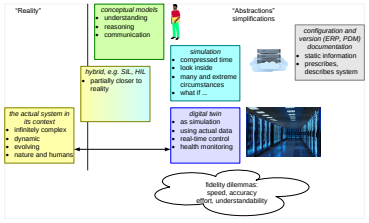
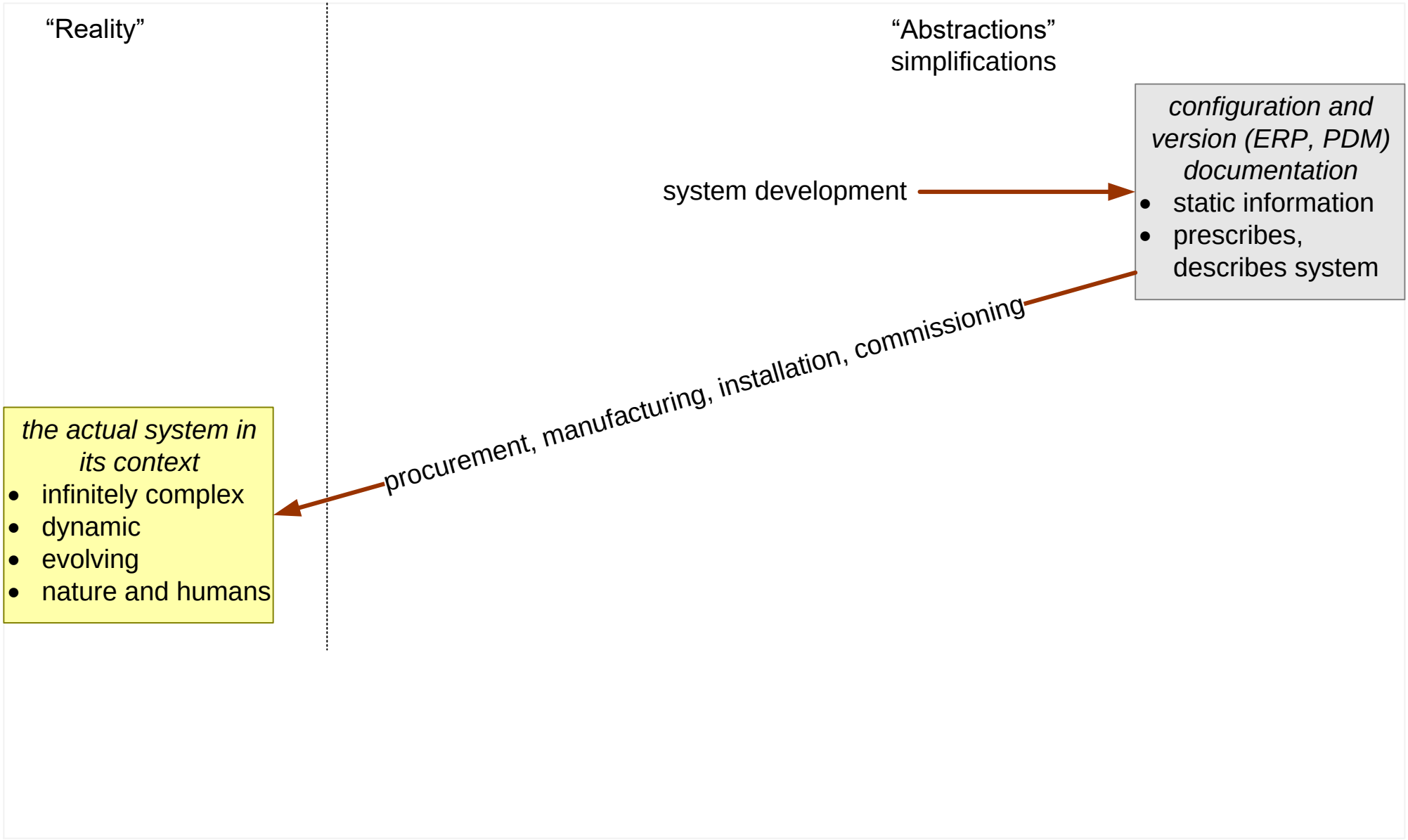


The system

the actual system in its context

- infinitely complex
- dynamic
- evolving
- nature and humans

Developing, Building and Operating



Simulating

“Reality”

“Abstractions”
simplifications

the actual system in its context
- infinitely complex
- dynamic
- evolving
- nature and humans

simulation
- compressed time
- look inside
- many and extreme circumstances
- what if ...

configuration and version (ERP, PDM) documentation
- static information
- prescribes, describes system

Hybrid simulators

“Reality”

“Abstractions”
simplifications

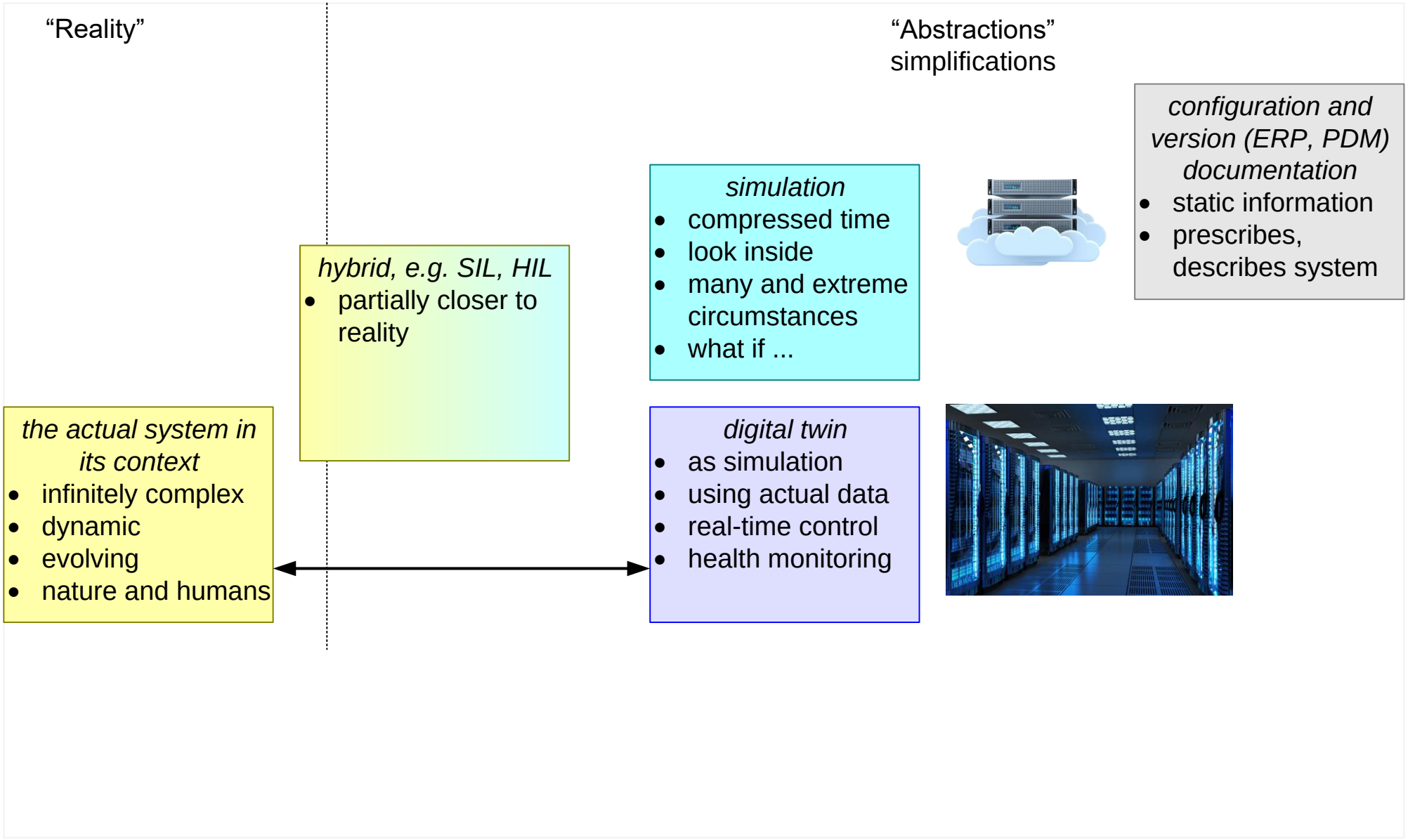
the actual system in its context
- infinitely complex
- dynamic
- evolving
- nature and humans

hybrid, e.g. SIL, HIL
- partially closer to reality

simulation
- compressed time
- look inside
- many and extreme circumstances
- what if ...

configuration and version (ERP, PDM) documentation
- static information
- prescribes, describes system

Digital Twin



Conceptual Models

"Reality"

conceptual models
- understanding
- reasoning
- communication

"Abstractions"
simplifications

configuration and version (ERP, PDM) documentation
- static information
- prescribes, describes system

simulation
- compressed time
- look inside
- many and extreme circumstances
- what if ...

hybrid, e.g. SIL, HIL
- partially closer to reality

the actual system in its context
- infinitely complex
- dynamic
- evolving
- nature and humans

digital twin
- as simulation
- using actual data
- real-time control

The Modeling Playing Field