



# 21. The SAP R/3 Framework

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# References (non-oblig.)

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- ▶ W.M.P. van der Aalst. Formalization and verification of event-driven process chains. *Information and Software Technology*, 41(10):639-650, 1999.
- ▶ Thomas Aidan Curran, Gerhard Keller. *SAP R/3 Business Blueprint*. Addison-Wesley 1999.
- ▶ Gerhard Keller, Thomas Teufel. *SAP R/3 prozessorientiert anwenden*. Addison-Wesley, 1998. Enthält die Haupt-Workflows des Business Blueprint.

# Problem

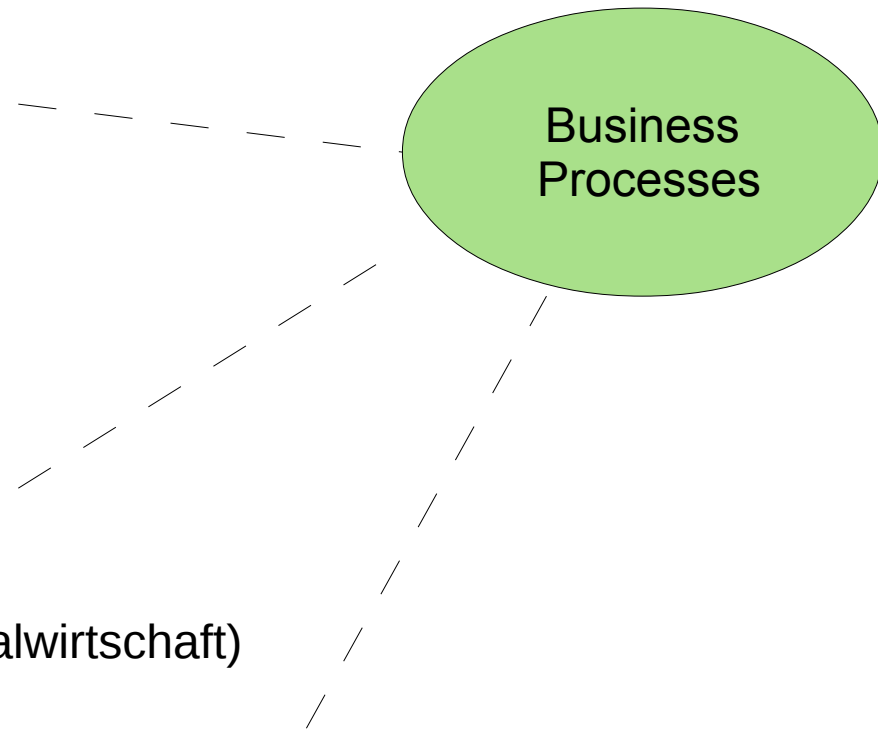
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- ▶ How to build a framework for Business Software?
- ▶ Software/Anwendungen/Produkte (SAP) Walldorf, founded 1972
  - Most of the Fortune 500 companies use SAP
- ▶ SAP R/2: Mainframe solution
- ▶ SAP R/3 1988-today. Client-server 3-tier
  - ABAP language with simple use of databases
  - Workflow specifications with Ereignis-gesteuerte Prozessketten (EPK)
  - Business blueprint: prefabricated processes for installation of the framework at the customer
- ▶ Future: SAP NetWeaver
  - Fully Java- and web-based

# Modules of R/3 3.0

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- ▶ Internals
  - FI Financials (Finanzwesen)
  - CO Controlling
  - AM Anlagenwirtschaft
  - PS Projektsystem
- ▶ Miscellaneous
  - OC Office&Communication
  - IS Branchenlösungen
- ▶ Core
  - SD Distribution (Vertrieb)
  - MM Material management (Materialwirtschaft)
  - PP Production planning
  - QM Quality management
  - PM Instandhaltung
- ▶ HR Human Resources (Personalwirtschaft)

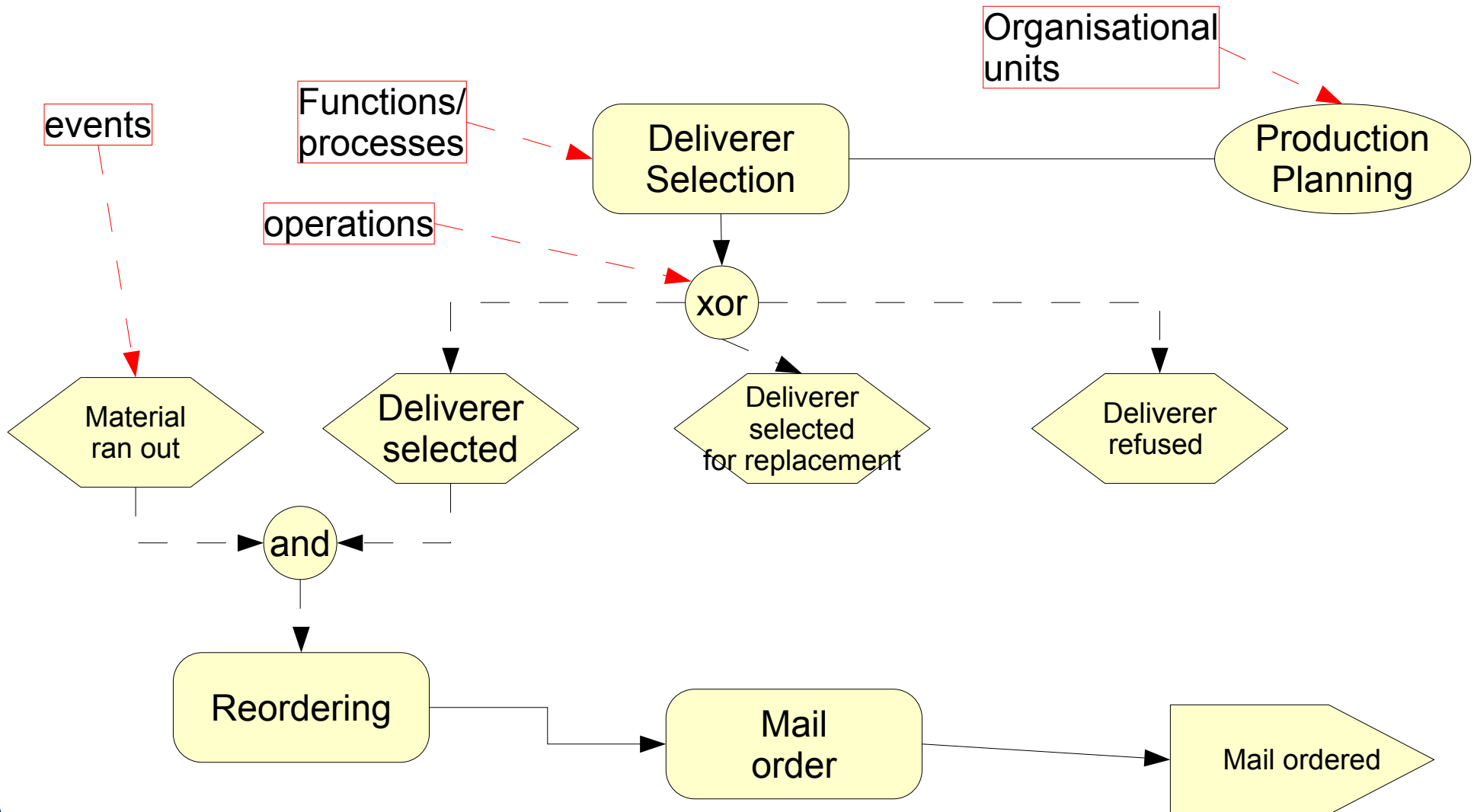


# Workflow Specifications with EPK

(Ereignisgesteuerte Prozessketten)

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- ▶ The SAP framework is steered by business workflow specifications
  - EPC (Event-driven process chains) specify processes that communicate with events



# Business Blueprint Process Framework

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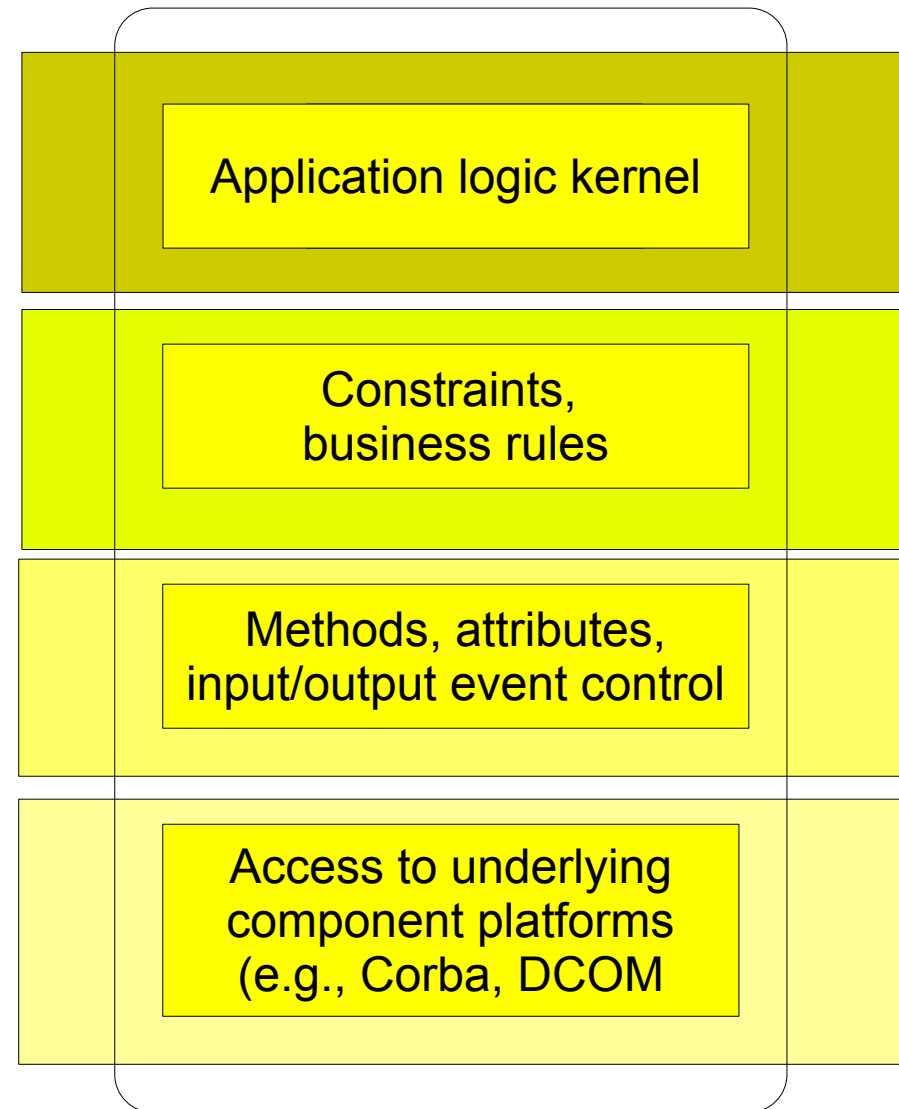
- ▶ The Business Blueprint are a collection of business process templates
  - EPK specification templates with *hooks*
  - The specifications are parameterized and adapted for concrete business processes
- ▶ They form a ***process framework*** for business process based applications
  - They conform to the template/hook principle, but rely on substitution
  - They are invasive specification components (see *invasive composition*, CBSE in summer).

**Business blueprints are business process frameworks**

# R/3 Repository

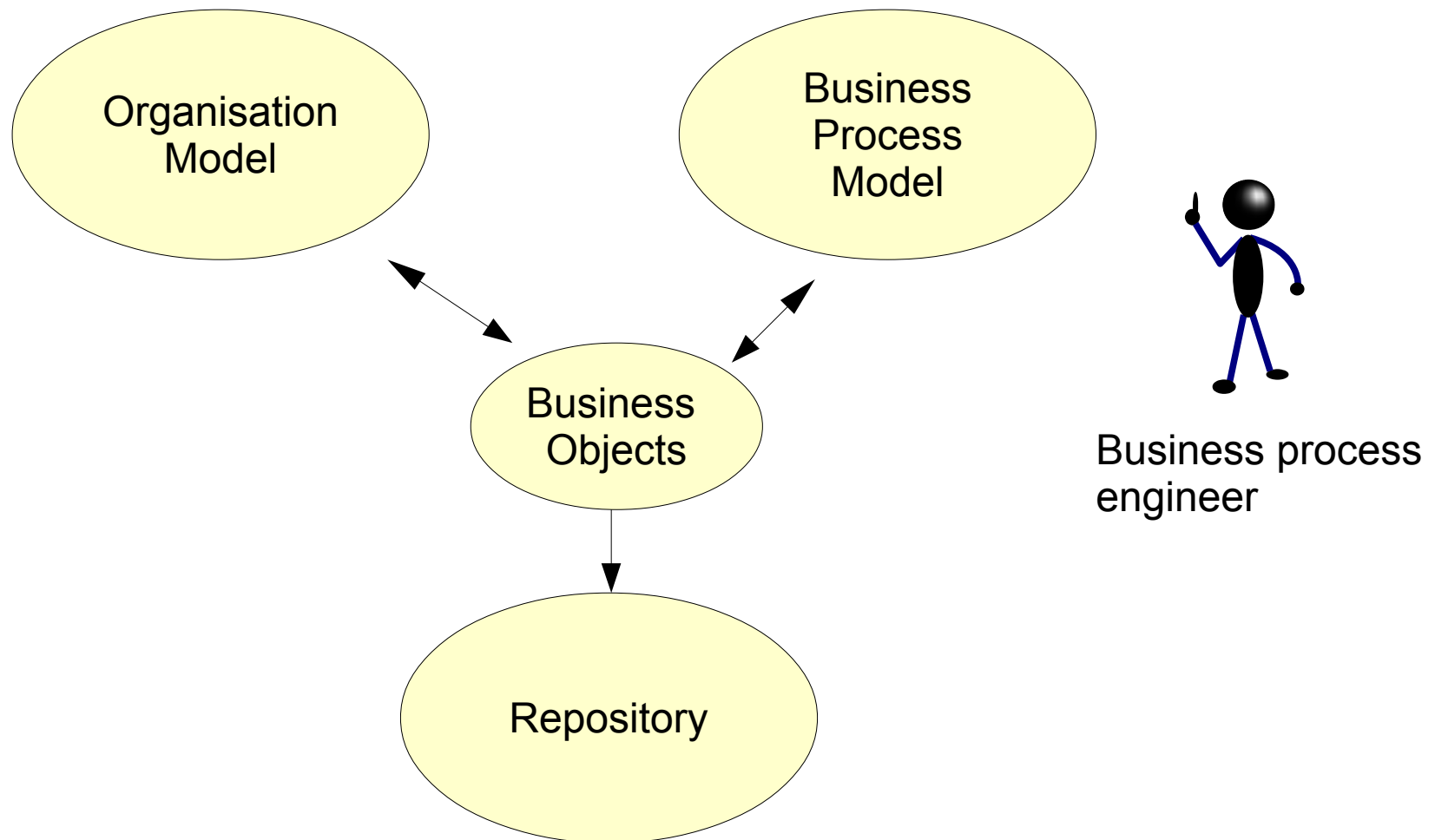
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- ▶ Distributed with Application Link Enabling (ALE)
  - An intelligent middleware layer that distributes repositories over several databases
- ▶ Stores Business Objects with interfaces (business application interfaces, BAPI)
  - > 170 Business Objects are predefined
  - Encapsulate well-known business knowledge
- ▶ A business object is a layered object
  - Internally, it maintains an entire data model (business object data model)
- ▶ The set of business objects forms a layered framework



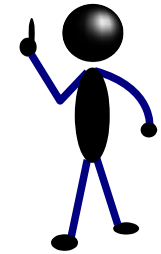
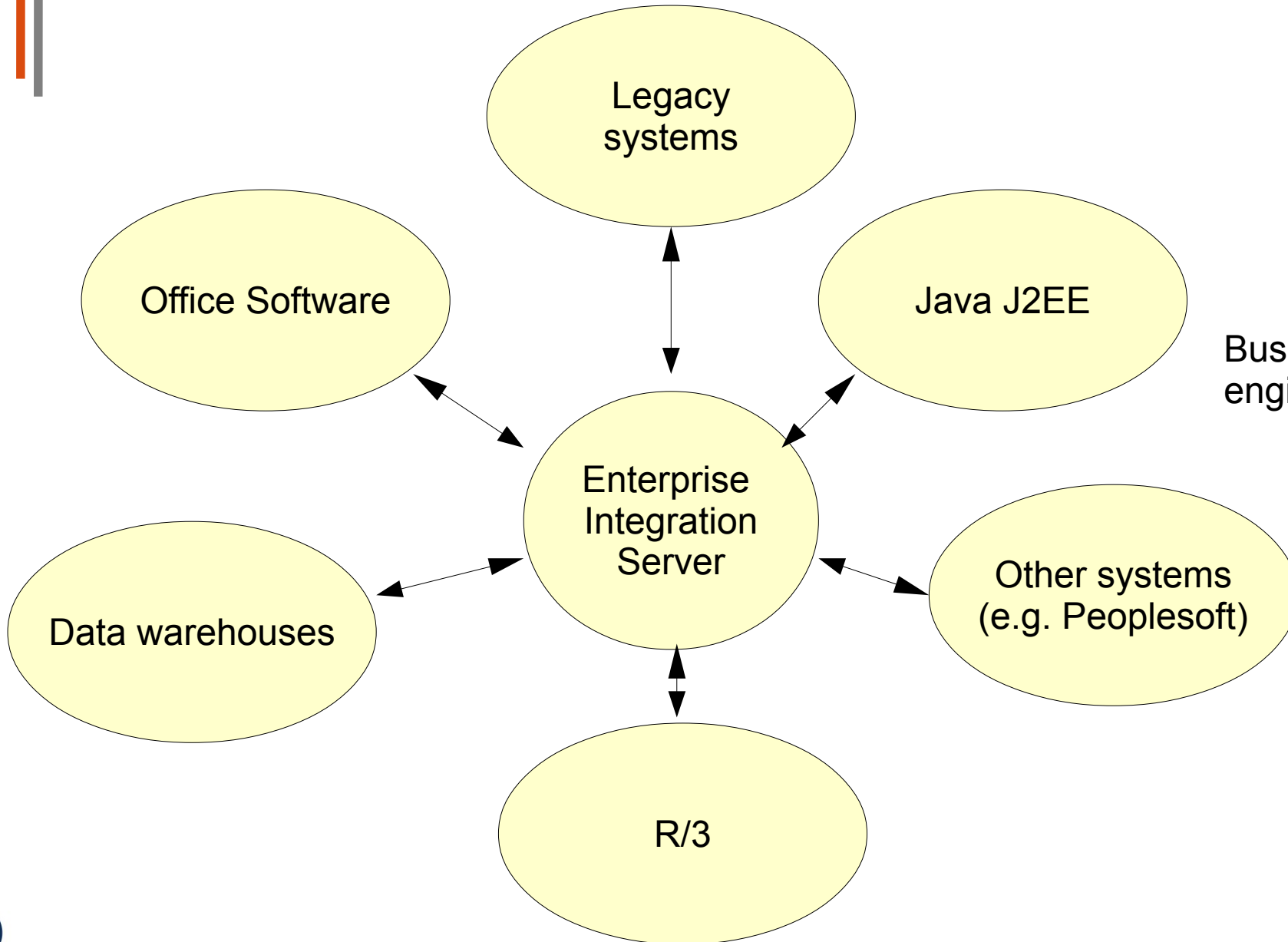
# Engineering with R/3

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# Business Application Integration



Business process engineer

# Insight: A Process Framework needs a Process Specification Language

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- ▶ If the framework is used for processes, we need a process specification language
  - Similar to web service area (enterprise services)
- ▶ Process languages
  - Petri nets (YAFL), Process languages
  - More in summer (CBSE)

**Business frameworks rely on process execution engines**

# The End

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- ▶ [www.sap.com](http://www.sap.com)
- ▶ SAP's research lab at TU Dresden
  - Director Dr. Hackenbroich
  - Chemnitzer Str 43, 3<sup>rd</sup> floor
  - Thematic area “Future Manufacturing Systems”
- ▶ Course “Enterprise Software” in winter period (Prof. Dr. Uwe Kubach)