21. The SAP R/3 Framework

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References (non-oblig.)

► 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.
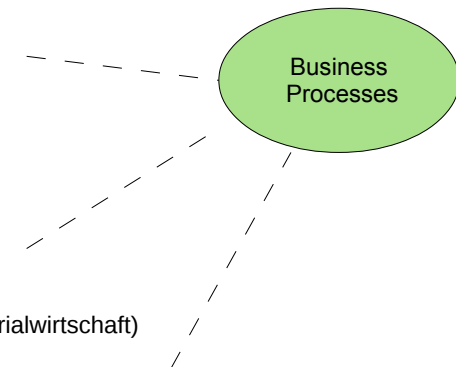
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Problem

► 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 plueprint: prefabricated processes for installation of the framework at the customer
► Future: SAP NetWeaver
  ▪ Fully Java- and web-based

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Modules of R/3 3.0

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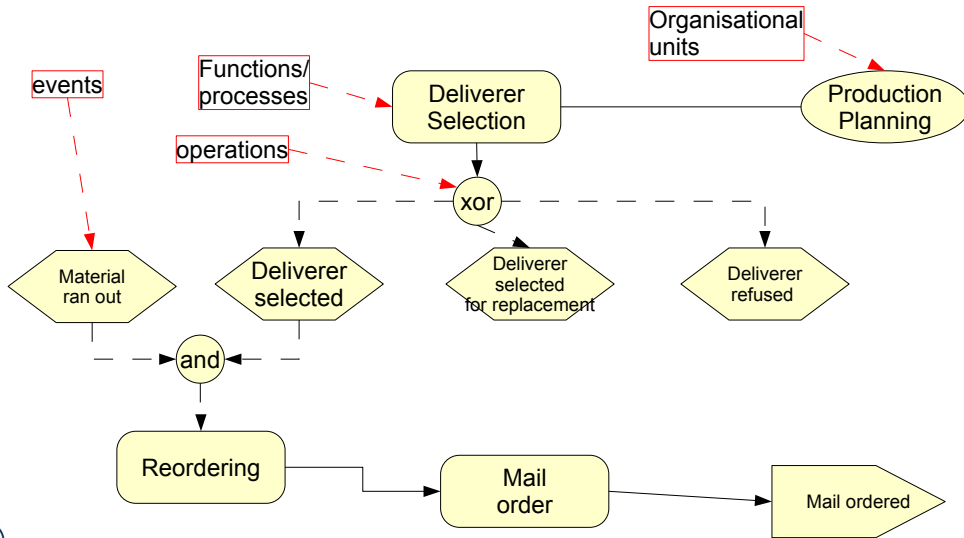► HR Human Resources (Personalwirtschaft)

Business Processes

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Workflow Specifications with EPK
(Ereignisgesteuerte Prozessketten)

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

Organisational units

Functions/ processes

events

operations

Deliverer Selection

Production Planning

xor

Material ran out

Deliverer selected

Deliverer selected for replacement

Deliverer refused

and

Reordering

Mail order

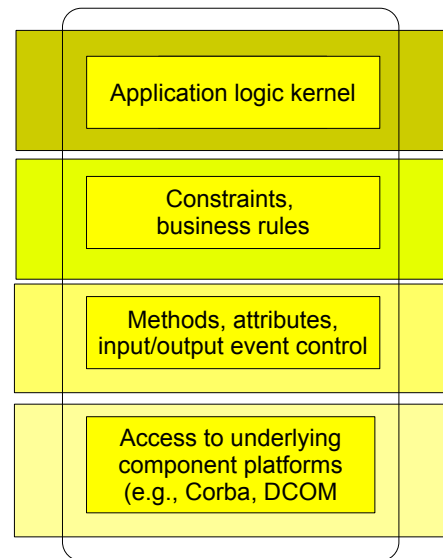Mail ordered

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Business Blueprint Process Framework

▶ 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).
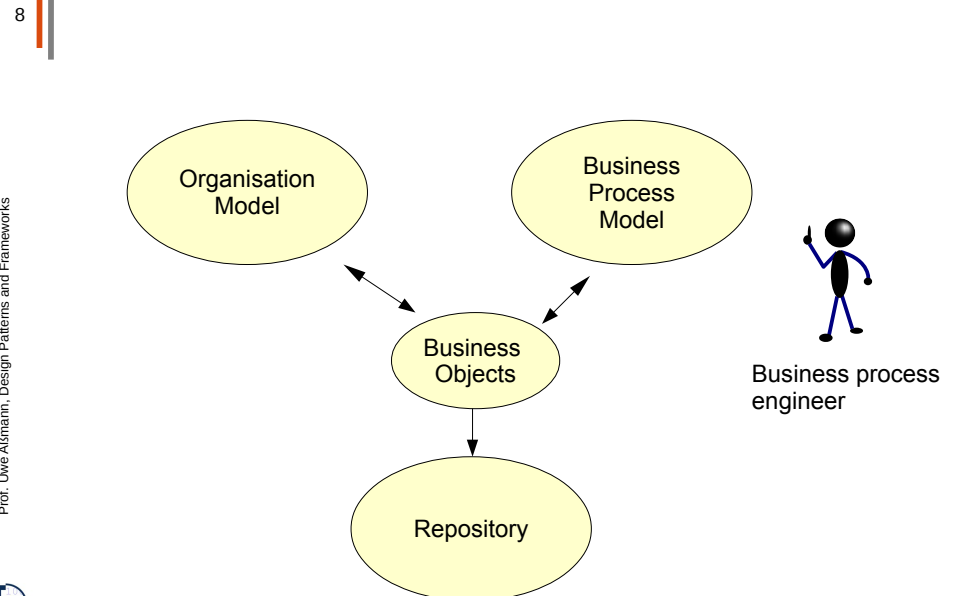
Business blueprints are business process frameworks

R/3 Repository

▶ 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

Application logic kernel

Constraints, business rules

Methods, attributes, input/output event control

Access to underlying component platforms (e.g., Corba, DCOM)

Engineering with R/3

Organisation Model

Business Process Model

Business Objects

Repository

Business process engineer

Business Application Integration

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Legacy systems

Office Software

Java J2EE

Business process engineer

Enterprise Integration Server

Data warehouses

Other systems (e.g. Peoplesoft)

R/3
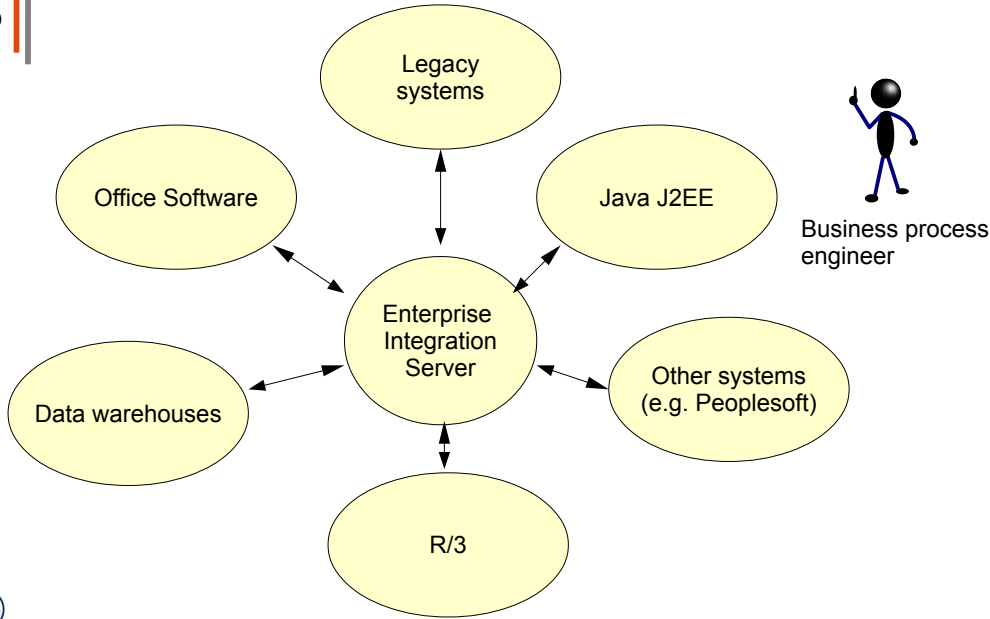
Insight: A Process Framework needs a Process Specification Language

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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
► SAP's research lab at TU Dresden
  ▪ Director Dr. Hackenbroich
  ▪ Chemnitzer Str 43, 3rd floor
  ▪ Thematic area "Future Manufacturing Systems"
► Course "Enterprise Software" in winter period (Prof. Dr. Uwe Kubach)