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Distinguished IT Architect (Open Group certified)

Enterprise IT Architectures

Business-IT Alignment, Methodologies, and Business Architecture

Agenda: Alignment Business and IT Architecture; BPM (Business Process Management)

- **Evolution Architecture Styles**
  - **Talking to Business**
  - **Alignment with Business and Goal setting**
  - **One Methodology: CBM (Component Business Modeling)**
  - *IT without value for the Business is in vain!*

- **Methodology SOMA (Service Oriented Modeling and Architecture)**

- **Standard (and Methodology) BPM (Business Process Management)**

- **Business Architecture**
  - **Independent of Technology**

Business-IT Alignment and CBM
(Component Business Modeling)

Think About: Explaining "Architecture" to Non-Architects
(most Business People are not Architects)

- **YOU must show the value of your work as Architect to your peers from the Business**

- **HOW do you explain what you are doing, HOW do YOU communicate about solutions ?**

- **HOW do you explain your job to a non-IT person (your grandma) ?**

- ***Today's Major Topic*: Talking and communicating to Business people as well as Linking Business Goals and Business Requirements to envisaged solutions**

Talking to the Business

- **Business and Architecture**

  - **There is a lot of discussion about change in business since years (e.g. Michael Hammer and James Champy, Reengineering the Corporation, 1993)**

  - **However, there is a lack of systematic approaches concerning Business Architecture and especially Business Processes**

- **Business is "constantly changing"**

  - **Remember Lehman's Laws (e.g. „A program that is used in a real-world environment necessarily must change or become progressively less useful in that environment.")**

  - **IT has to be prepared for change – however, there is the perception of various changing speeds**
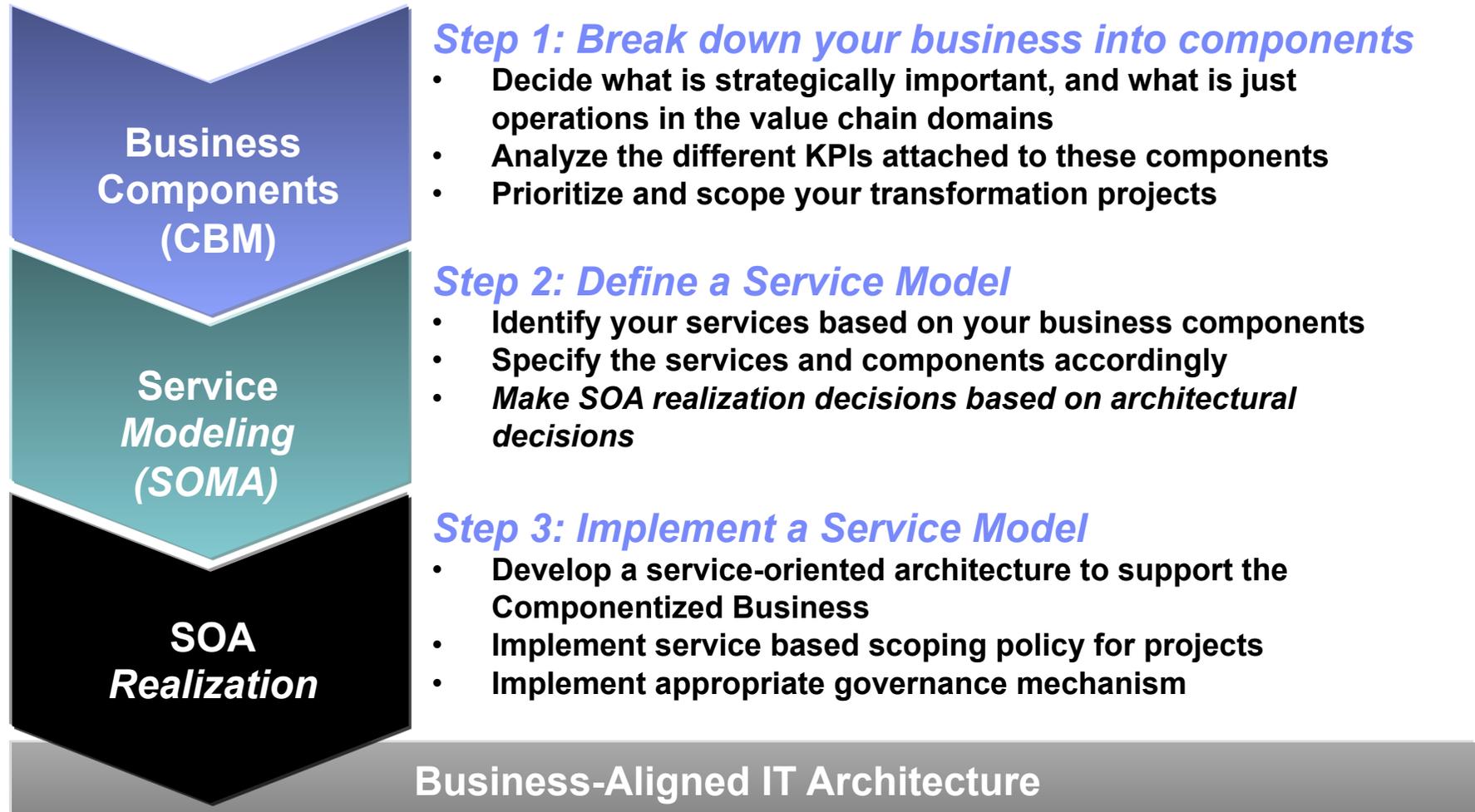
Business-IT-Alignment
(how to establish a working relationships)

- **Approaches to communicate and influence decisions**
  - **Finding out what is relevant for the Business**
  - **You should work only on topics that are needed (providing business value)**

- **Demonstrate value of solutions to the Business by**
  - **Showing how Capabilities are met**
  - **Showing how Requirements are fulfilled**
  - **Demonstrating ROI to stakeholders**

- **IT without business buy-in is meaningless**
  - **Note: Reason for failed projects is 90% Politics and 10% Technology**

Business-IT Alignment – Top-Down Approach for SOA

Business Components (CBM)

Service Modeling (SOMA)

SOA Realization

Business-Aligned IT Architecture

Step 1: Break down your business into components
- **Decide what is strategically important, and what is just operations in the value chain domains**
- **Analyze the different KPIs attached to these components**
- **Prioritize and scope your transformation projects**

Step 2: Define a Service Model
- **Identify your services based on your business components**
- **Specify the services and components accordingly**
- *Make SOA realization decisions based on architectural decisions*

Step 3: Implement a Service Model
- **Develop a service-oriented architecture to support the Componentized Business**
- **Implement service based scoping policy for projects**
- **Implement appropriate governance mechanism**

Source: IBM

Component Business Model (CBM) – Definition (1)

A **Business Component** is a part of an enterprise that has the potential to operate autonomously, for example, as a separate company, or as part of another company.

Columns are Business Competencies, defined as large business areas with characteristic skills and capabilities, for example, product development or supply chain.

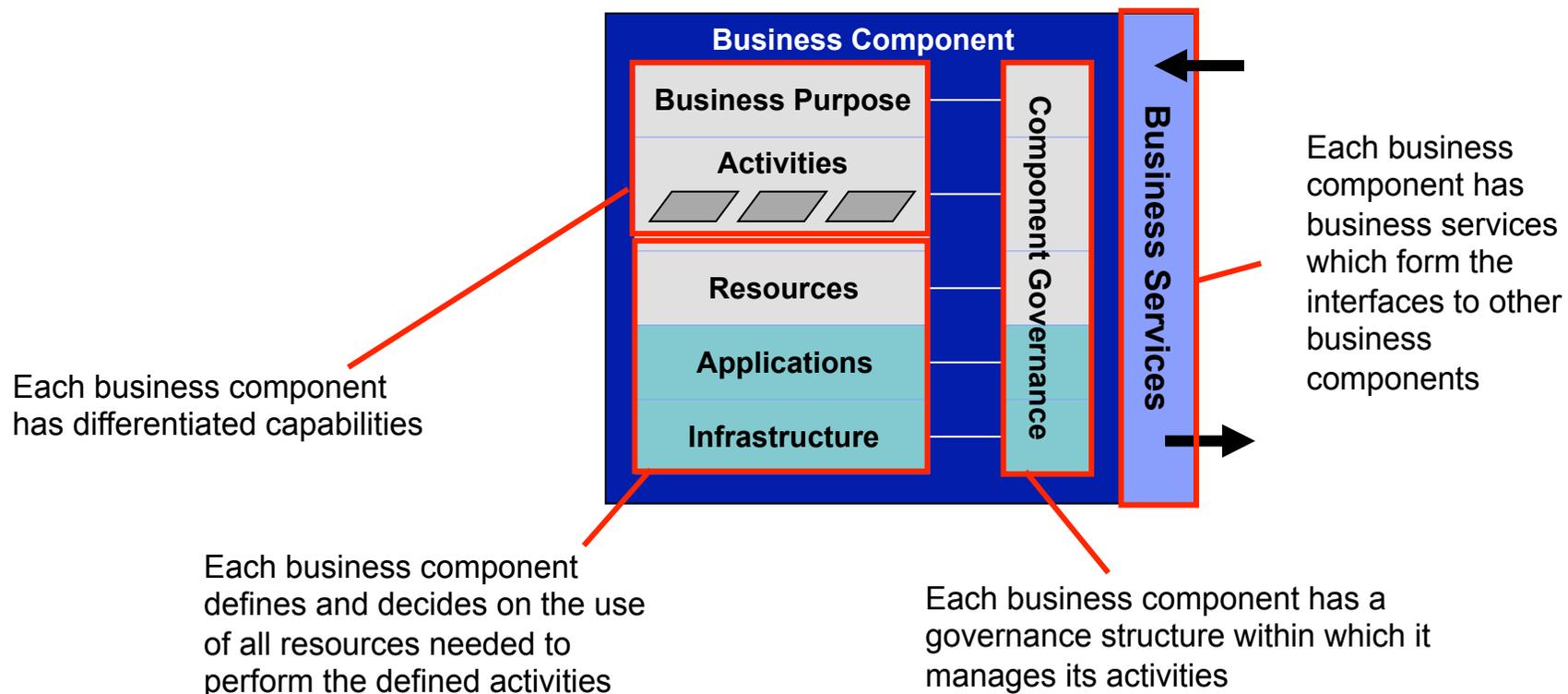An **Operational Level** characterizes the scope of decision making. The three levels used in CBM are direct, control and execute.
- Direct is about strategy, overall direction and policy.
- Control is about monitoring, managing exceptions and tactical decision making
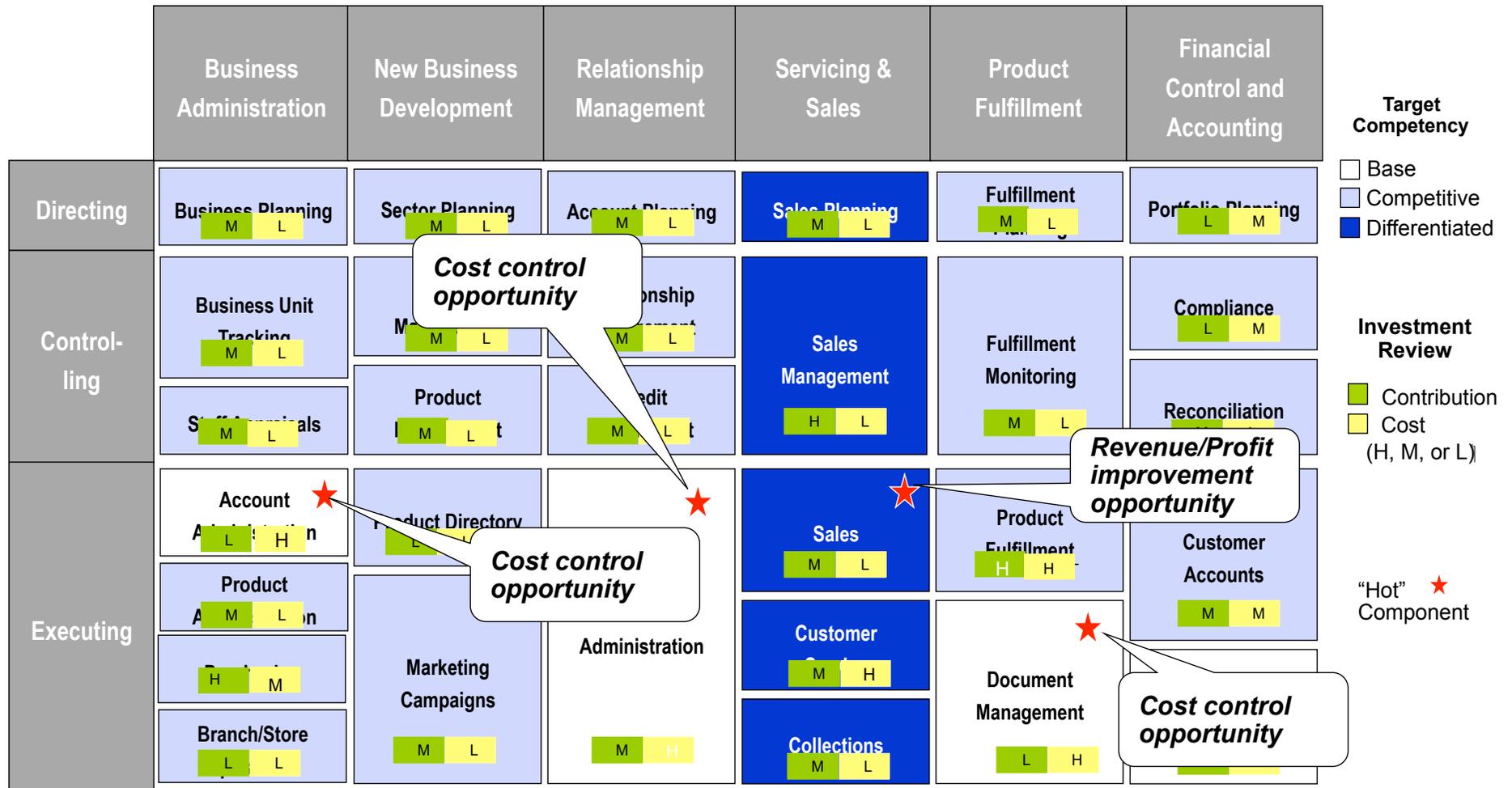- Execute is about doing the work

	Business Administration	New Business Development	Relationship Management	Servicing & Sales	Product Fulfillment	Financial Control and Accounting
Direct	Business Planning	Sector Planning	Account Planning	Sales Planning	Fulfillment Planning	Portfolio Planning
Control	Business Unit Tracking	Sector Management	Relationship Management	Sales Management	Fulfillment Planning	Compliance
	Staff Appraisals	Product Management	Credit Assessment			Reconciliation
Execute	Staff Administration	Product Directory	Credit Administration	Sales	Product Fulfillment	Customer Accounts
				Customer Dialogue	Document Management	
	Production Administration	Marketing Campaigns		Contact Routing		General Ledger

Source: IBM

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CBM – Definition (2): The building block of a component business model is a 'business component'

A component is a business in microcosm. It has activities, resources, applications, infrastructure. It has a governance model. It provides goods and services (business services)

Business Component Elements

Each business component has differentiated capabilities

Each business component defines and decides on the use of all resources needed to perform the defined activities

Each business component has business services which form the interfaces to other business components

Each business component has a governance structure within which it manages its activities

Source: IBM

Domain Decomposition – Component Business Modeling for JKE

	Business Administration	New Business Development	Relationship Management	Servicing & Sales	Product Fulfillment	Financial Control and Accounting
Directing	Business Planning	Sector Planning	Account Planning	Sales Planning	Fulfillment Planning	Portfolio Planning
Controlling	Business Unit Tracking / Staff Appraisals	Sector Management / Product Management	Relationship Management / Credit Assessment	Sales Management	Fulfillment Monitoring	Compliance / Reconciliation
Executing	Account Administration / Product Administration / Purchasing / Branch/Store Operations	Product Directory / Marketing Campaigns	Credit Administration	Sales / Customer Service / Collections	Product Fulfillment / Document Management	Customer Accounts / General Ledger

Target Competency

☐ Base
☐ Competitive
■ Differentiated

Source: IBM

Domain Decomposition – Component Business Modeling for JKE

	Business Administration	New Business Development	Relationship Management	Servicing & Sales	Product Fulfillment	Financial Control and Accounting
Directing	Business Planning M L	Sector Planning M L	Account Planning M L	Sales Planning M L	Fulfillment Planning M L	Portfolio Planning L M
Control-ling	Business Unit Tracking M L	M L	Relationship Management M L	Sales Management H L	Fulfillment Monitoring M L	Compliance L M
	Staff Appraisals M L	Product Management M L	Credit M L			Reconciliation
Executing	Account Administration L H	Product Directory L		Sales M L	Product Fulfillment H H	Customer Accounts M M
	Product Administration M L		Administration M H	Customer Service M H		
	Product H M	Marketing Campaigns M L		Collections M L	Document Management L H	
	Branch/Store L L					

Target Competency
- ☐ Base
- ☐ Competitive
- ■ Differentiated

Investment Review
- 🟩 Contribution
- 🟨 Cost
  (H, M, or L)

⭐ "Hot" Component

Cost control opportunity

Cost control opportunity

Revenue/Profit improvement opportunity

Cost control opportunity

Source: IBM

CBM and IT Systems Coverage for JKE – "Footprint"

Source: IBM
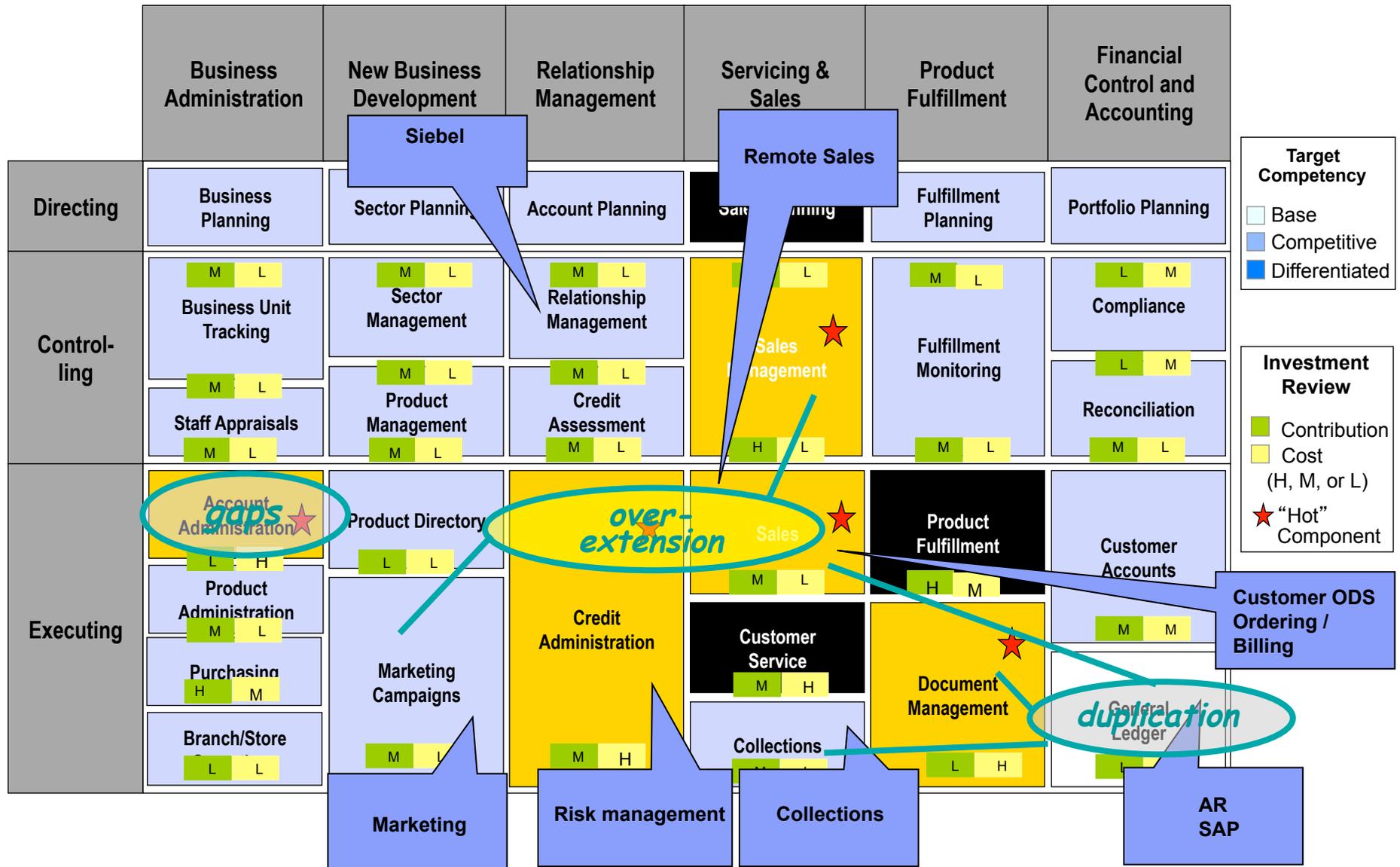
This lack of "goodness" and the inability to generate increased downstream value is addressed by more carefully connecting the service and component paradigms within CBM

Inside the Business Component:

Each component comprises a **unique purpose** in the enterprise, a set of **services** and the **set of capabilities** required to deliver them.

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Unique Purpose

Set of capabilities

Resources incl:
• Skills, roles
• Process
• Knowledge
• Technology
• etc.
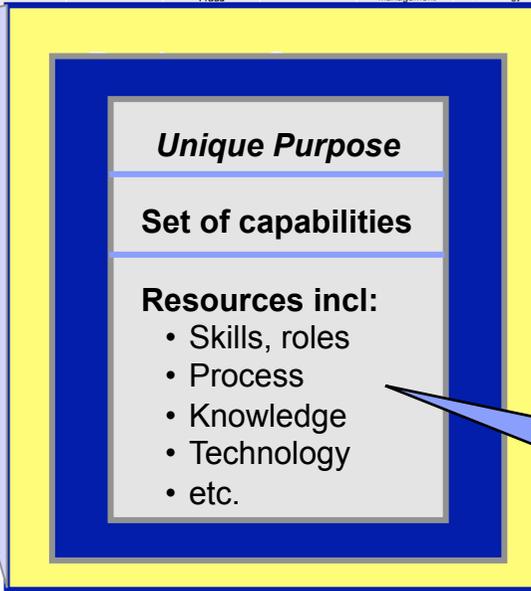
Service 1

Service 2

Service 3

To fully specify the component, not only do we need to explicitly define and document its services…

…we also need to describe how the component will deliver these services via its resources
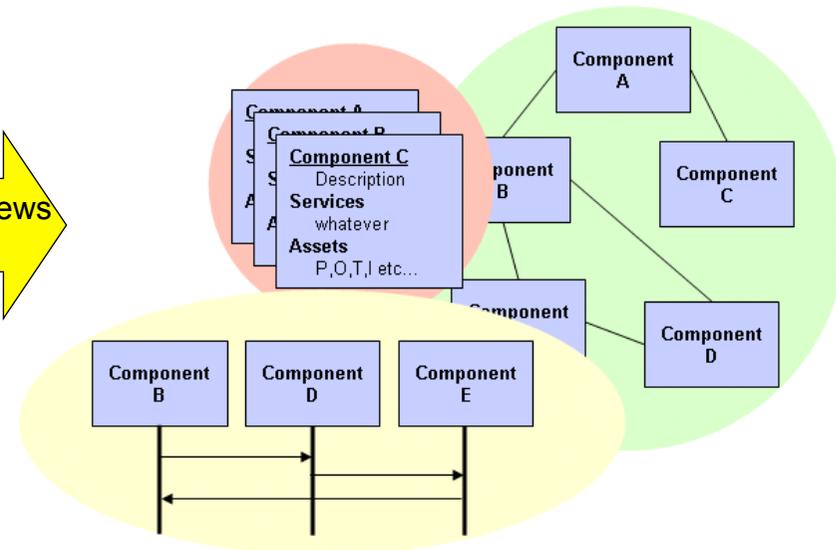
Source: IBM

We need to develop "architectural views" of the CBM, helping us understand the detail of the components, their relationships, and the way they co-operate (via services) in order to meet the needs of the enterprise

CBM Map,

Used as a strategic, "insight" tool

Also supports Programme Portfolio Management etc. (Programme overlap etc.)

CBM Component specifications, relationships and interactions, as part of a Business Architecture

Used to support specific programmes of change (responsibilities of and relationships between components)

Source: IBM

**SOMA
(Service Oriented Modeling and Architecture)**

Methodology SOMA
(Service Oriented Modeling and Architecture)

- **SOMA is a business-driven modeling and design method**

- **SOMA provides in-depth guidance on how to move from the business models to the IT models required by SOA**

- **SOMA adds new service-oriented aspects and techniques in intelligent ways to enable an SOA with services directly traceable to business goals and requirements**

At the heart of *SOMA* is identification, specification, realization and implementation of services, components and flows

Governance

Startup
Solution Template, Method Adoption

Identification
of Candidate Services and Flows

Specification
of Services, Components, and Flows

Realization
Decisions, Templates, Patterns, Feasibility

Implementation

Deployment

Close

Monitoring & Management
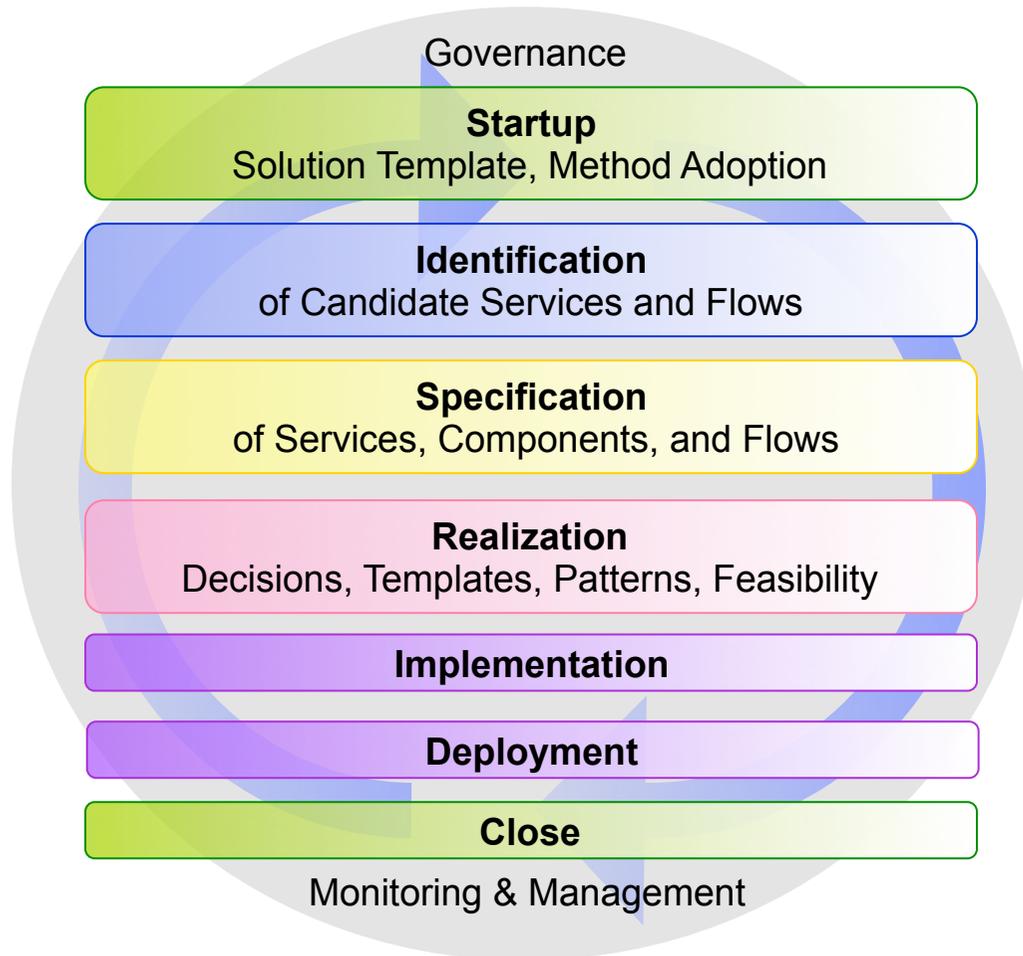
- **Design is separated in Identification and Specification**

- **Realization are mainly decisions on how to implement, buy, or use existing assets**

- **Implementation and Deployment as "classical" Software Engineering**

Source: IBM

SOMA defines What we do and How we do it

What we do ?

How we do it?

Governance

Input from: Business Analysis & Existing Asstes

Domain Decomposition	Goal-Service Modeling	Existing Asset Analysis

Identification
of candidate services and flows, leverageable existing assets

Component Flow Specification

Subsystem Analysis

Service Flow Specification
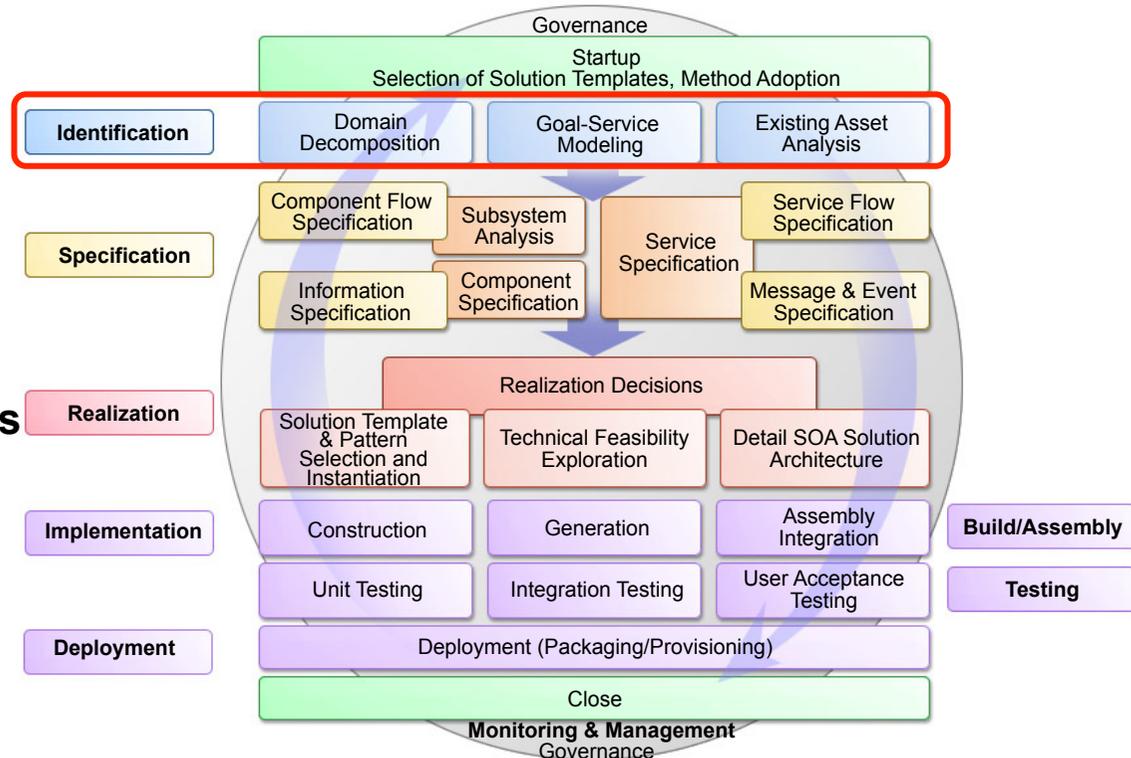
Service Specification

Specification
of services to be exposed, flows, and components (for realization of functionality)

Information Specification

Component Specification

Message & Event Specification

Realization Decisions

Realization
captures realization decisions, selects solution templates, details SOA Solution Ref. Arch.

Solution Template & Pattern Selection	Technical Feasibility Exploration	Detail SOA Solution Architecture
Solution Template	Construction Generation	Assembly Integration
Unit Testing	Integration Testing	User Acceptance Testing

Implementation
incl. construction/ generation, assembly, testing, deployment, monitoring and management

Deployment (Packaging/Provisioning)

Monitoring & Management

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Source: IBM

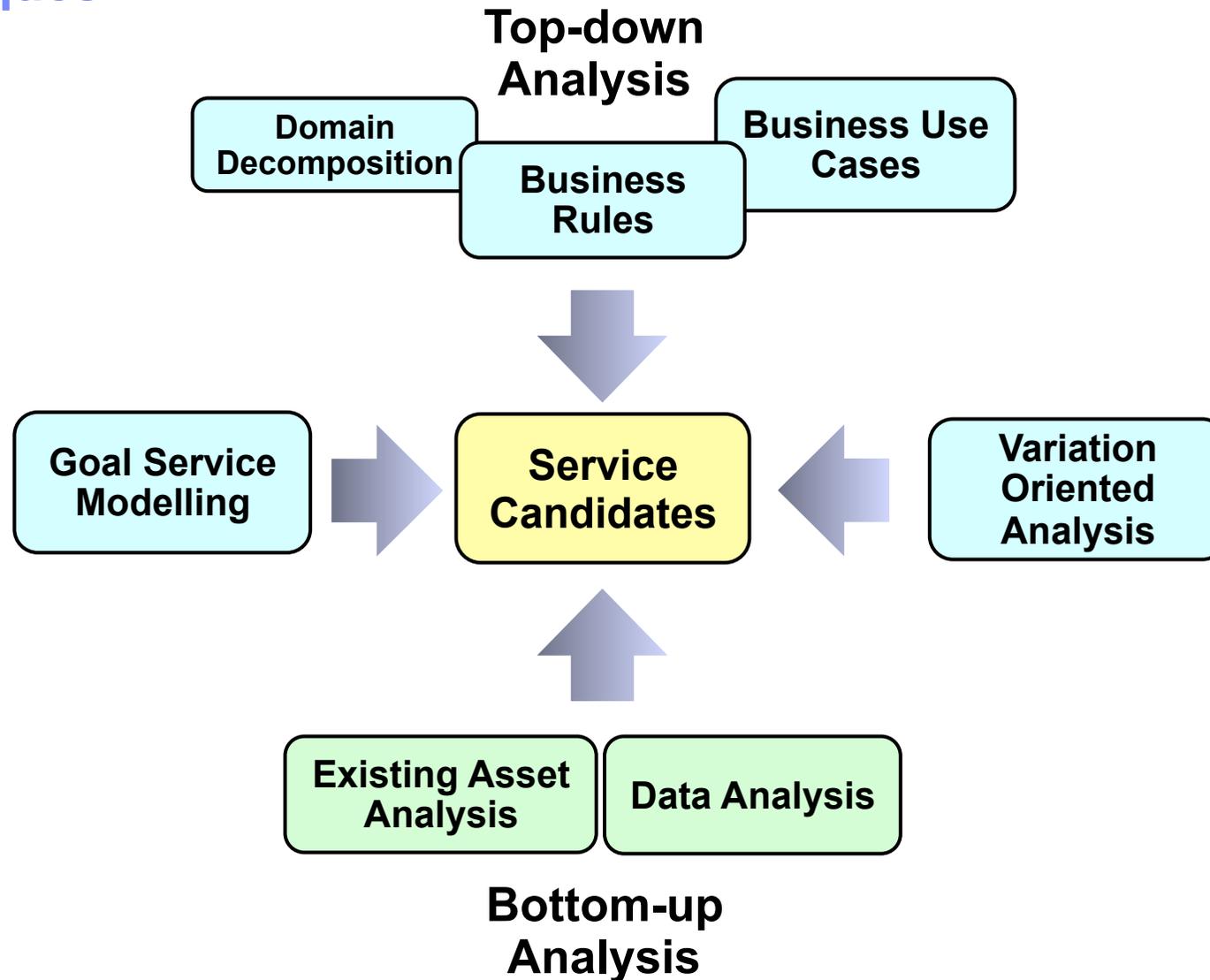© 2016 Hans-Peter Hoidn & Kai Schwidder

SOMA – Identifies Services

- **Domain Decomposition (Top-down Analysis)**
  - **Process Decomposition**
  - **Functional Area Analysis**
  - **Information Analysis, Modeling, and Planning**
  - **Rule and Policy Analysis**
  - **Variation-Oriented Analysis**
- **Existing Asset Analysis (Bottom-up Analysis)**
- **Goal-Service Modeling**
- **Additionally, Service Refactoring and Rationalization**
  - **Service Litmus Tests**
  - **Exposure Decisions, including Exposure Scope**

Id Services, Components, and Flows

Source: IBM

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SOMA – Service Identification Through Complimentary Techniques

Top-down Analysis

Domain Decomposition

Business Rules

Business Use Cases

Goal Service Modelling

Service Candidates

Variation Oriented Analysis

Existing Asset Analysis

Data Analysis

Bottom-up Analysis

Source: IBM

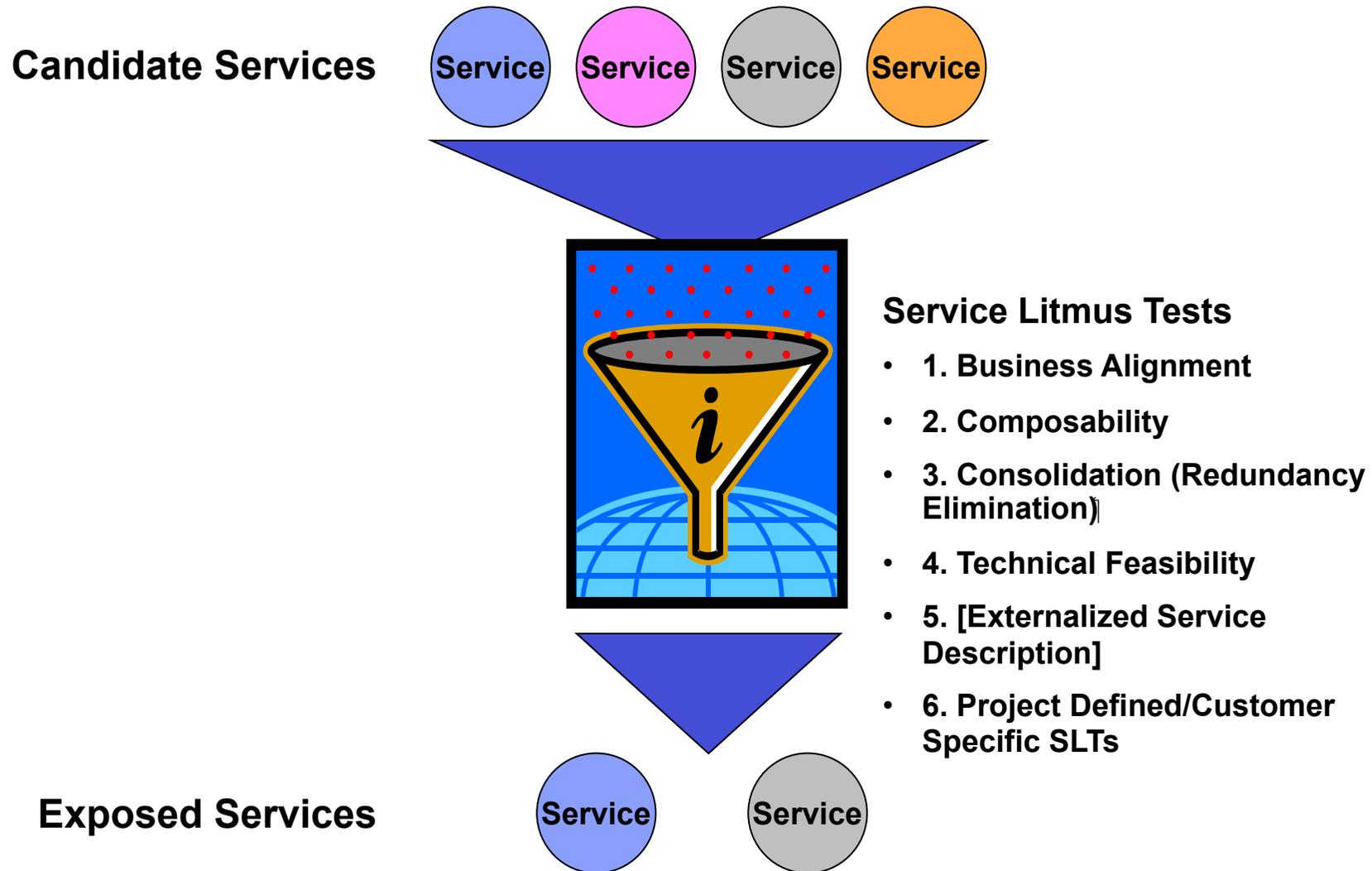# *SOMA* Specification uses comprehensive techniques to specify Services, Flows, and Service Components that Realize Services

- **Information Specification**
  - Data Model, Message Model, Business Glossary

- **Existing Asset Analysis – Fine Grained**
  - Determine the technical viability of existing applications and approaches to realize services

- **Service Specification**
  - Elaborates the Service Model, for example, service dependencies, service composition and flow, rules and policies, event specification, service operation, service message specification, QoS requirements, design decisions, and so on

- **Subsystem Analysis**
  - Partitions subsystems into service components that will be responsible for service realization

- **Component Specification**
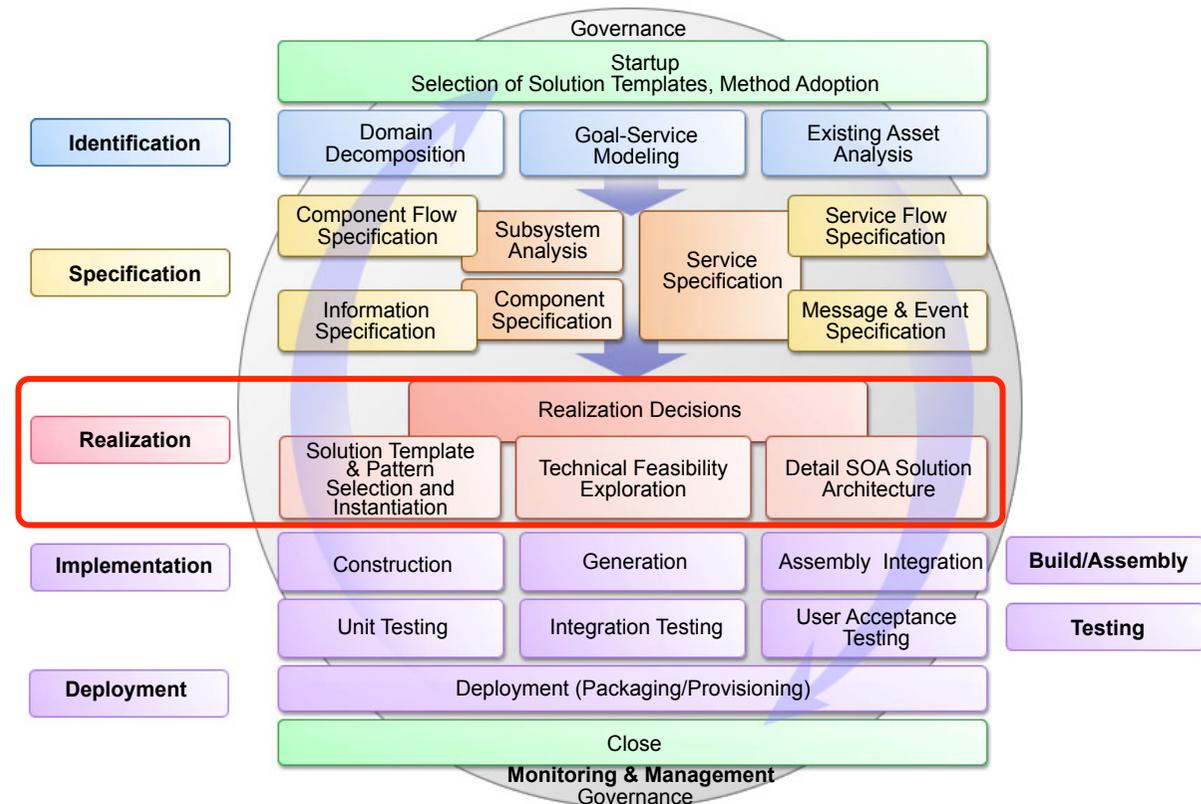 - Details component modeling, flow, information architecture, messages

Governance

	Startup Selection of Solution Templates, Method Adoption

Identification

Domain Decomposition	Goal-Service Modeling	Existing Asset Analysis

Specification

Component Flow Specification	Subsystem Analysis		Service Flow Specification
Information Specification	Component Specification	Service Specification	Message & Event Specification

Realization

Realization Decisions		
Solution Template & Pattern Selection and Instantiation	Technical Feasibility Exploration	Detail SOA Solution Architecture

Implementation

Construction	Generation	Assembly Integration	**Build/Assembly**
Unit Testing	Integration Testing	User Acceptance Testing	**Testing**

Deployment

Deployment (Packaging/Provisioning)
Close

Monitoring & Management
Governance

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Source: IBM

SOMA – Application of Service Litmus Test for Service Exposure Decisions

Candidate Services

Service Service Service Service

Service Litmus Tests

- **1. Business Alignment**

- **2. Composability**

- **3. Consolidation (Redundancy Elimination)**

- **4. Technical Feasibility**

- **5. [Externalized Service Description]**

- **6. Project Defined/Customer Specific SLTs**

Exposed Services

Service Service

Source: IBM

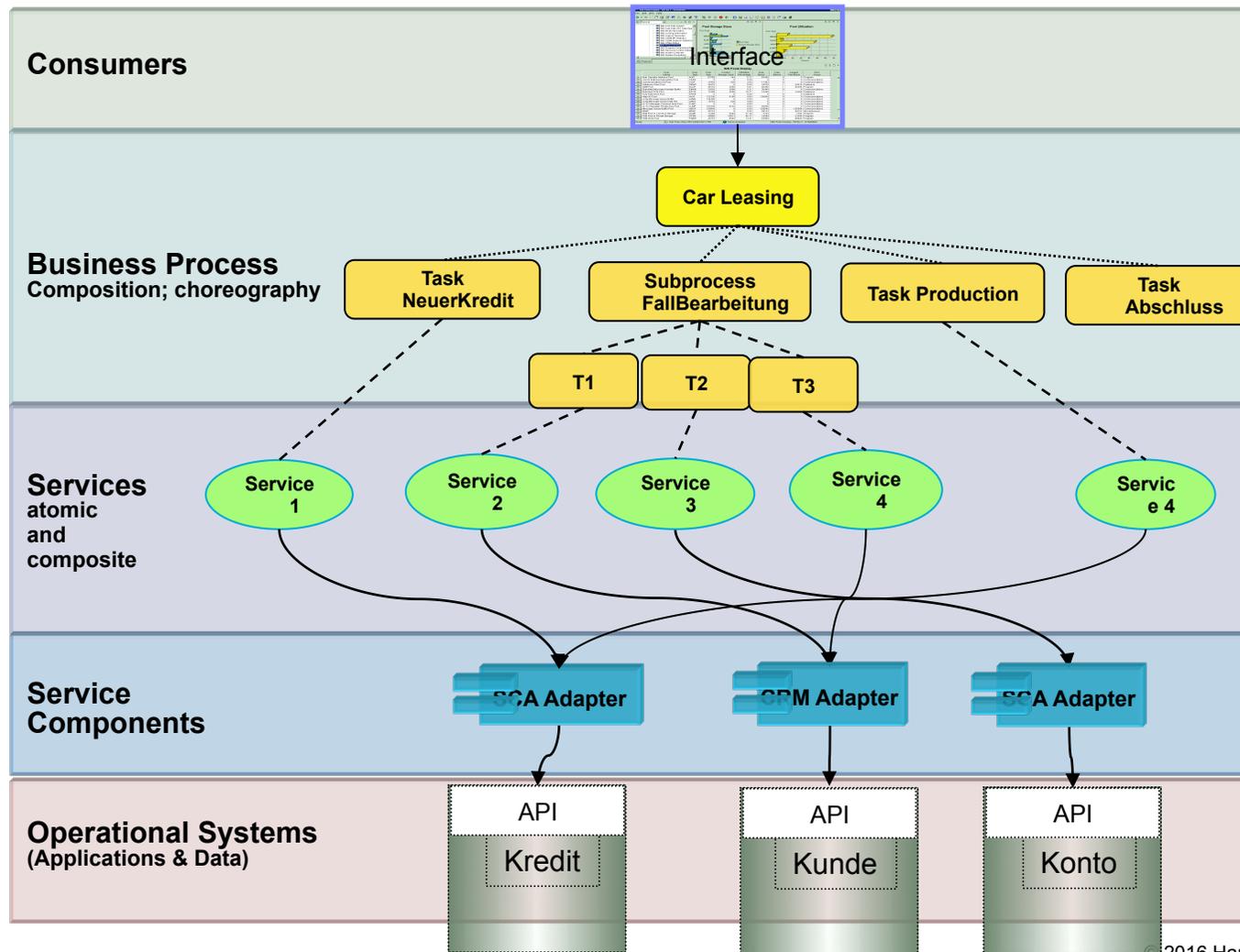# *SOMA* Realization (Includes SOA Solution Stack Instantiation)

- **Select and instantiate Solution Templates and Patterns**
- **Technical Feasibility Exploration**
  - **Examine approaches to handle client requirements**
  - **Examine legacy application specific considerations**
- **Detail SOA Solution Stack**
- **Realization Decisions**
  - **Consider alternatives**
  - **Select the alternative**
  - **Provide justification**

Governance

Startup		
Selection of Solution Templates, Method Adoption		

Identification

| Domain Decomposition | Goal-Service Modeling | Existing Asset Analysis |

Specification

| Component Flow Specification | Subsystem Analysis | | Service Flow Specification |
| Information Specification | Component Specification | Service Specification | Message & Event Specification |

Realization

| Realization Decisions | | |
| Solution Template & Pattern Selection and Instantiation | Technical Feasibility Exploration | Detail SOA Solution Architecture |

Implementation

| Construction | Generation | Assembly Integration | **Build/Assembly** |
| Unit Testing | Integration Testing | User Acceptance Testing | **Testing** |

Deployment

| Deployment (Packaging/Provisioning) | | |

| Close | | |

Monitoring & Management
Governance

Source: IBM

The SOA Layered View is populated with the SOMA Method (see SOA RA – The Open Group SOA Reference Architecture)

SOMA Method

SOA Solution Stack

Startup / Adoption
<< Input from: Business Analysis & Existing Assets>>

Identification
of Candidate Services and Flows

Specification
of Services, Components, and Flows

Realization
Decisions, Solution Templates & Patterns,
Architecture, Technology Feasibility

Implementation
Build/Assembly, Testing

Deployment
Packaging and Provisioning

consumers — JService Portlet WSRP B2B Other

business processes
process choreography

services
atomic and composite

service components

operational systems — Packaged Application, Custom Application, OO Application

Composite Service
Atomic Service
Registry

Service Consumer
Service Provider

Integration (Enterprise Service Bus Approach)
QoS Layer(Security, Management, and Monitoring Infrastructure Service)
Data Architecture and Business Intelligence
Governance

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Source: IBM

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Example Car Leasing (again) – SOA Layers

Questions

BPM (Business Process Management)

Can Your Processes Handle Change, Uncertainty and Complexity?

Transformation Today Means:

- **Simpler Business Led Change**

- **Full Process Visibility and Governance**

- **Optimized Processes and Decisions**
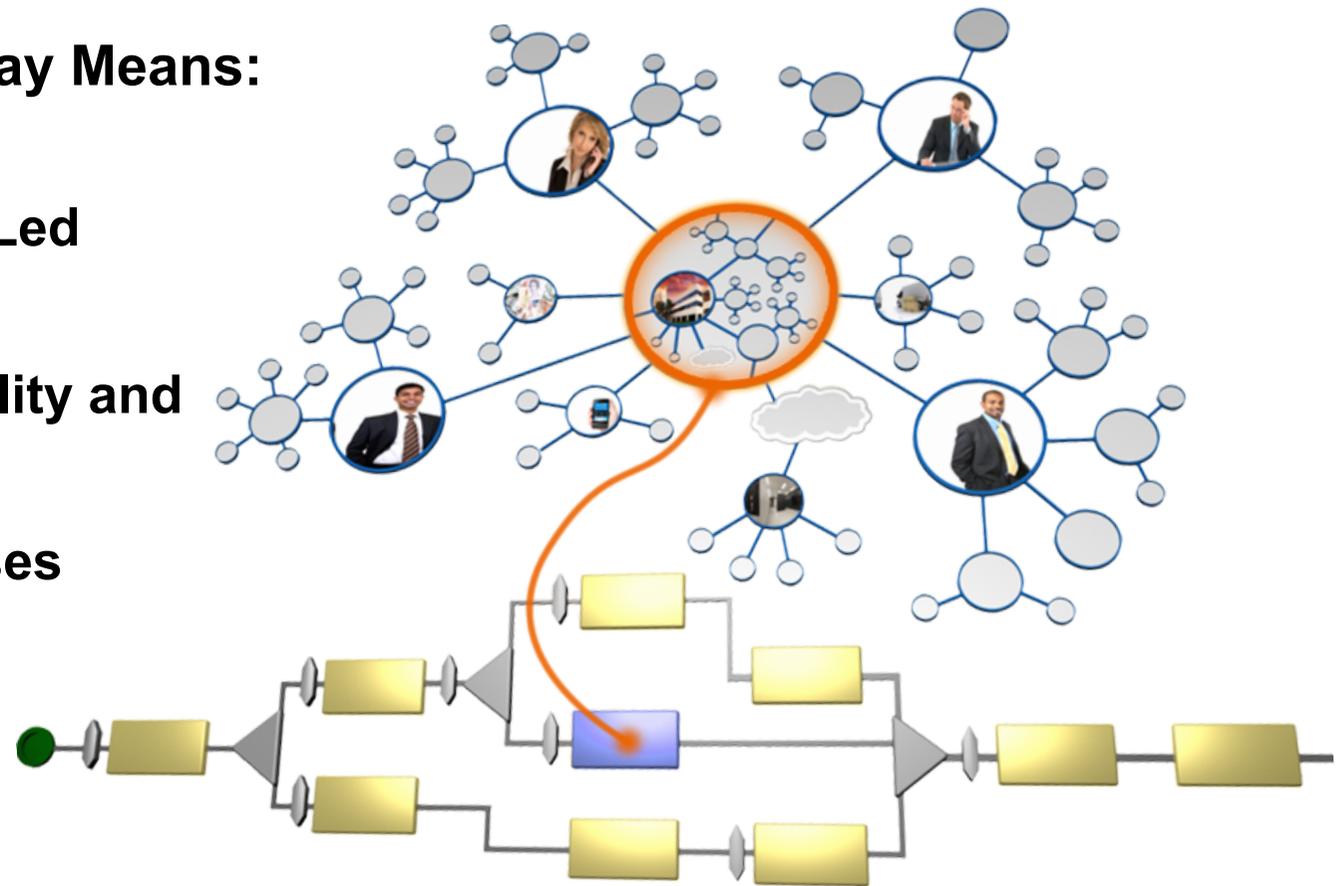
Agile Processes and Decisions with
Business Process Management

Source: IBM
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BPM Delivers a Layer for Control and Visibility
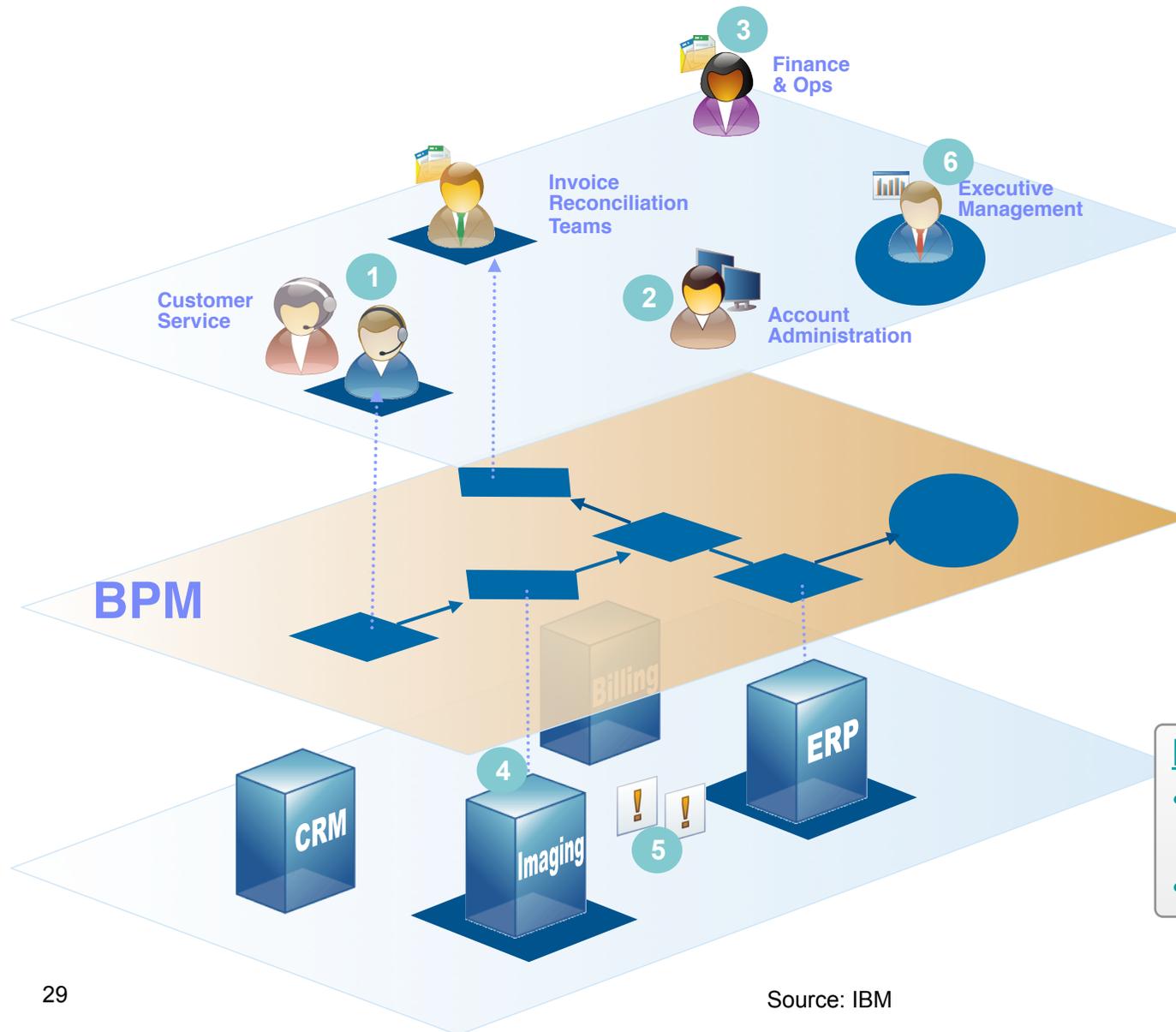
1. **Automatically prioritizes and routes work**

2. **Guides users through decisions**

3. **Standard and consistent work prioritization**

4. **Leverages exiting system data Systems**

5. **Reacts to business events and generates actions**

6. **Real-time visibility and process control**

Benefits:
- 80% Reduction in Manual Interactions
- Faster Issue Resolution

Source: IBM

BPM and SOA linked together

Finance & Ops

Invoice Reconciliation Teams

Executive Management

Customer Service

Account Administration

BPM

Now focusing on BPM

SOA

Enrichment
Messaging

Systems

CRM

Imaging

Billing

ERP
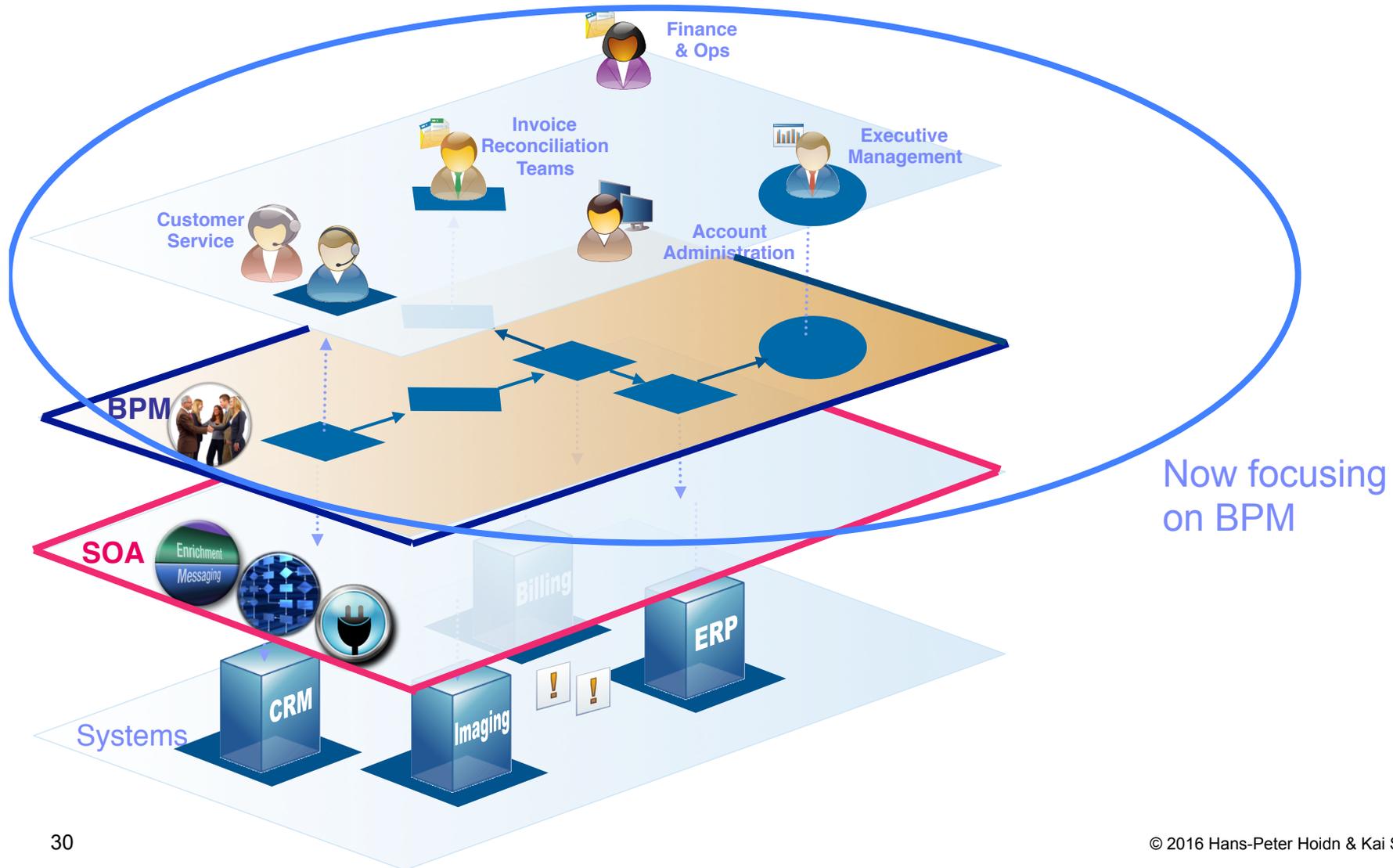
BPMN 2.0 (Business Process Model and Notation)

- **BPMN is an OMG Standard (Object Management Group – see www.omg.org), most IT vendors are supporting BPMN**

- **BPMN 2.0 covers notation as well as the metamodel suitable for execution (BPMN 1.x covered only the notation)**

- **BPMN 2.0 supports:**
  - **Notation that a business person understands including a visual model with an appropriate Interchange Format**
  - **Semantic Metamodel and an appropriate Interchange Format (such that models can be exchanged between tools)**
  - **BPMN "execution semantics"**

Definition of Terms
(see also Standard BPMN – Business Process Model and Notation)

- **Business Process Definition (BPD)**
- **Swim Lane**
- **Milestone**
- **Participant**
- **Step/Activity**
- **Flow Line**
- **Business Event**
- **User Story**
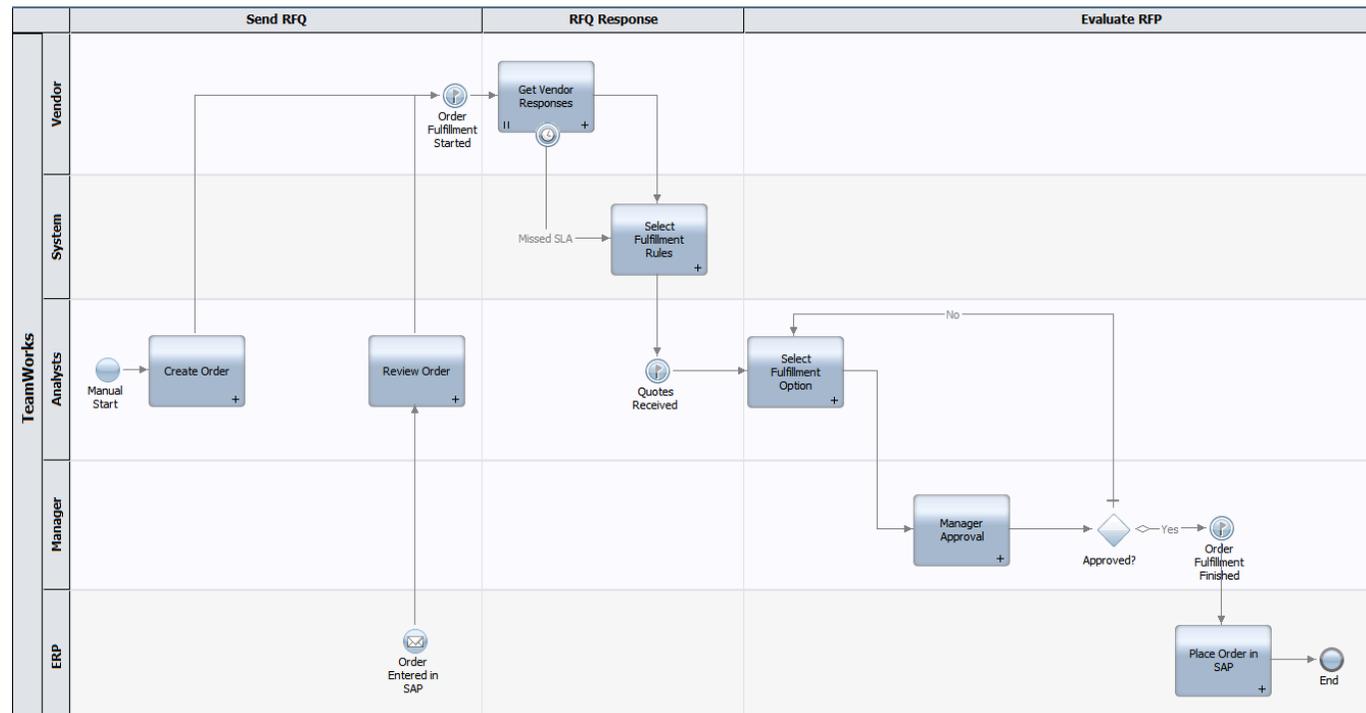
What is **not** a Business Process Definition?

- **Entity State Diagrams**
- **Use Cases, Use Case Relationship Diagrams**
- **System Relationship Diagram**
- **Architectural Diagram**
- **Workflow Model (Application Development), Screen Flow**
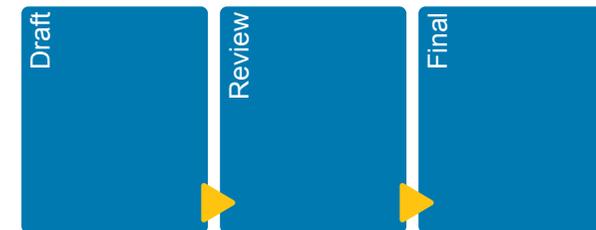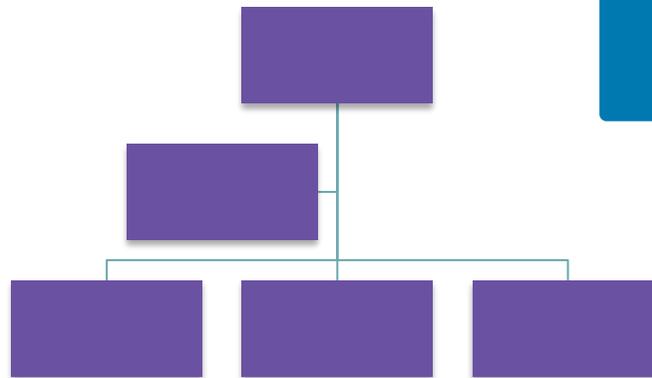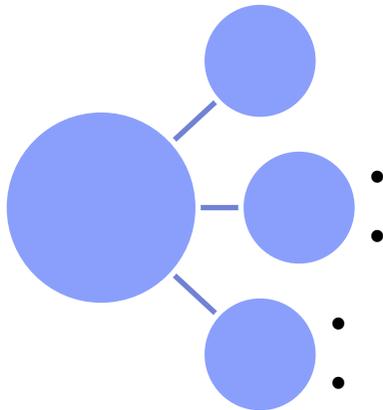
Activity/Step

A unit of granularity in a process that…

- **Has a goal that can be expressed as a singular outcome**
- **Implemented as**
    - Task **(human or system)**
    - Sub-process
- **Can be a human task**
    - Single participant **begins the activity**
- **Can contain multiple steps, (e.g. screens in a screen flow)**
    - **These steps are not *process* steps**
- **Can be a sub-process**
    - **Implemented as another BPD**

Events

A business event…

- **Is the occurrence of a condition that triggers an activity.**
- **Can listen to catch a condition to trigger an activity or…**
- **…throw a result upon occurrence.**

throw   listen

- **Types of events include the following:**
  - **Start /End**
  - **Timer**
  - **Message**
  - **Exception**
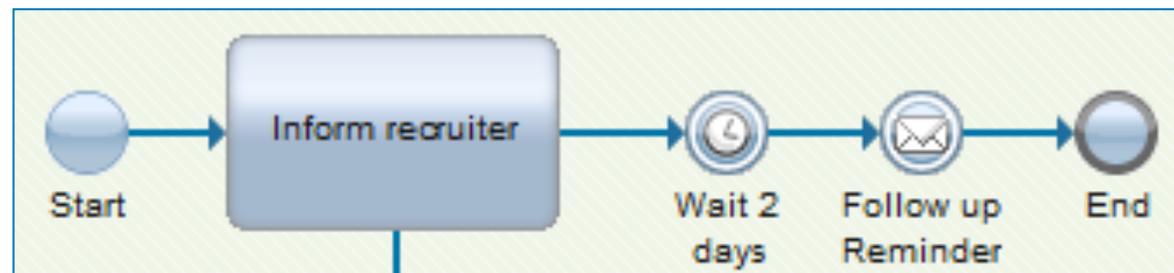
BPMN in Action: Automation of Business Processes

- **BPMN 2.0 Semantics automates the execution of business processes**
  - **Key is: "*The diagram is the process*"**
  - **Round trip is possible**
  - **It is always known where the process stands**
  - **KPIs (Key Performance Indicators) can be attached**
 - **Bottlenecks can be identified**
  - **Processes can be optimized**

- **BPMN supports a Round Trip: modeling, implementation, deployment, execution, monitoring, and back to modeling**

- **Business people are eligible to monitor the execution of processes (and the KPIs)**

The Business Problem – one process instead of many actions

Yesterday

Tomorrow
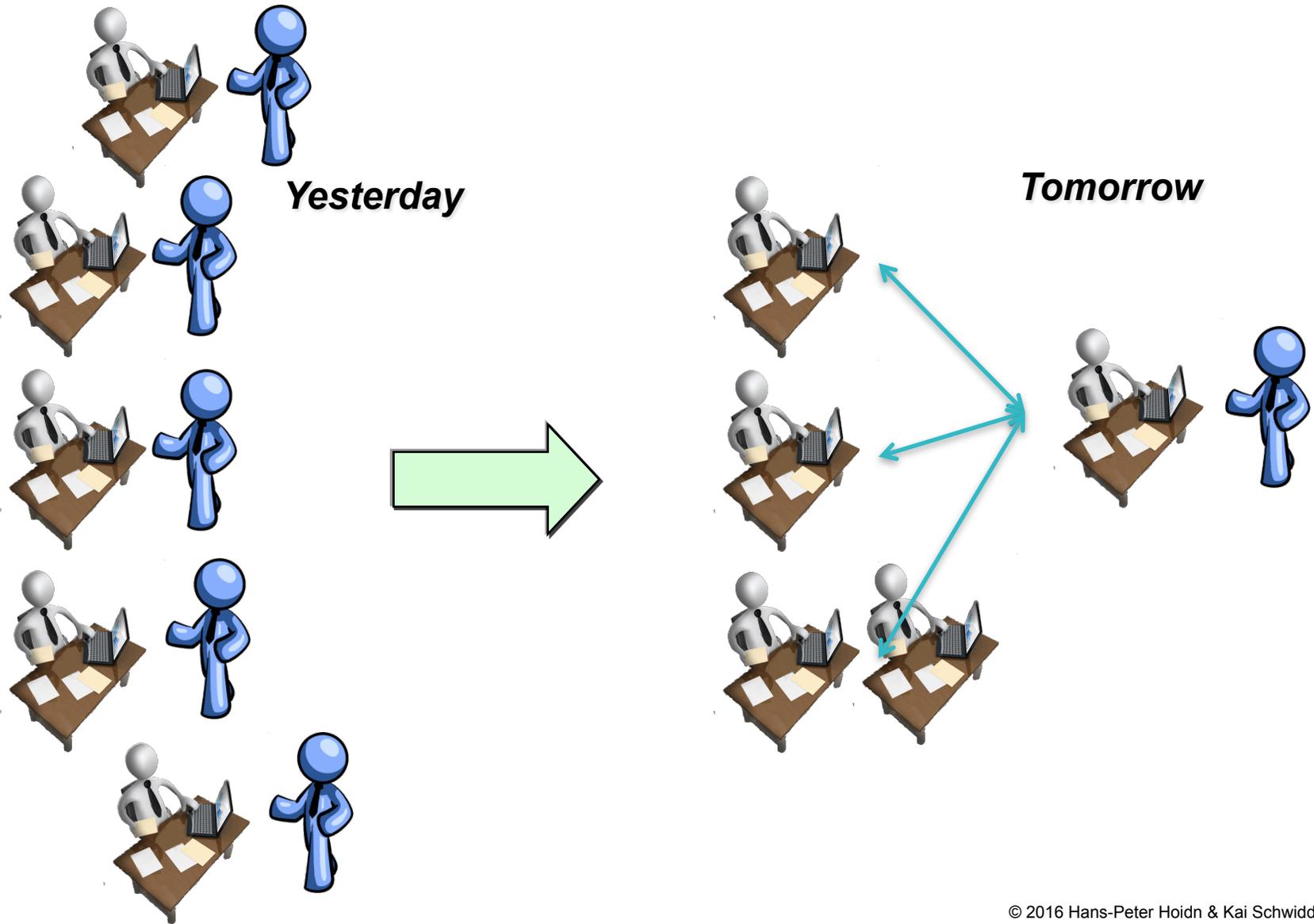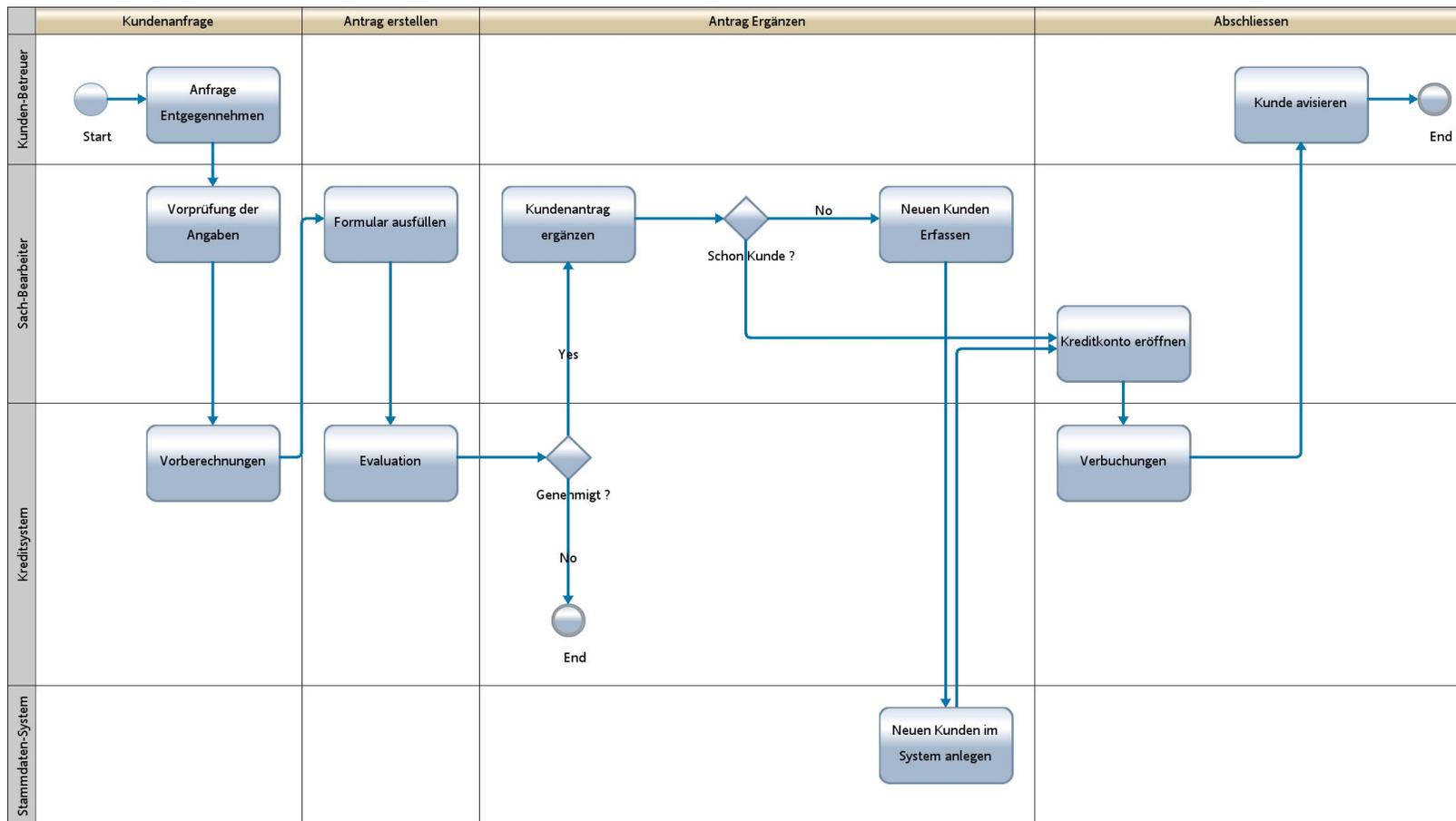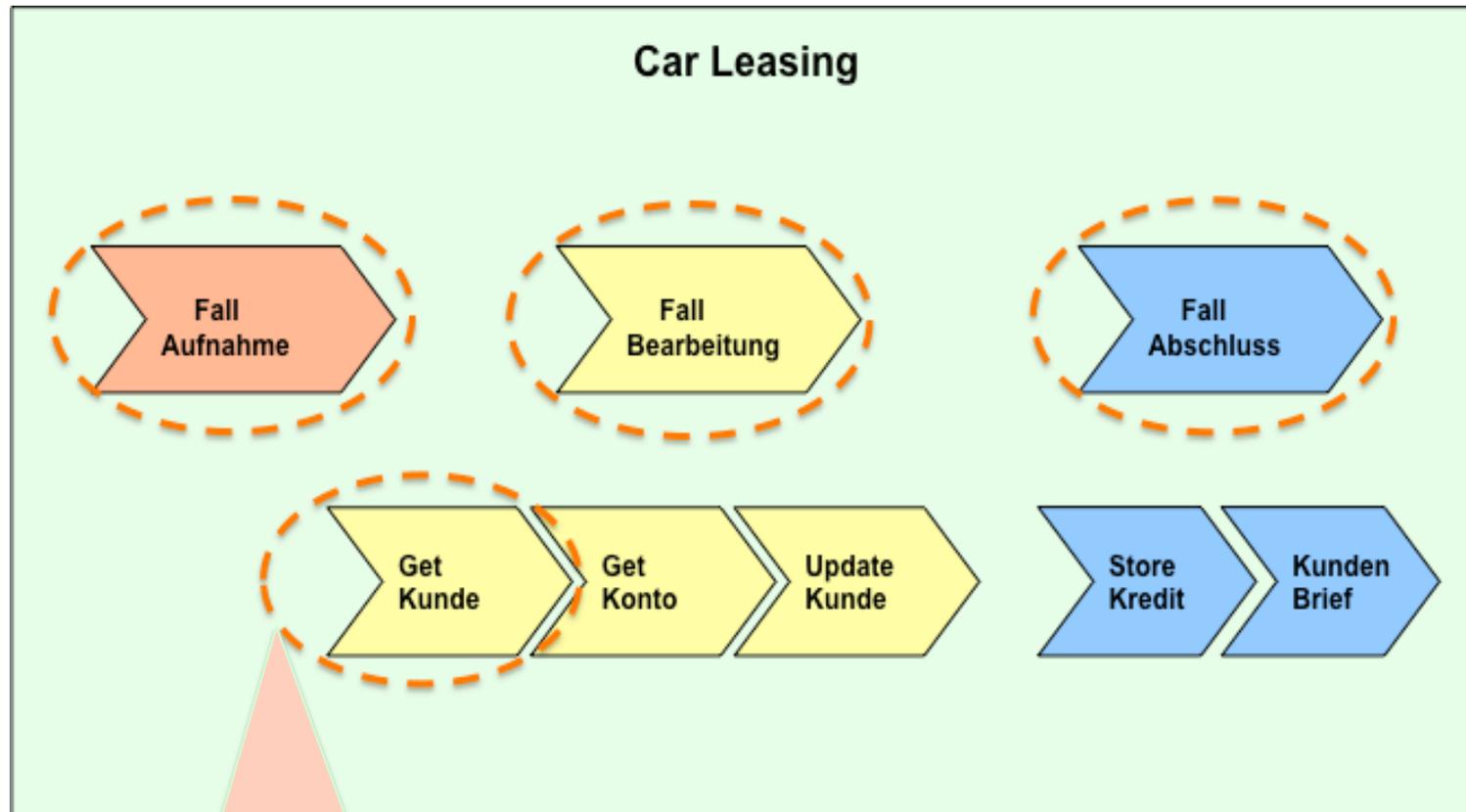
Business Process Reality and Plans
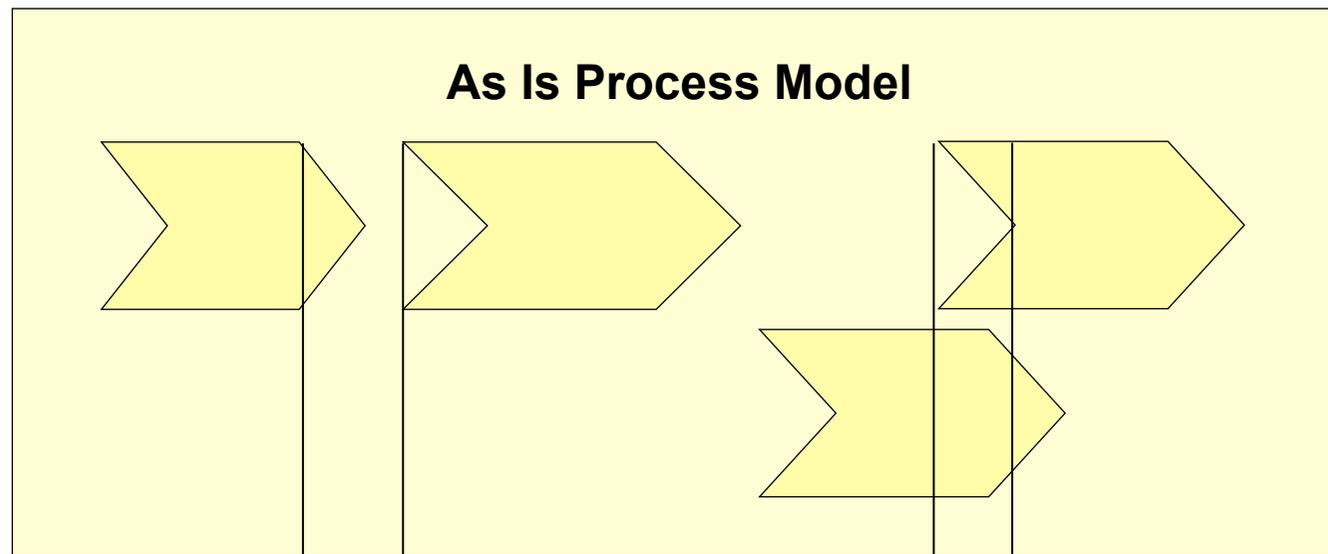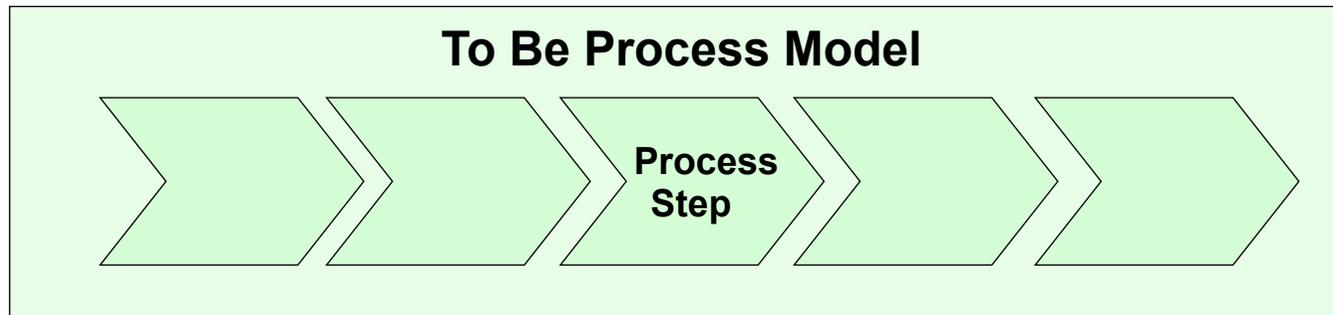
Gap

Overlapping

Example Car Leasing – BPMN Process Map

Example Car Leasing – Process Hierarchy

Round-Trip: Shared Model with BPM 2.0

Process Portal

Process Coaches

Process Portal

Admin Console

Worker

Manager

Scoreboards

Administrator

Process Designer

Execute

Business Modeler

Process Center
Shared Model

- Collaborative platform
- Repeatable & iterative development cycle
- **What you model is what is executed**
- Shortened cycle of development
- Decrease maintenance workload
- No code approach

Process Designer

Design

Optimize

Process Inspector

Business Developer

Process Optimizer

Process Designer

Business Analyst

Integration Developer Source: IBM

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Integration: Seamless Collaboration Across Roles

Business Process Owner

- **Authors a Process Application**
- **Defines Service Interfaces for Implementation by Integration Developer**

Integration Developer

- **Imports the Process Application**
- **Generates Service Implementations**
- **Unit Tests Services**
- **Delivers Services to Repository**

Business Process Owner

- **Wires the Implemented Services to the Process**
- **Unit Test the Process**

Shared Assets   Versioned Assets   Server Registry

BPM Repository

Source: IBM

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Designing BPM / SOA Application: Layered View
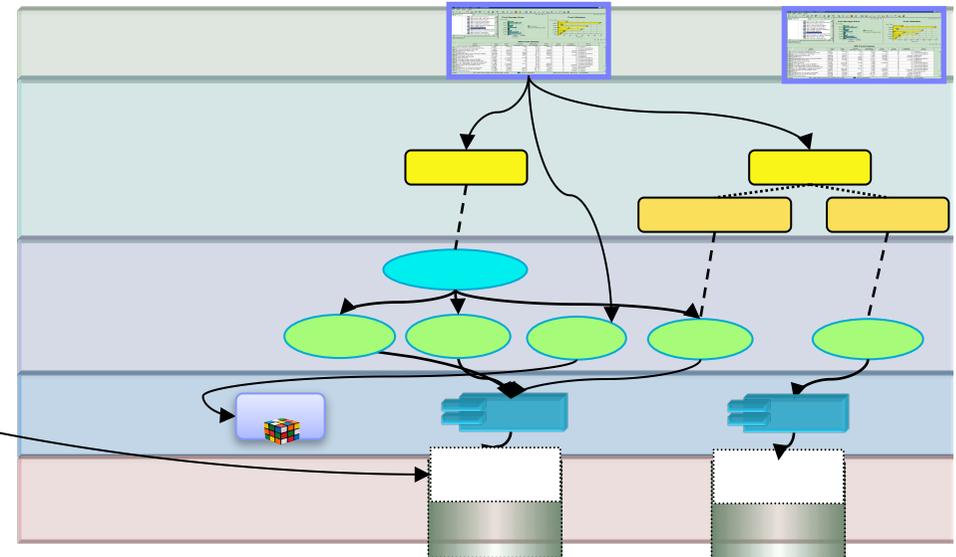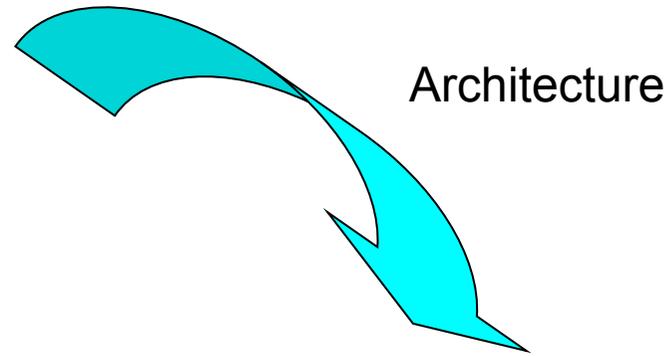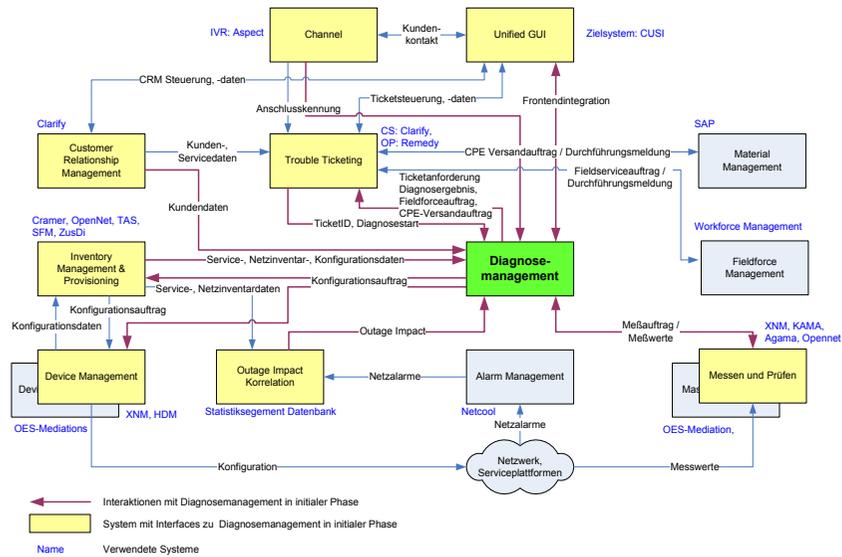
Architecture

Integration of "Legacy"

Designing BPM / SOA Application: Process Modeling

Modeling

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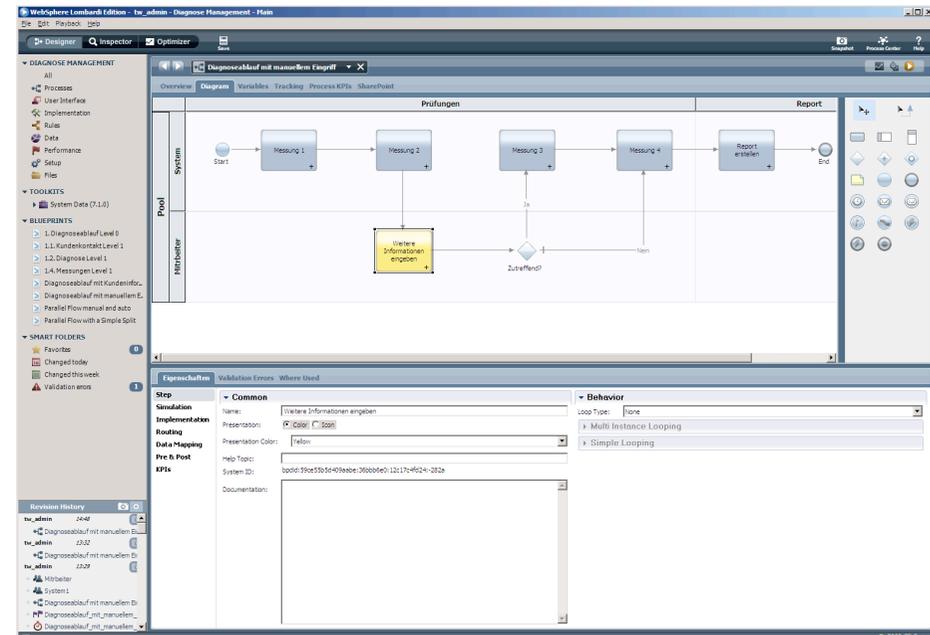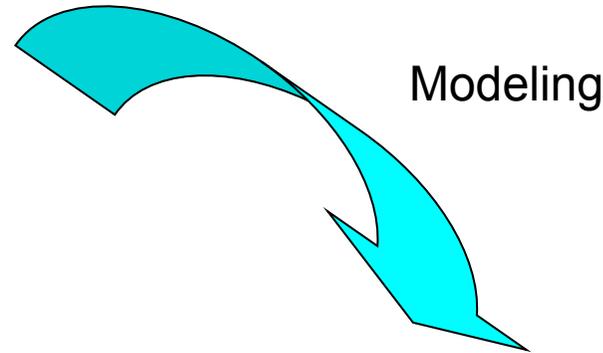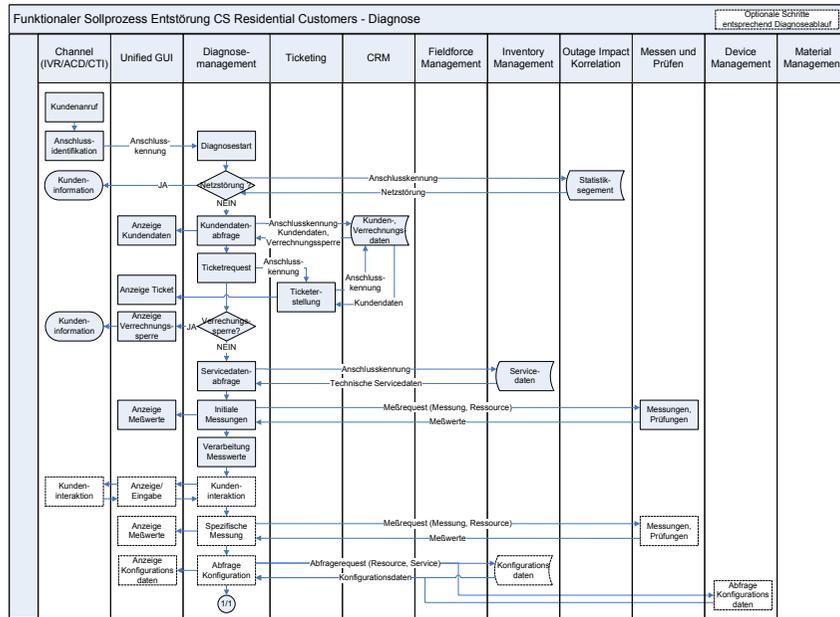
Business Architecture

Business vs. IT (Just some Terms)

- **Time-to-Market**
- **Cost**
- **Risk**
- **Sourcing**
- **Compliance**
- **Organization**
- **Security**
- **Role**
- **Capability**
- **Process**
- **…**

- **Data**
- **Function**
- **Program**
- **Reliability**
- **Performance**
- **Access**
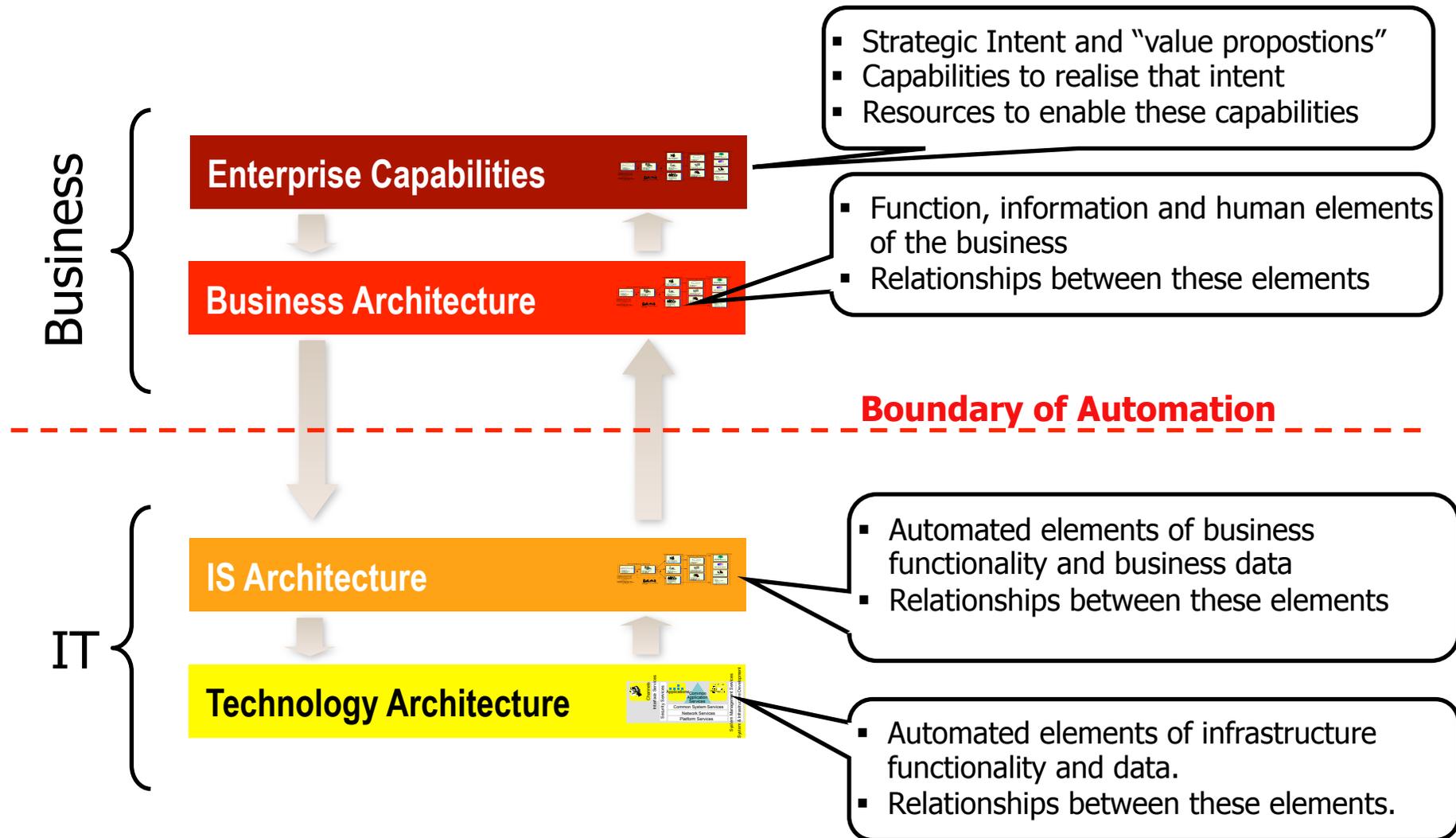- **Authentication**
- **Software**
- **…**

Business Processes and *Business Services*

- **The *Service Model* includes a Business Service Part**
  - **which describes the business meaning of a service and thus bridges the gap between Business and IT**
  - **Specifications within a Service Portfolio provide Business Function building blocks**
- **The *Process Model* following BPMN**
  - **Has a business meaning as well and**
  - **thus bridges the gap between Business and IT**

- **Note:**
  - **Business Processes are key for a Business Architecture since many years (now we have a standard to use)**
  - **Sig Sigma consulting concentrates on improving processes**
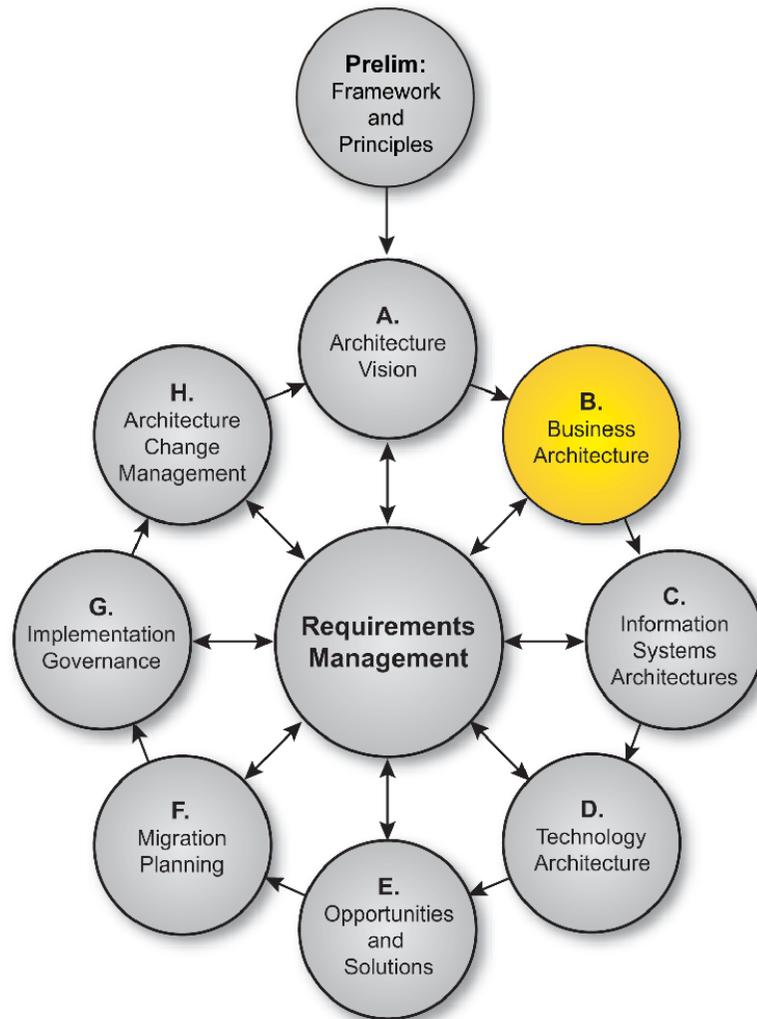 - **Business Functions correspond to Activities in a process**

Business Architecture – Bottom Line

- **Describes: Function, information and human elements of the business relationships between these elements**

- **Seen as the prerequisite for all architecture work**

- **A business architecture *has no regard* for the use of automation [independent of IT]**

- **The most important work product is the Business Process Model**
    - **Implies Business – IT – Alignment**
    - **Business Modeling includes Business Use Cases**

Business Architecture – Positioning

- Strategic Intent and "value propostions"
- Capabilities to realise that intent
- Resources to enable these capabilities

Business

Enterprise Capabilities

Business Architecture

- Function, information and human elements of the business
- Relationships between these elements

Boundary of Automation

IT

IS Architecture

- Automated elements of business functionality and business data
- Relationships between these elements

Technology Architecture

- Automated elements of infrastructure functionality and data.
- Relationships between these elements.

Source: IBM Architectural Thinking

Business Architecture – Content according to TOGAF

- Organization structure
- Business Goals and Objectives
- Business Functions
- Business Services
- Business Processes
- Business Roles
- Business Data Model (according to Course ATE240)
- Correlation of organization and functions

Objectives / Approach Business Architecture (TOGAF 8.1 & 8.2)

▪ **The *objectives* of Phase Business Architecture are to:**

– **Develop the Target Business Architecture that describes how the enterprise needs to operate to achieve the business goals, and respond to the strategic drivers set out in the Architecture Vision, in a way that addresses the Request for Architecture Work and stakeholder concerns**

– **Identify candidate Architecture Roadmap components based upon gaps between the Baseline and Target Business Architectures**

▪ ***Approach***

– **In summary, the Business Architecture describes the product and/or service strategy, and the organizational, functional, process, information, and geographic aspects of the business environment**
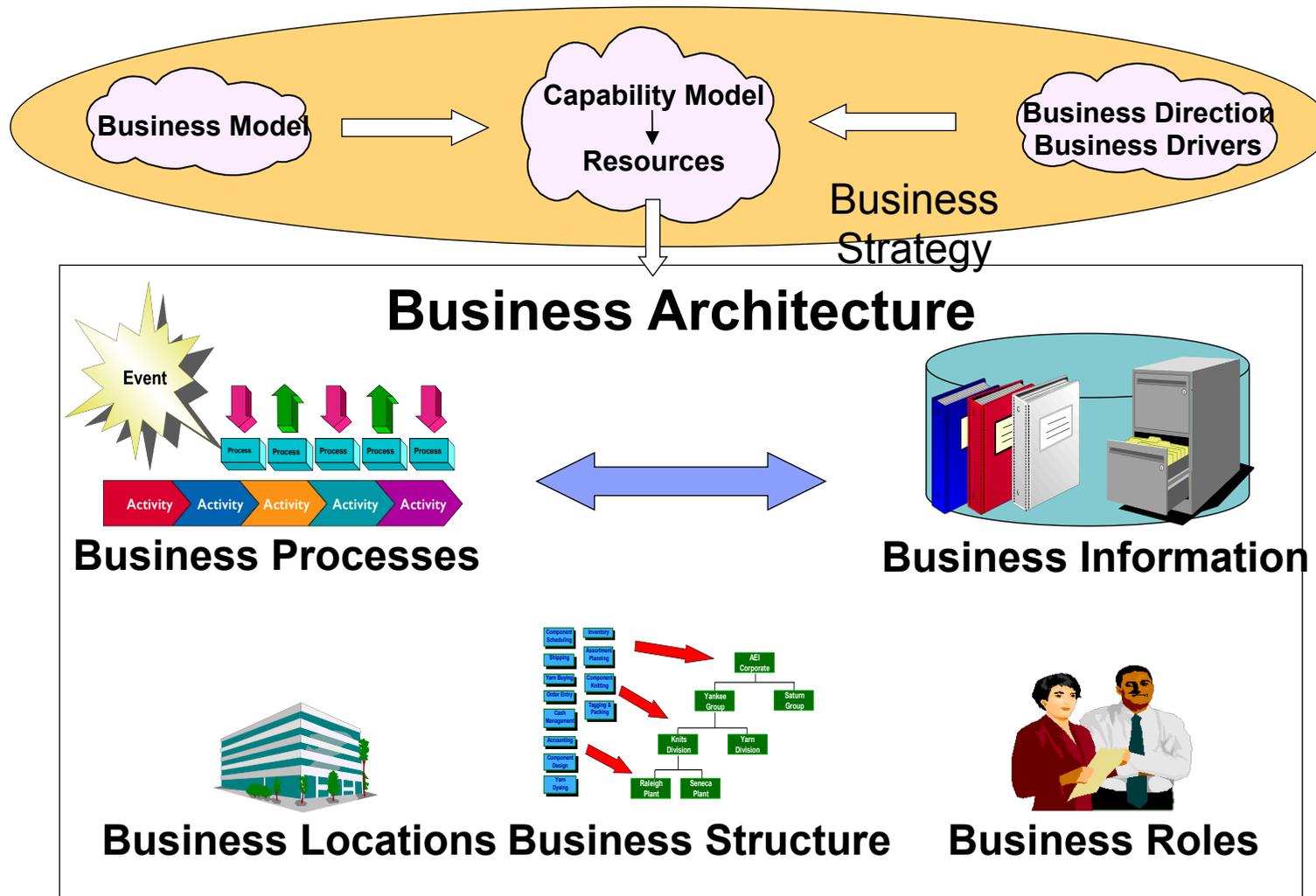
Some more – from TOGAF Document Chapter 8.2

- **General**

  - is […] the first architecture activity that needs to be under taken
  - is also often necessary as a means of demonstrating the business value of subsequent architecture work to key stakeholders

- **Business Modeling**

  - *Activity Models* (also called Business Process Models) describe the functions associated with the […] business activities […] Activity models are hierarchical in nature
  - *Use Case Models* can describe either business processes or systems functions
  - *Class Models* are similar to logical data models

Business Architecture – **Aspects**

Business Model

Capability Model

Resources

Business Direction
Business Drivers

Business
Strategy

Business Architecture

Event

Process Process Process Process Process

Activity | Activity | Activity | Activity | Activity

Business Processes

Business Information

Business Locations **Business Structure**

Business Roles

Source: IBM Architectural Thinking

Business Architecture – Benefits

- **A Business Architecture is used to:**
  - **Provide an understanding of how the business is structured and how it serves a given market place**
  - **Describe current and futures states of the business**
  - **Help identify future initiatives for the business and use of technology**
  - **Document the alignment of the business strategy to enabling IT transition plans and projects**
  - **Guide future IT investment as it allows the identification of functional areas targeted for change**
  - **To understand the business context in which a system will work**
  - **Help an organization to meet the challenges of a rapidly changing marketplace.**

"A Business Architecture is the structure or structures of a business, which comprise processes, resources, goals, and information, the externally visible properties of those parts, and the relationships amongst them."

IBM Business Architecture Description Standards

Source: IBM Architectural Thinking

Main Business Architecture Work Products – reduced to the Minimum – emphasis on Business Processes
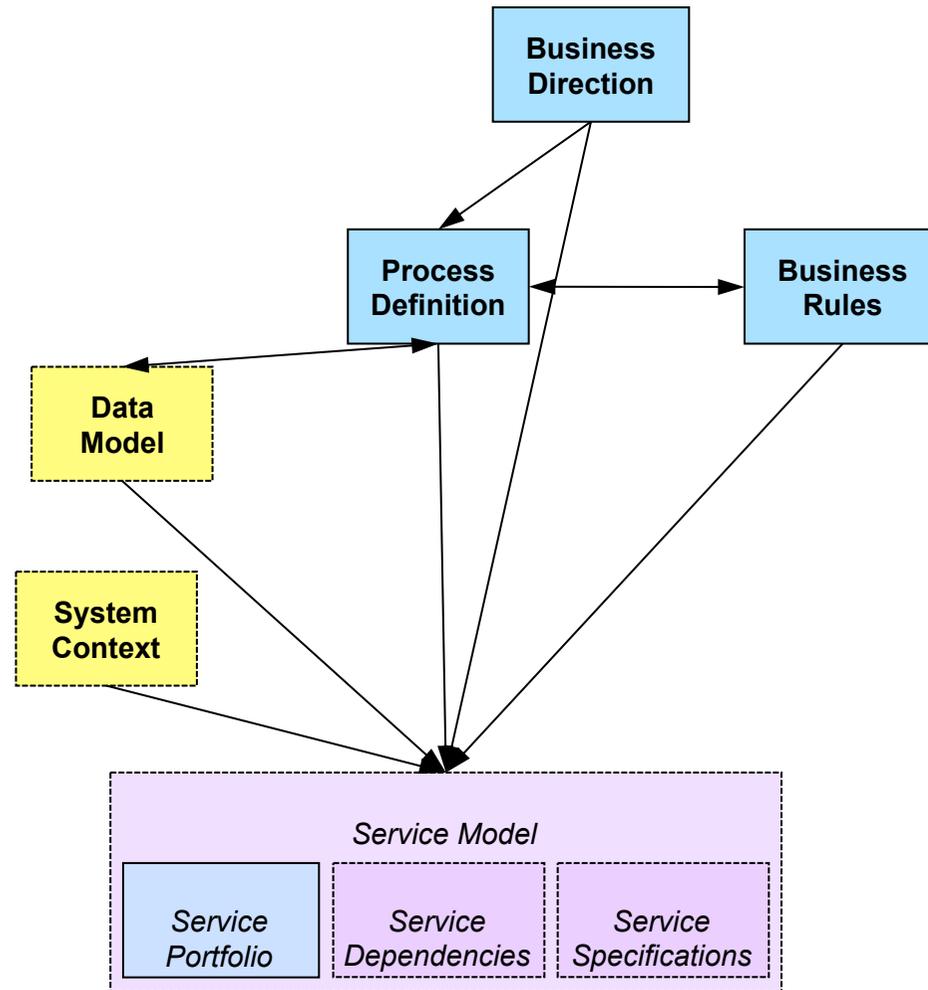
Questions

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- **Judith Hurwitz, Robin Bloor, Carol Baroudi, Service Oriented Architecture for Dummies,**
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- **Ali Arsanjani:** *Service-oriented modeling and architecture (How to identify, specify, and realize services for your SOA)*, **IBM developer Works, 2004; see**
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- ***BPMN*, Version 2.0.2, Release Date: January 20, 2014, Documents Associated With BPMN 2.0.2 see http://www.omg.org/spec/BPMN/2.0.2/**