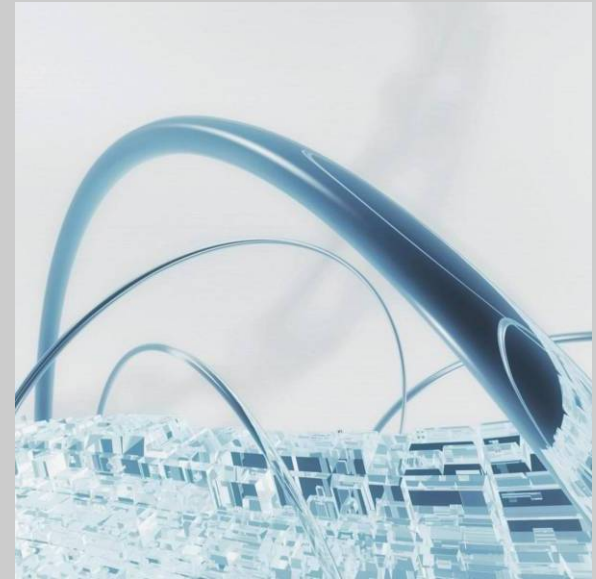


# The Internet of Service

CEC Dresden

SYSTEMATIC THOUGHT LEADERSHIP FOR INNOVATIVE BUSINESS



Dr. Jorge Cardoso, SAP Research



# Agenda



## Internet of Services

1. **SAP Research @ CEC Dresden**
2. The Rise of Services
3. Internet of Services
4. Service Engineering
5. Theseus/Texo



# SAP Research Global Network



■ SAP Labs-based Research Centers

■ Campus-based Engineering Centers

**SAP RESEARCH**





## Research Fields

(Application Research)

Future Manufacturing

Unified Product Content Mgmt

## Research Programs

(Technology Research)

Data Management  
& Analytics

Software  
Engineering  
&  
Architecture  
(Service Engineering)

Semantic  
Technologies  
&  
Applications

Smart Items



# Research Field Future Manufacturing Motivation



## SAP in Manufacturing

- World market leader with about 45% market share
- SAP Manufacturing Solution (Planning, Execution, Quality & Maintenance Management)
- SAP Manufacturing Integration and Intelligence

## Trends (IDC and AMR Research)

- PLM market will grow at a 9.7% through 2011
- Collaborative Product Design
  - 19% PLM license share and 17% growth rate in 2006
- Collaborative decision environments
  - The next big IT investment area in PLM
  - Collaborative decision-making among the top 10 predictions for Product Lifecycle Management in 2008
  - Ontologies and semantics: The next hot topic for decision environments
- Customer Needs Management (CNM)
  - Fastest growing segment of PLM: 14% five-year



# Data Management & Analytics



## Holistic data management

- Distributed file systems (transfer project with NetWeaver)
- Active Information Store (with Palo Alto)
- Corporate data quality (with St. Gallen)

## Data integration

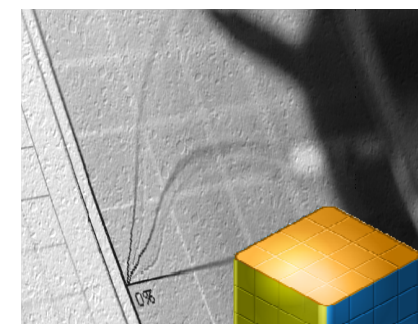
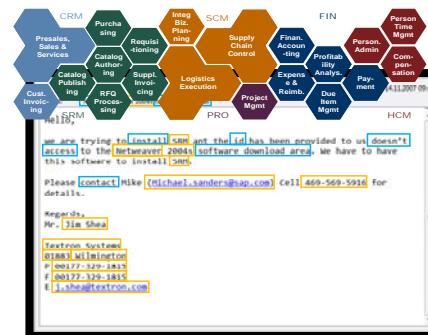
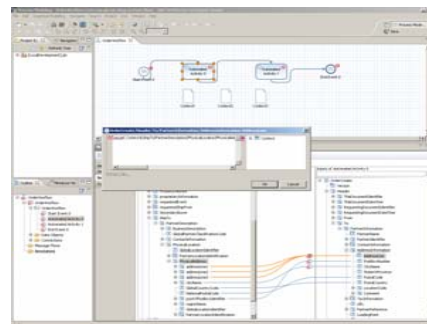
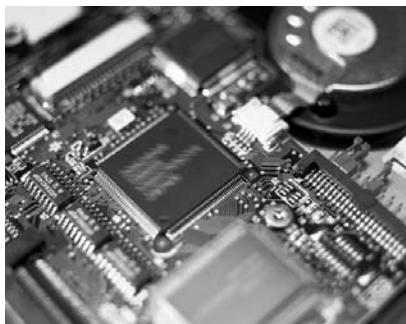
- Semi-automatic data migration
- Semi-automatic message mapping
- Ontology matching
- Matching framework in NetWeaver

## Unstructured information management

- Text mining (with Business Objects)
- Entity centric information management
- Data fusion
- Use Case for SAP Marketplace with SAP KPS

## Data analysis

- High-performance event correlation
- Visual analytics (with Business Objects)
- BI over unstructured data (Article in DB Spektrum)





## Model-Driven Business Application Engineering

- Model-driven development
- Aspect-oriented modeling
- Model transformations and views
- Software product lines

## Service Engineering

- Planning, designing, developing and evolving service based applications
- Enabler for Service Ecosystems
- User Interfaces for services

## Adaptive Applications

- Multi-modal user interface development
- Context-aware applications



# Agenda



## Internet of Services

1. SAP Research @ CEC Dresden
- 2. The Rise of Services**
3. Internet of Services
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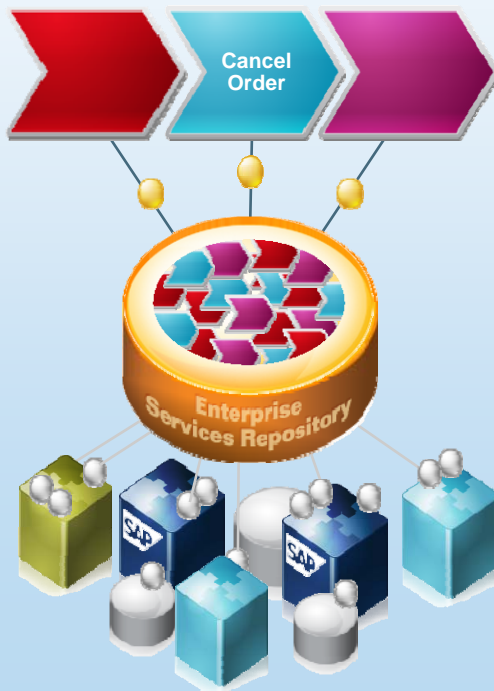
# From Enterprise SOA to The Internet of Services



## TASK-ORIENTED SERVICES

### Enterprise SOA

**Internal value networks...**  
focus on key activities, processes  
and relationships



## COMPOSED ENTERPRISE SERVICES

### Enterprise SOA 2.0

**External value networks...**  
include customers, suppliers, partners, and consumers





## Business

- Service outsourcing – \$1 billion per year per F1000 company on third party services\*
- Globalization of supply/demand biggest trend in service industries
- SaaS growth outpacing expectations\*:
  - \$6.3b in '06
  - \$19.3b in '11



\*[Gartner, IDC, Aberdeen]



# Trends in Globalization of Services (cont'd)



## Commercial Ventures

- DirectGov.uk (UKOnline)
- USA.gov (FirstGov)
- Singapore TradeExchange



### Welcome to the SRII Web site

**2007 FRONTIERS IN SERVICE CONFERENCE**  
SRII would like to encourage you to be part of the Frontiers in Service Conference on October 4-7, 2007 in San Francisco, CA. This conference will focus on topics centered on service productivity and innovation. The

#### FOUNDING PARTNERS



## Research endeavours

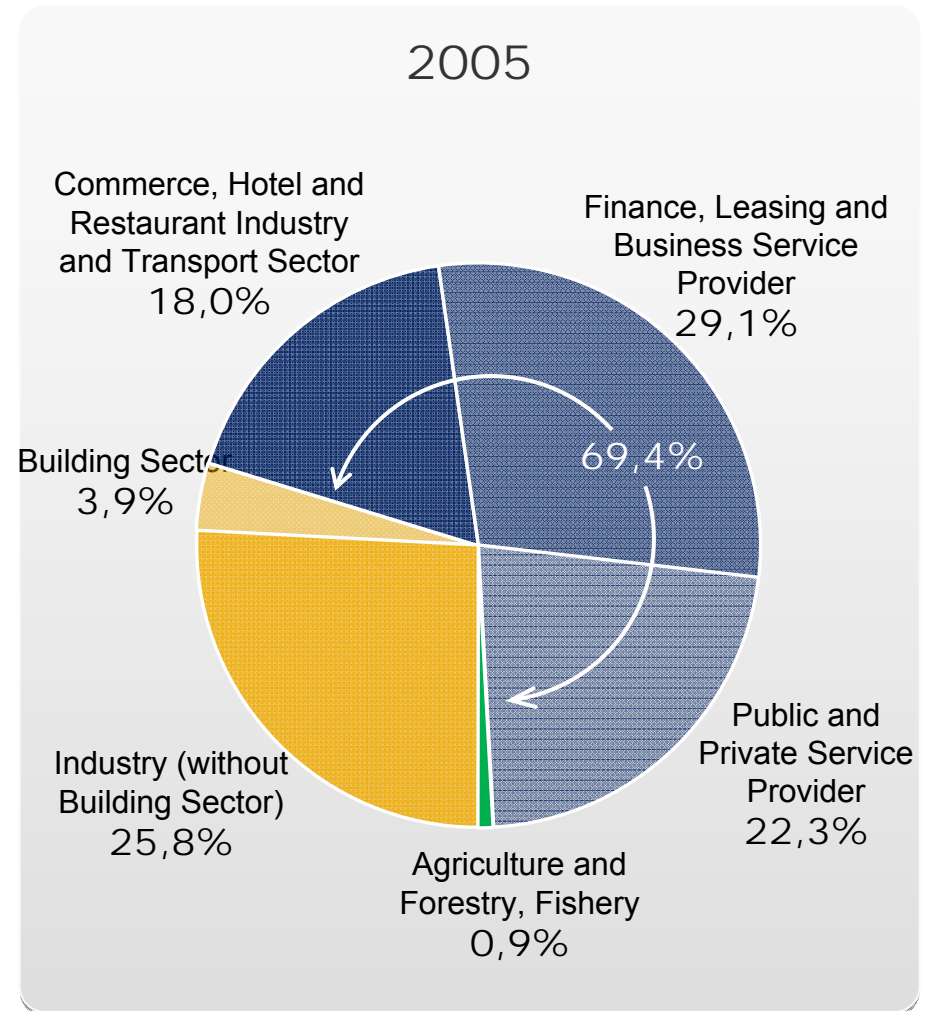
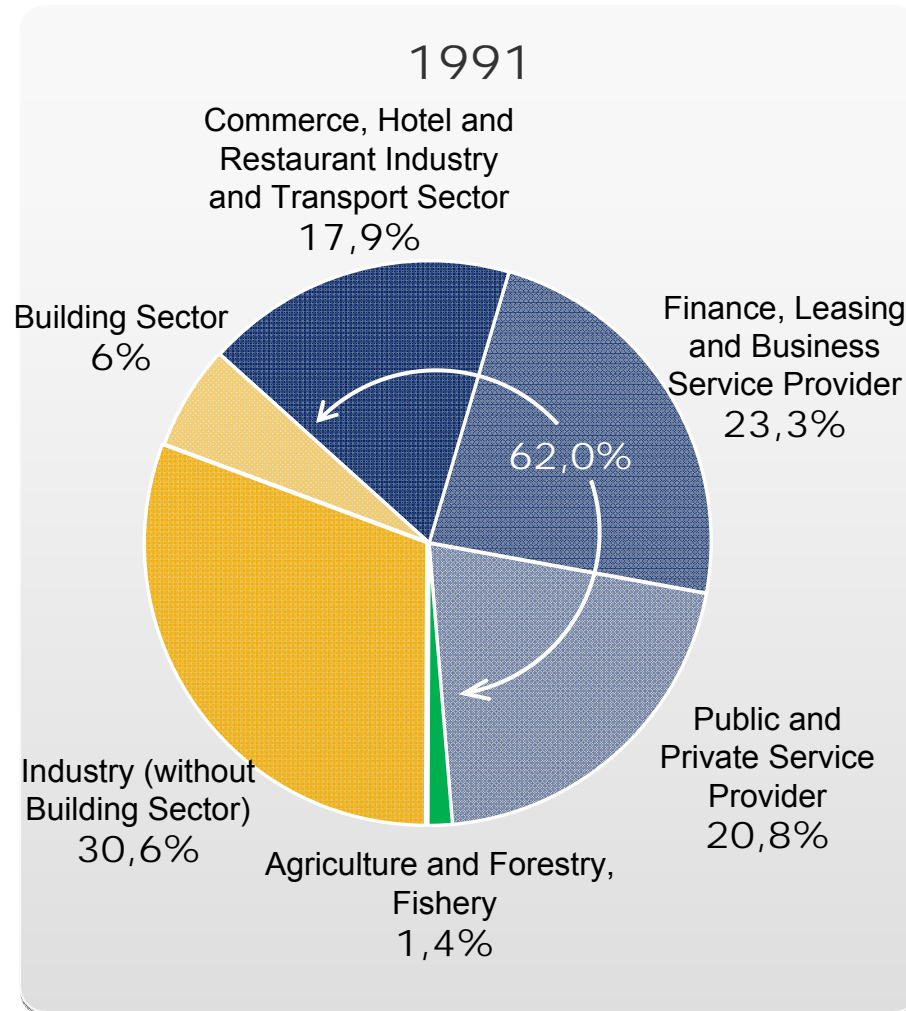
- **Theseus** - German Lighthouse Project (German Govt funded, €250m)
- **Smart Services Research Centre** (Australian Govt funded, €60m)
- **Internet of Services** research field – SAP Research
- **EU FP7** service research projects (EU funded, SAP budget €35.5m)
- Service Research and Innovation Initiative (founded by IBM)



# Trend: "Tertiarisation" Growth through services



## Gross Value Added in Germany

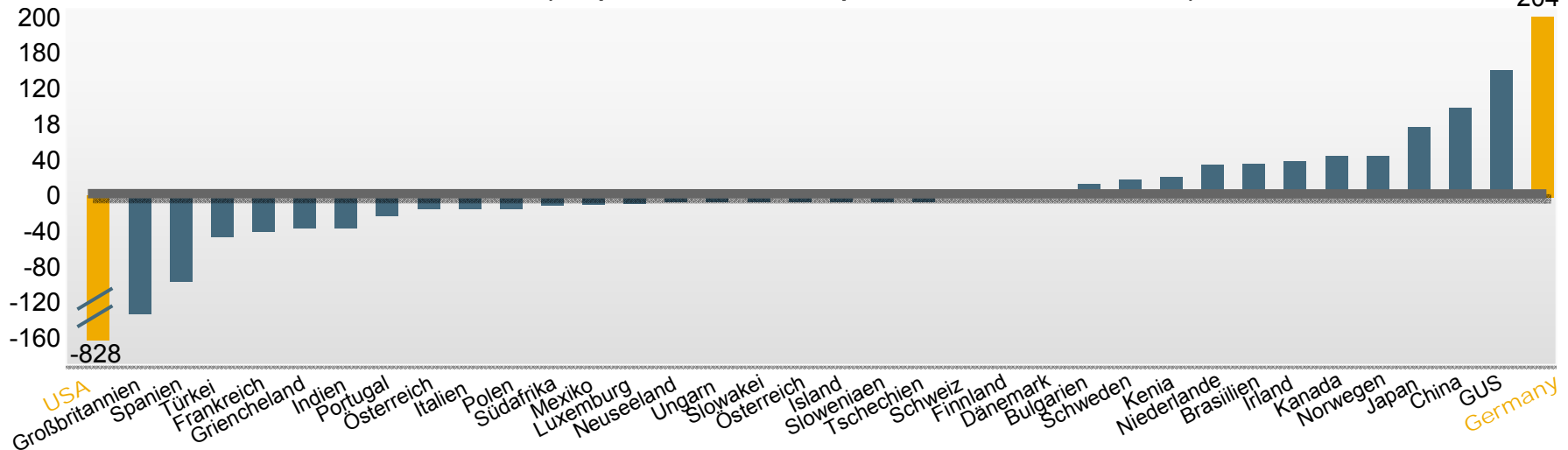




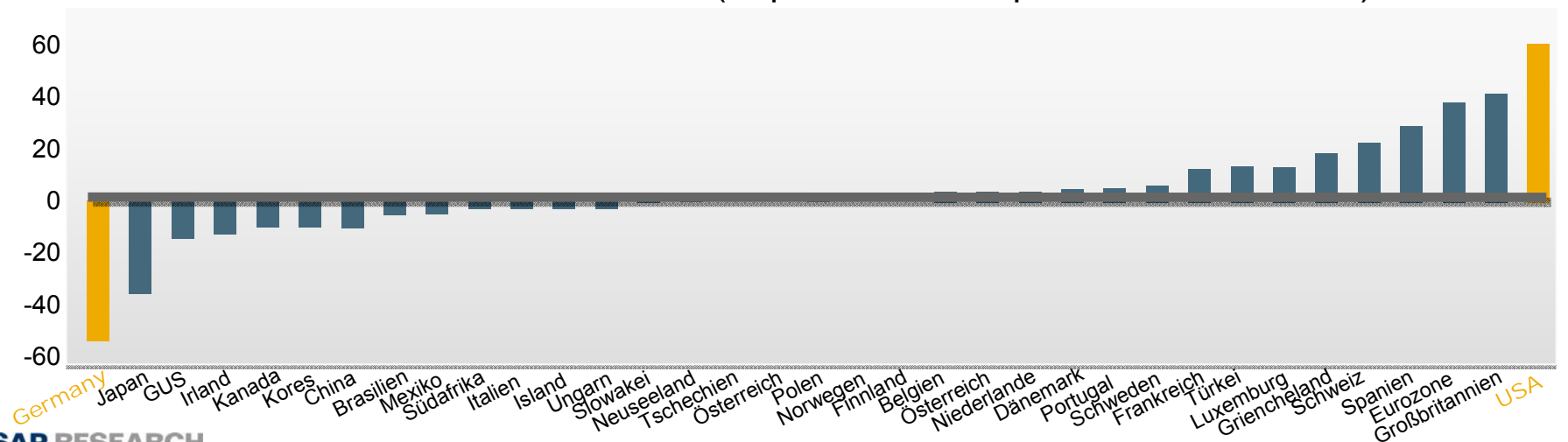
# Trend: Growing international trade German backlog for services



World trade **balance** 2005 (Exports minus imports in bn US-Dollar)



Services trade **balance** 2003-2005 (Exports minus imports in bn US-Dollar)

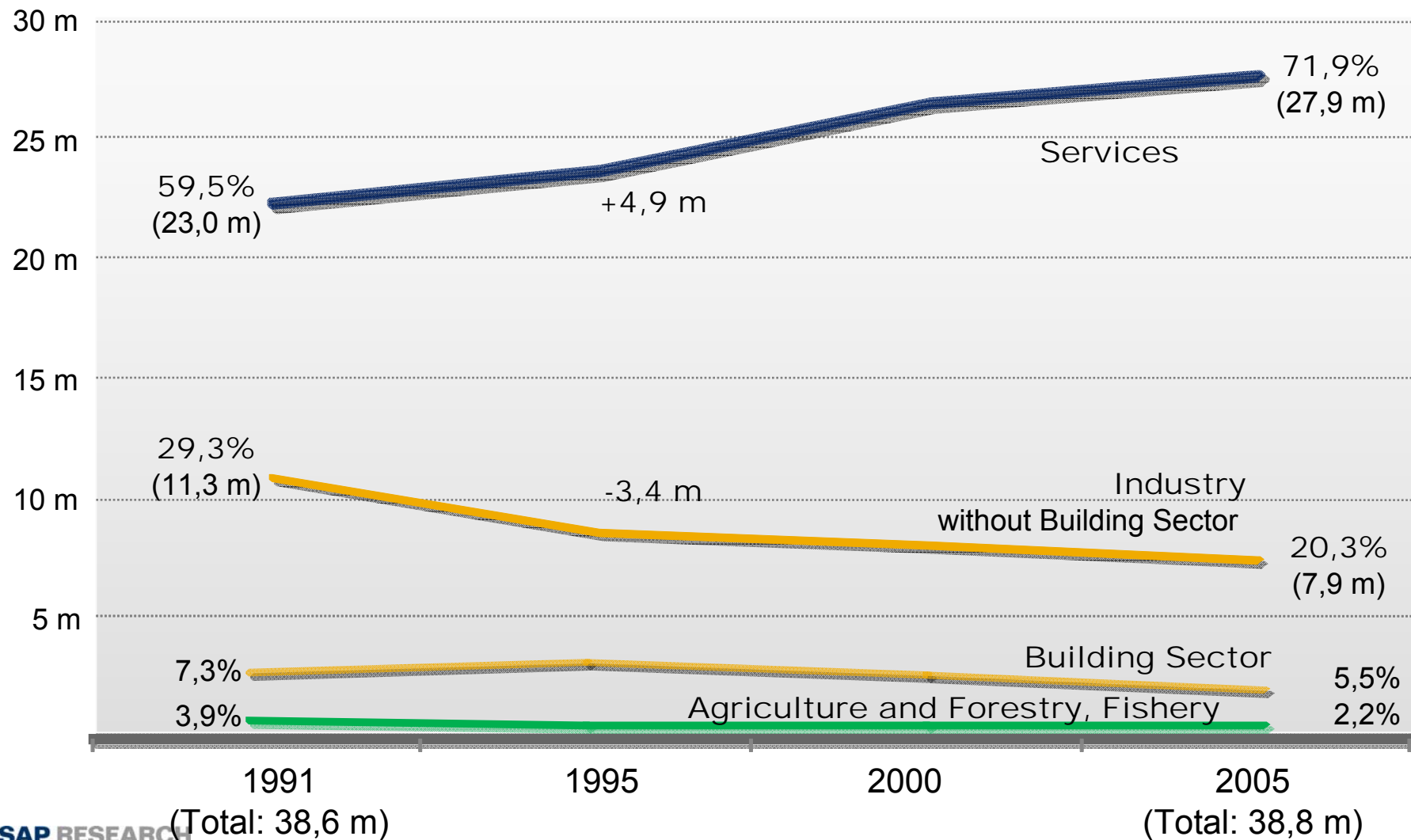




# Trend: Tertiarisation Employment through services



## Employees in Germany

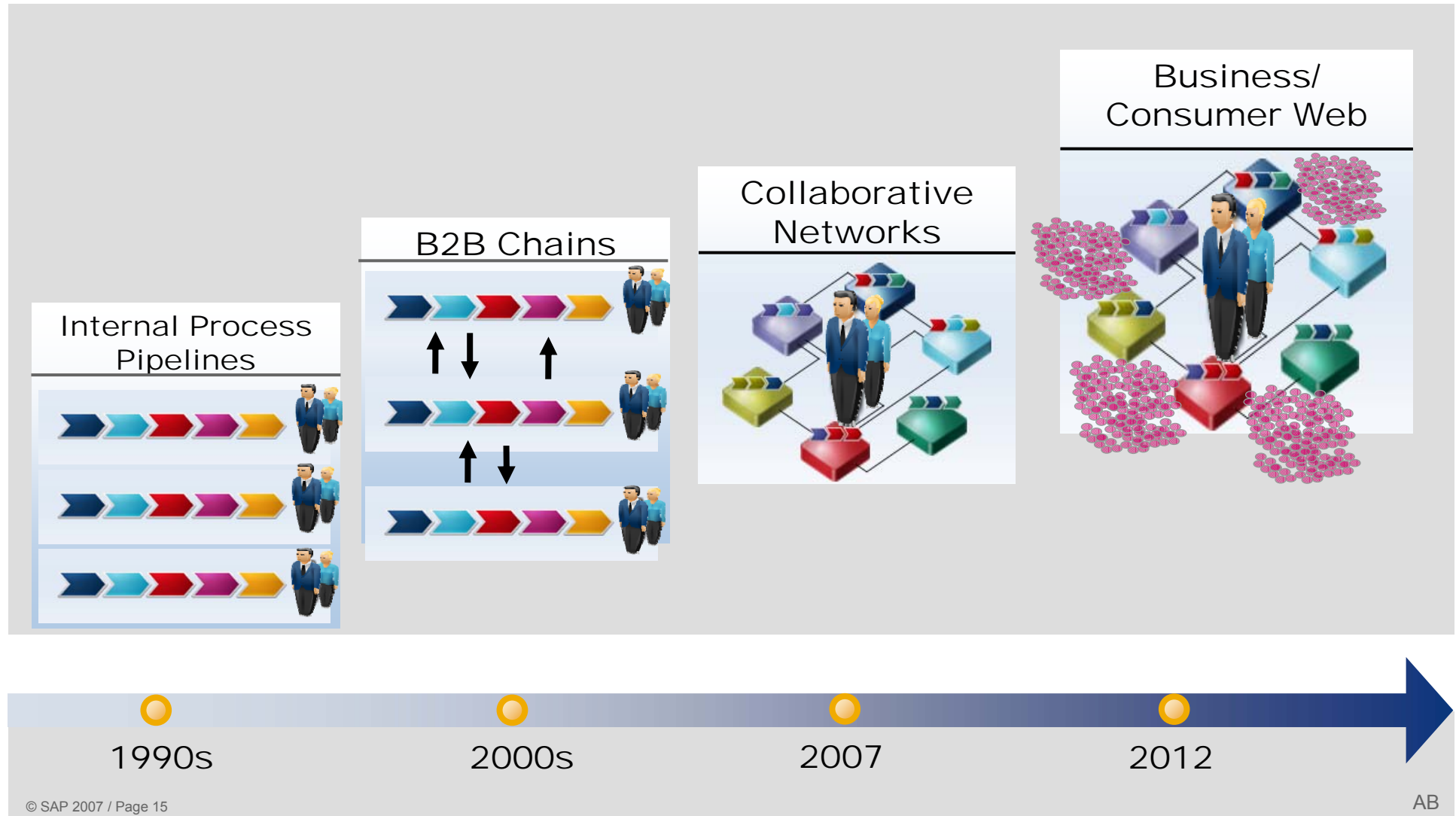




# Business Network Transformation



Towards Lean and Agile Business Processes of the Future!





# Business Network Transformation



Towards Flexible and Lean Business Processes of the Future!

## HARD-WIRED VALUE CHAIN



The End-Customer  
moves to the  
Center  
of the Network!

## BUSINESS WEB



1990s

2000s

2010s



# Convergence

## Physical products and services



From product ...



... to solutions

**HILTI**



Drilling machine



Drilling holes



**NOKIA**  
Connecting People



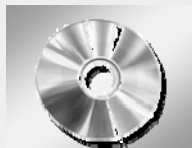
Mobile



Navigation



**SAP**



Software-  
CD



Software  
as a Service





# Service Aspects

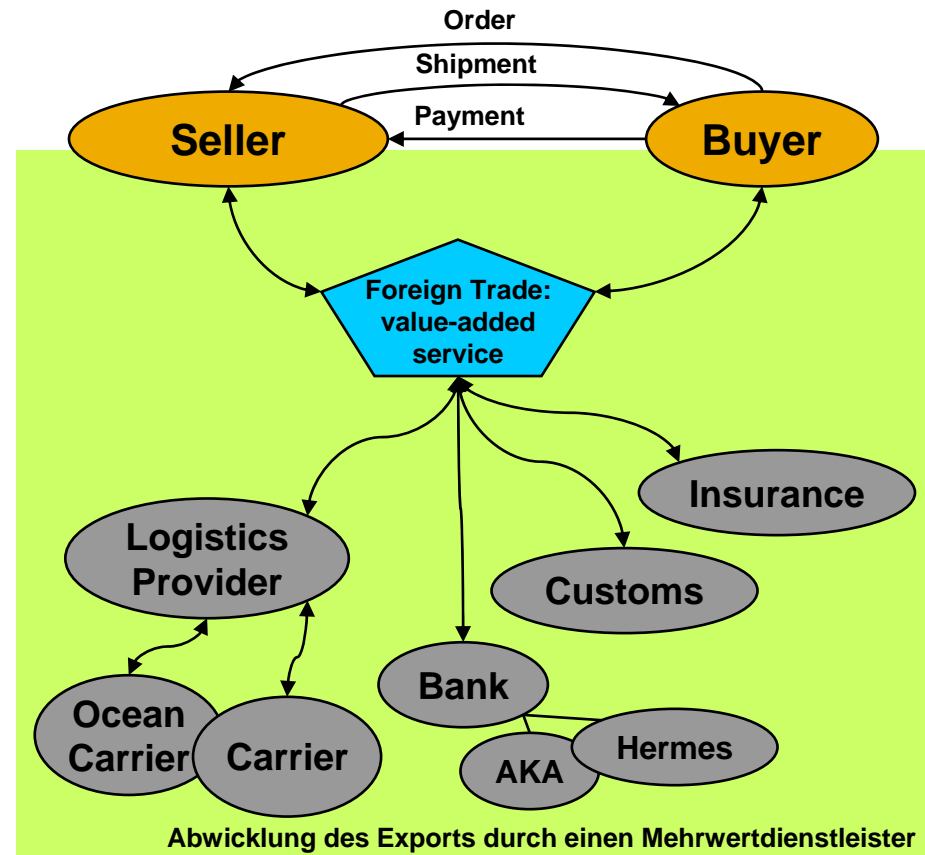
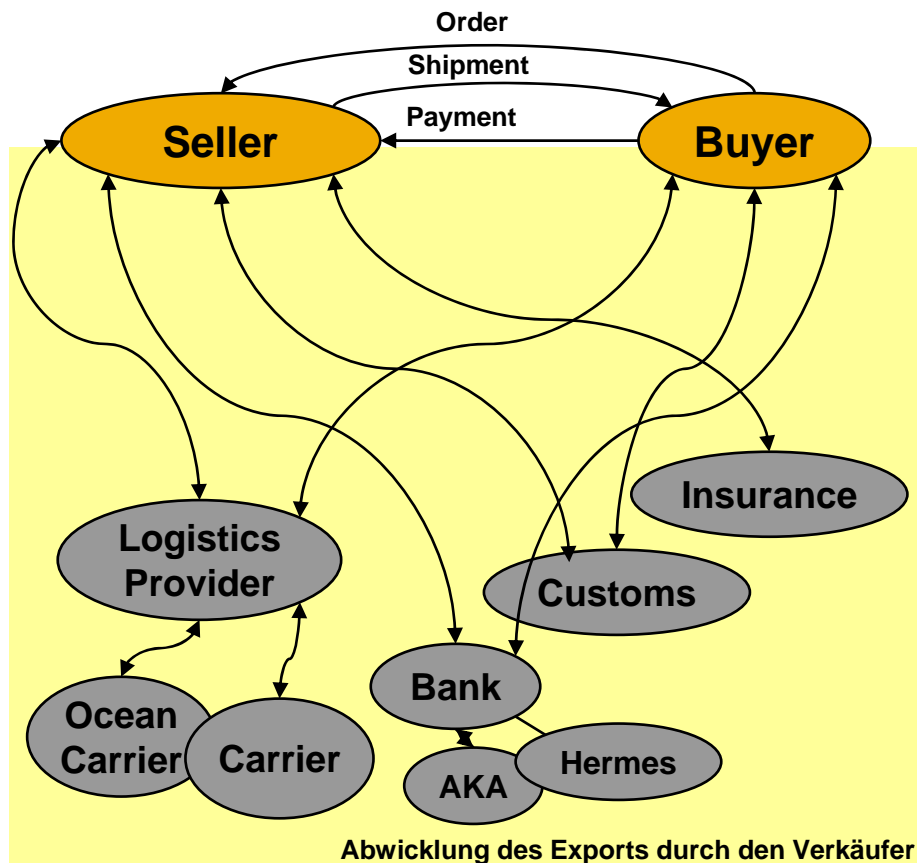
## Exporting Goods in Foreign Trade



Foreign trade processing is a **complex service**

For SMEs, foreign trade processing is **NOT a core competence**

A reliable **value-added service provider** coordinates the process on behalf of the seller





## Agenda



# Internet of Services

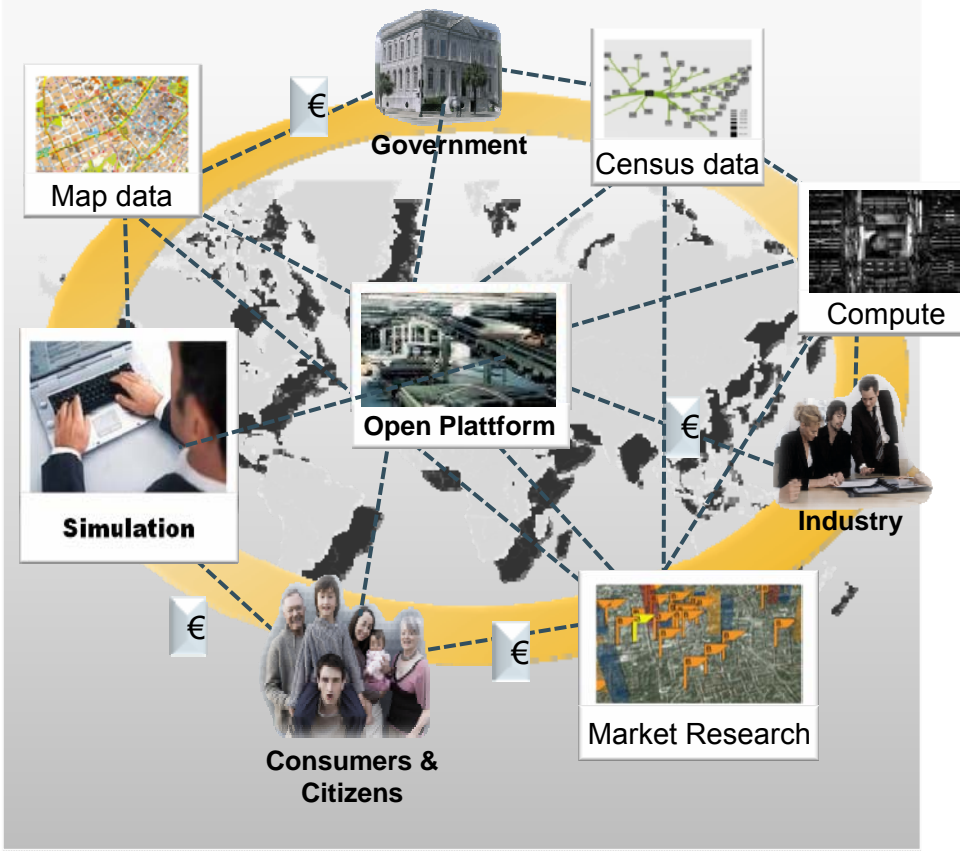
1. SAP Research @ CEC Dresden
2. The Rise of Services
- 3. Internet of Services**
4. Service Engineering
5. Theseus/Texo



# A New Phenomenon Emerges Internet of Services Vision



## Services in a connected world



**A worldwide, trusted  
Service Ecosystem of  
Service Providers, Consumers  
and Brokers  
buying, selling, repurposing and  
composing services  
for different needs**

*- resulting in -*

**A new way of organizing the  
interaction between  
partner ecosystem  
& customer base**



## Definition

### Business Webs are...



“ ... collaborative social networks among enterprises, public organizations and individuals in order to achieve a common set of goals enabled through the Internet of Services.

SAP Research 2006

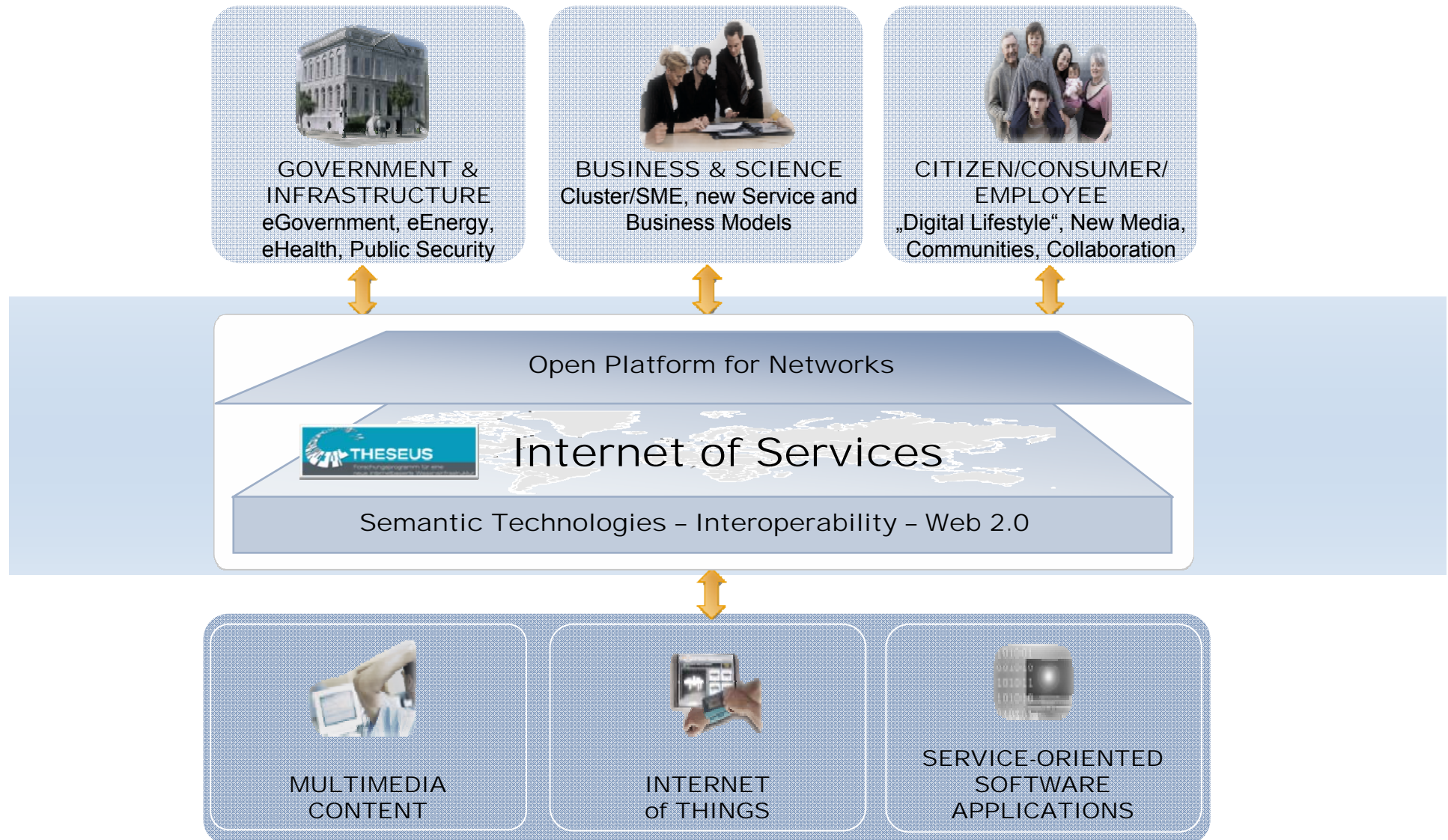
... characterized by:

- \* **utilize Internet of Services via Enterprise SOA.**
- \* **deliver value-added services composed of individual services provided by the members of the Business Web.**
- \* **flexible and dynamic business model implementation and transformation.**
- \* **flexible membership of business partners based on mediation and brokering of their provided services forming a service ecosystem.**





# The Big Picture: Vision of the Internet of Services



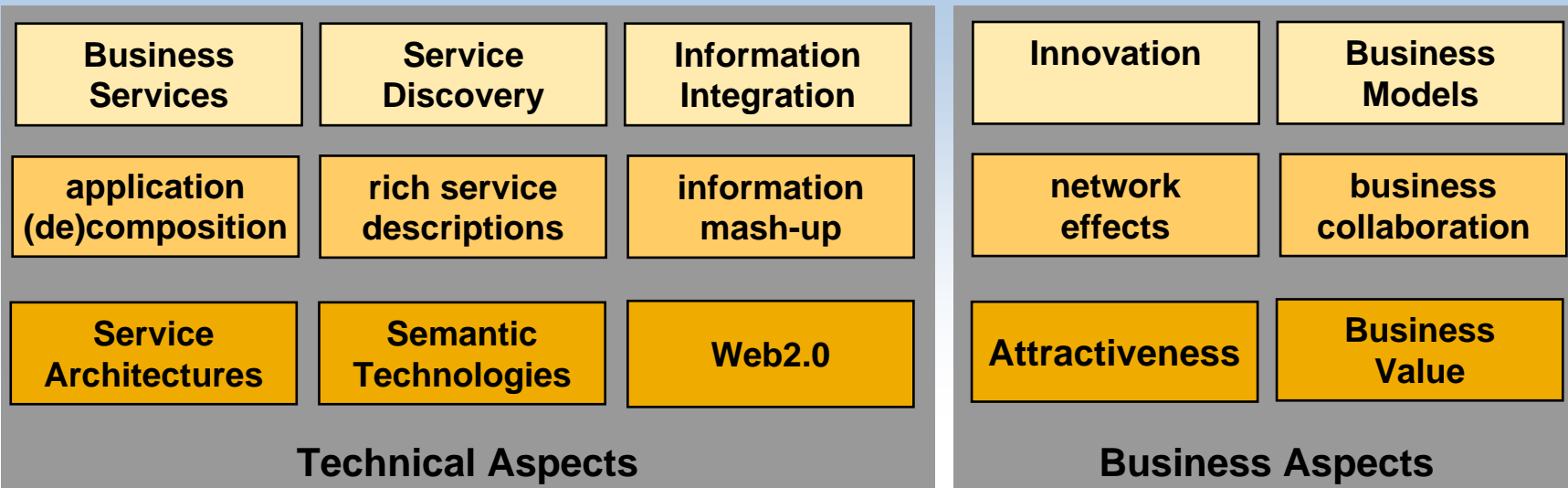


# Overview

## High-level Building Blocks

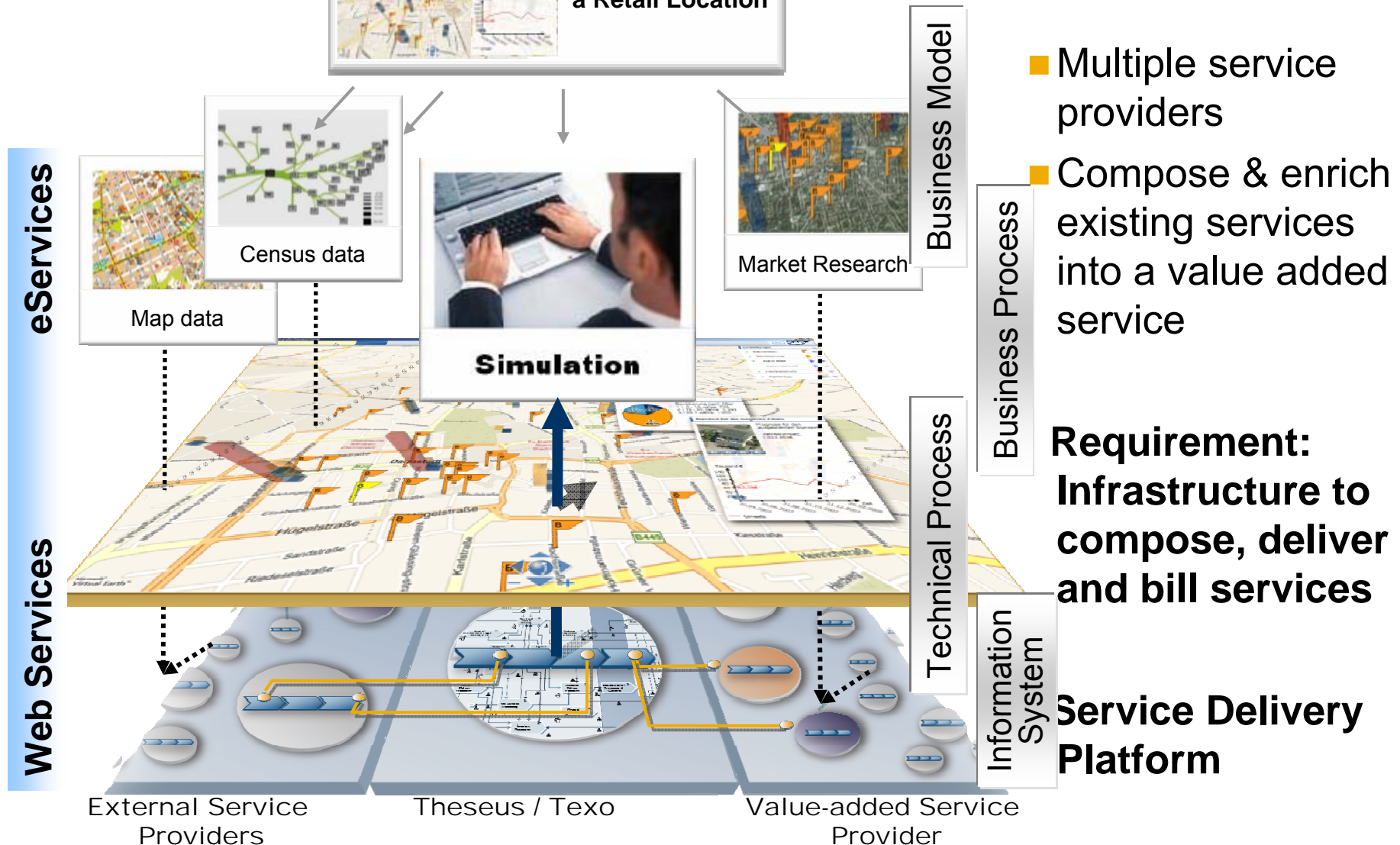


Internet of Services





# Value-added Services: Evaluation of a Retail Location



SAP RESEARCH



# Agenda



## Internet of Services

1. SAP Research @ CEC Dresden
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3. Internet of Services
4. **Service Engineering**
5. Theseus/Texo

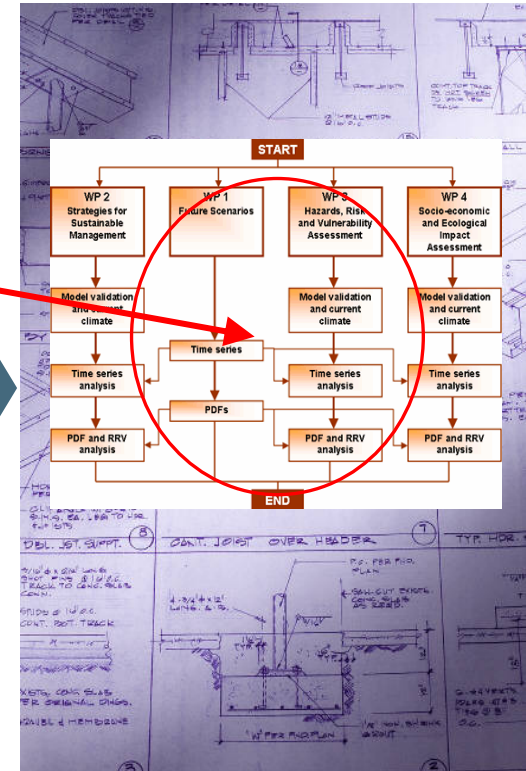
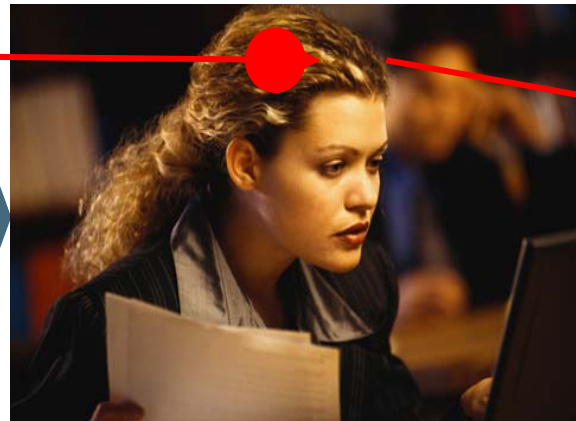


# Services and Models



**A Service**

## Mental model

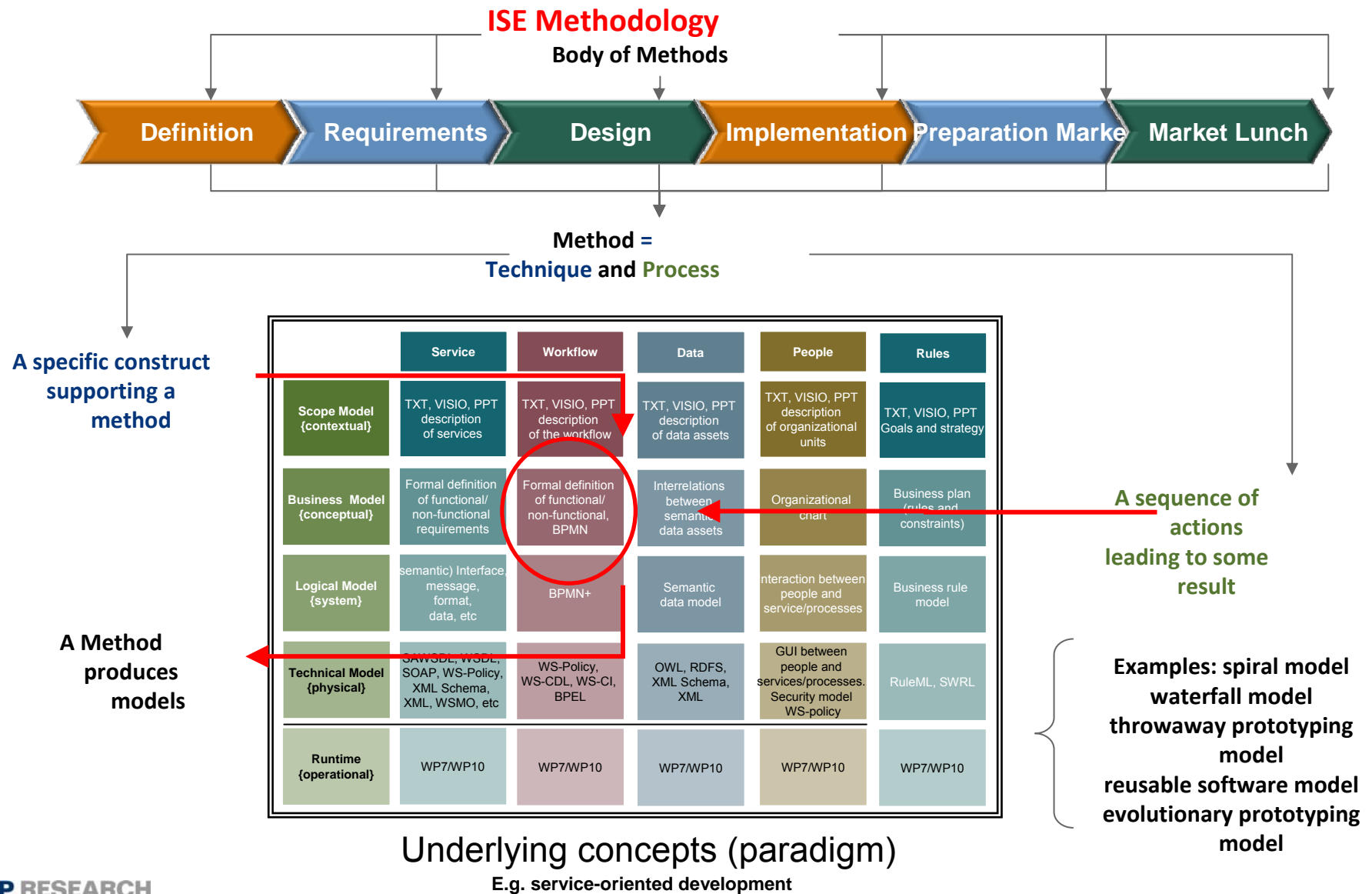


**Model**

A model is an abstraction  
A model only focus on certain aspects  
A model is created to describe a phenomena

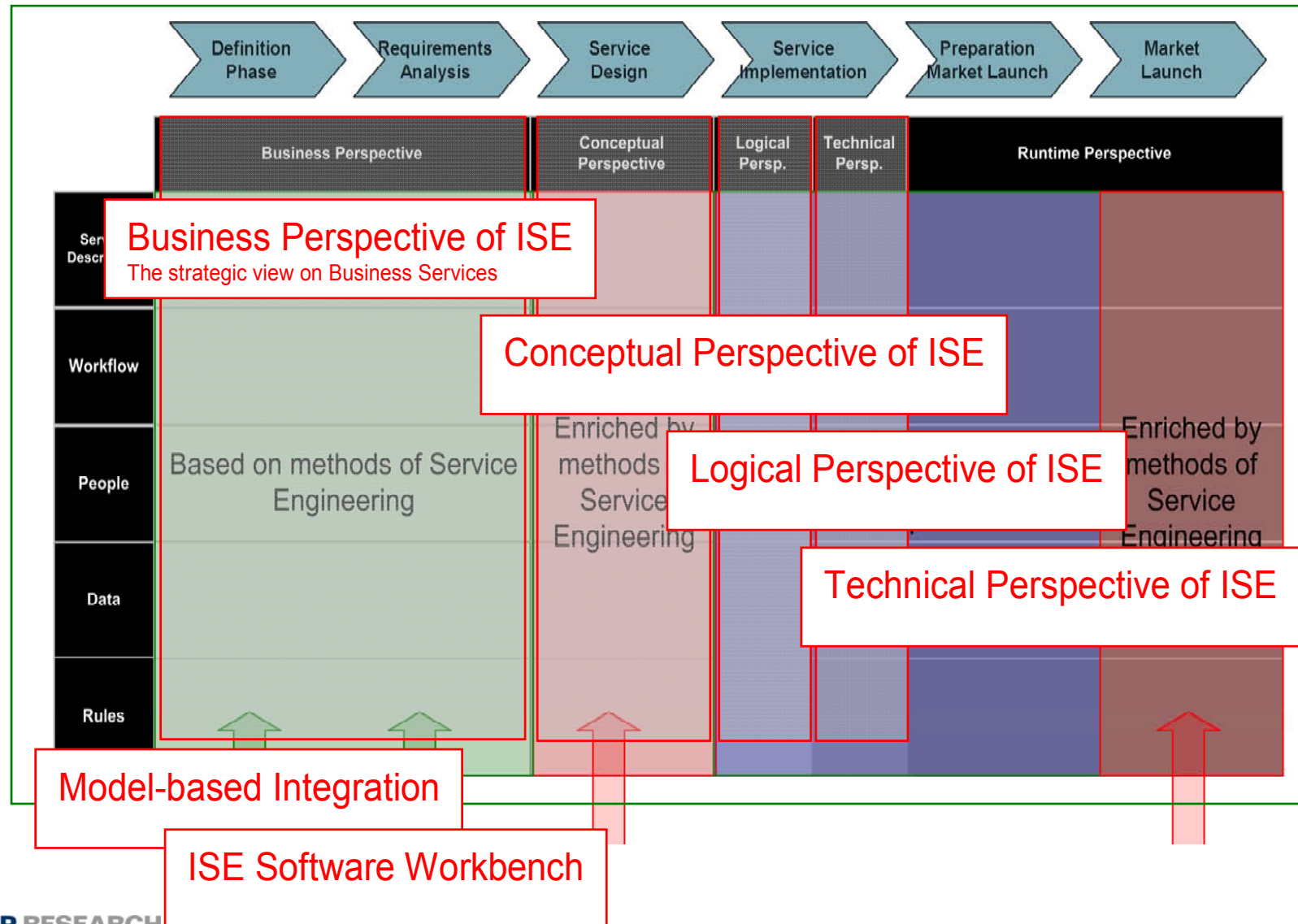


# ISE Methodology





# Model-driven Service Engineering





# ISE Workbench Model-driven Service Engineering



**News - 22.04.2008**  
**alpha d6.3.1 available internally**



# ISE Workbench Model-driven Service Engineering



**ISE Service Model Wizard**  
Please select which models should be initialized.

Category Selection

Service	Workflow	Data	People	Rules
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Model Selection

Scope Model	Mind Map	Mind Map	Mind Map	Mind Map	Mind Map
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Business Model	UML Component	UML Activity	UML Class	UML Use Case	OCL
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Logical Model	UML Op. Class	BPMN	UML Ontology Profile	Diamondl	Decision Table
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Technical Model	WSDL	BPEL	OWL	CAP	Drools
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

**ISE Service Model Wizard**  
Please choose the names of the initial models.

Model	Filename
Service - Mindmap	Mindmap
Service - UML-Component	umlComponent
Service - tba	umlOPClass
Service - WSDL	WSDL
Workflow - Mindmap	Mindmap
Workflow - UML-Activity	umlActivity
Workflow - BPMN	BPMN
Workflow - BPEL	BPEL
Data - Mindmap	Mindmap
Data - UML-Class	umlClass
People - Mindmap	Mindmap
People - UML UseCase	umlUseCase
People - Diamondl	Diamondl
People - Cap	Cap
Rules - Mindmap	Mindmap
Rules - tba	DecisionTable
Rules - tba	drools



# ISE Workbench Mindmaps



Executive



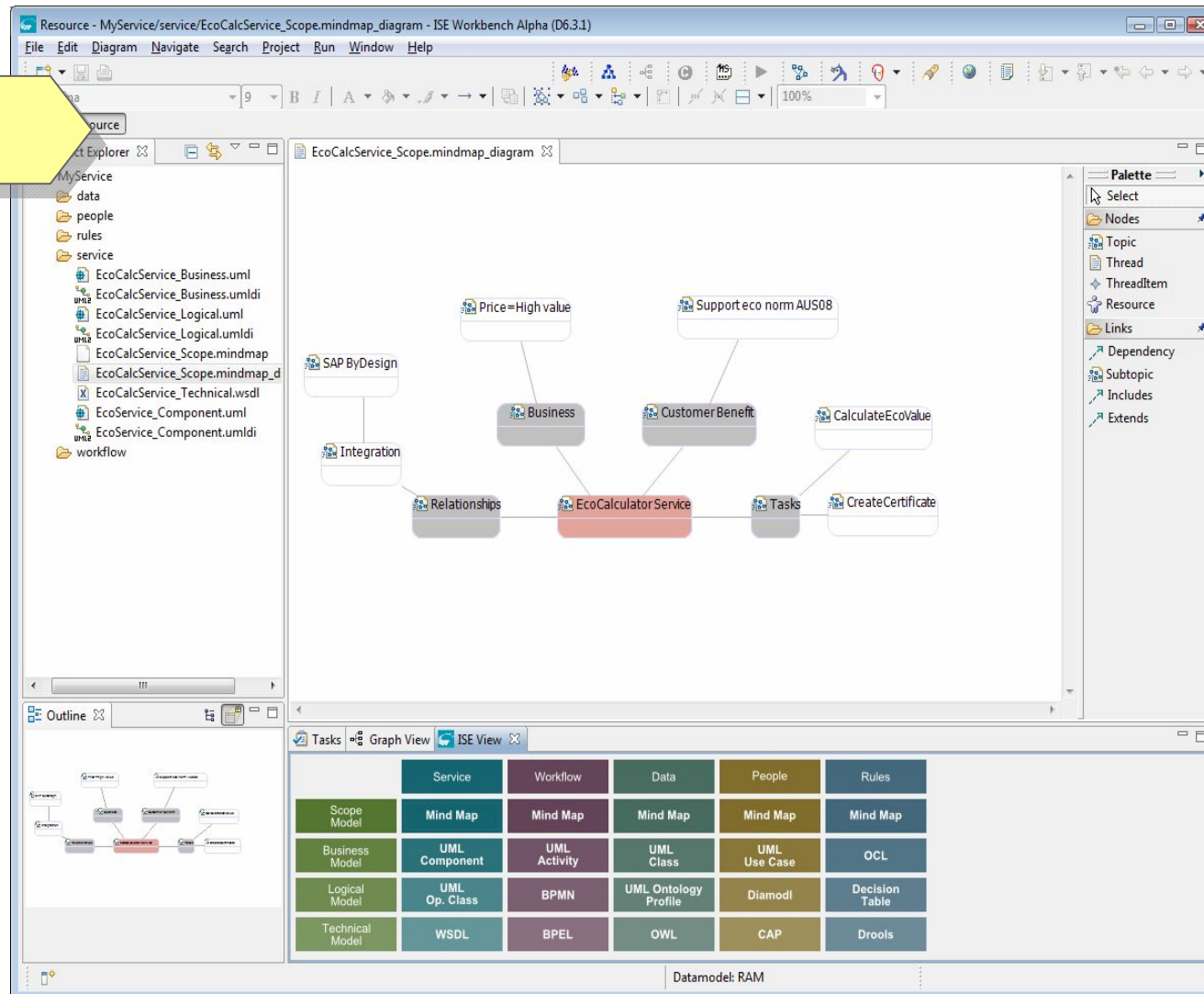
Manager



Business Analyst



Process Architect





# ISE Workbench BPMN



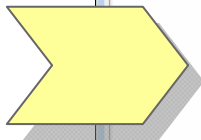
Executive



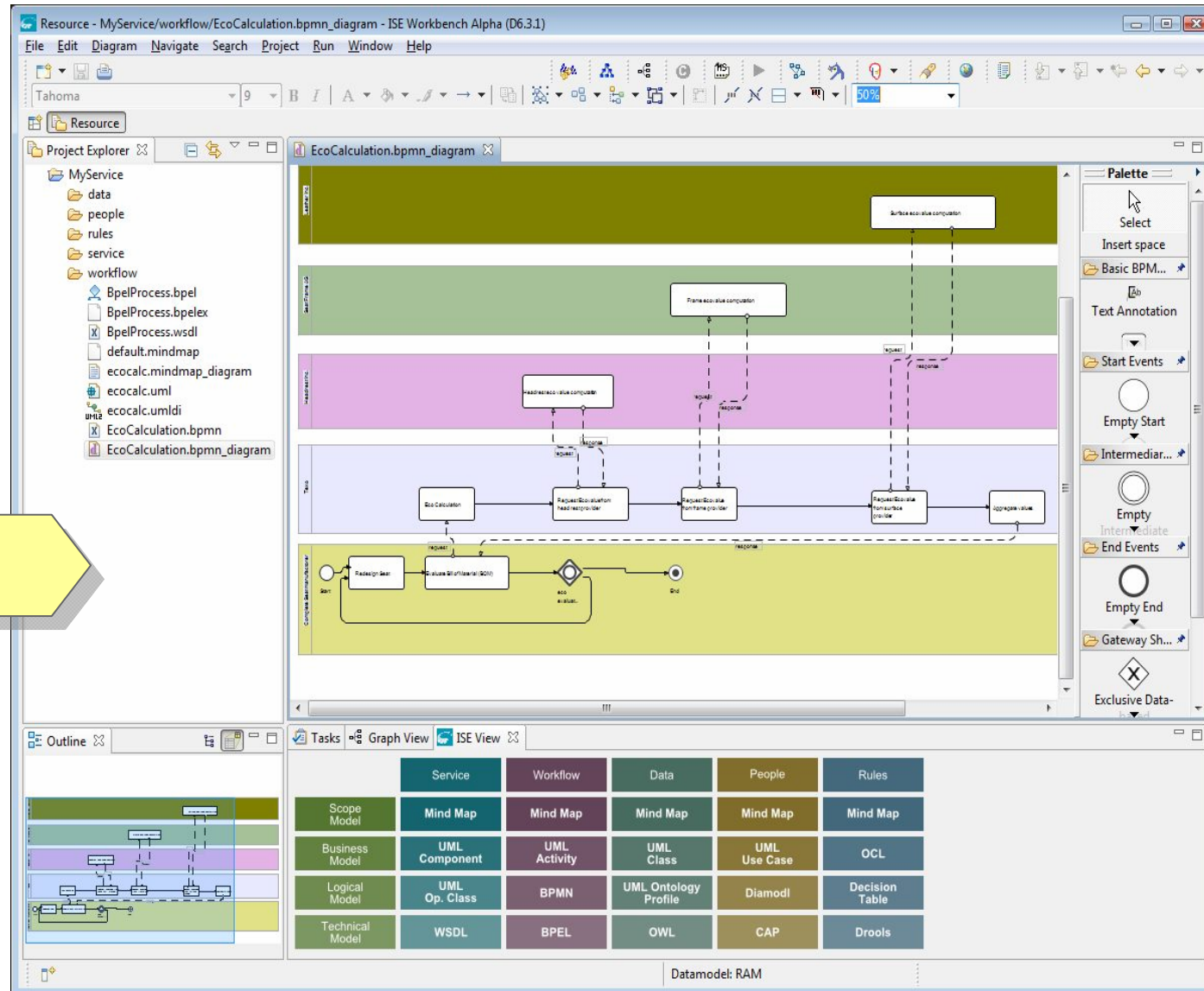
Manager



Business Analyst



Process Architect



SAP RESEARCH



# ISE Workbench BPEL



Executive



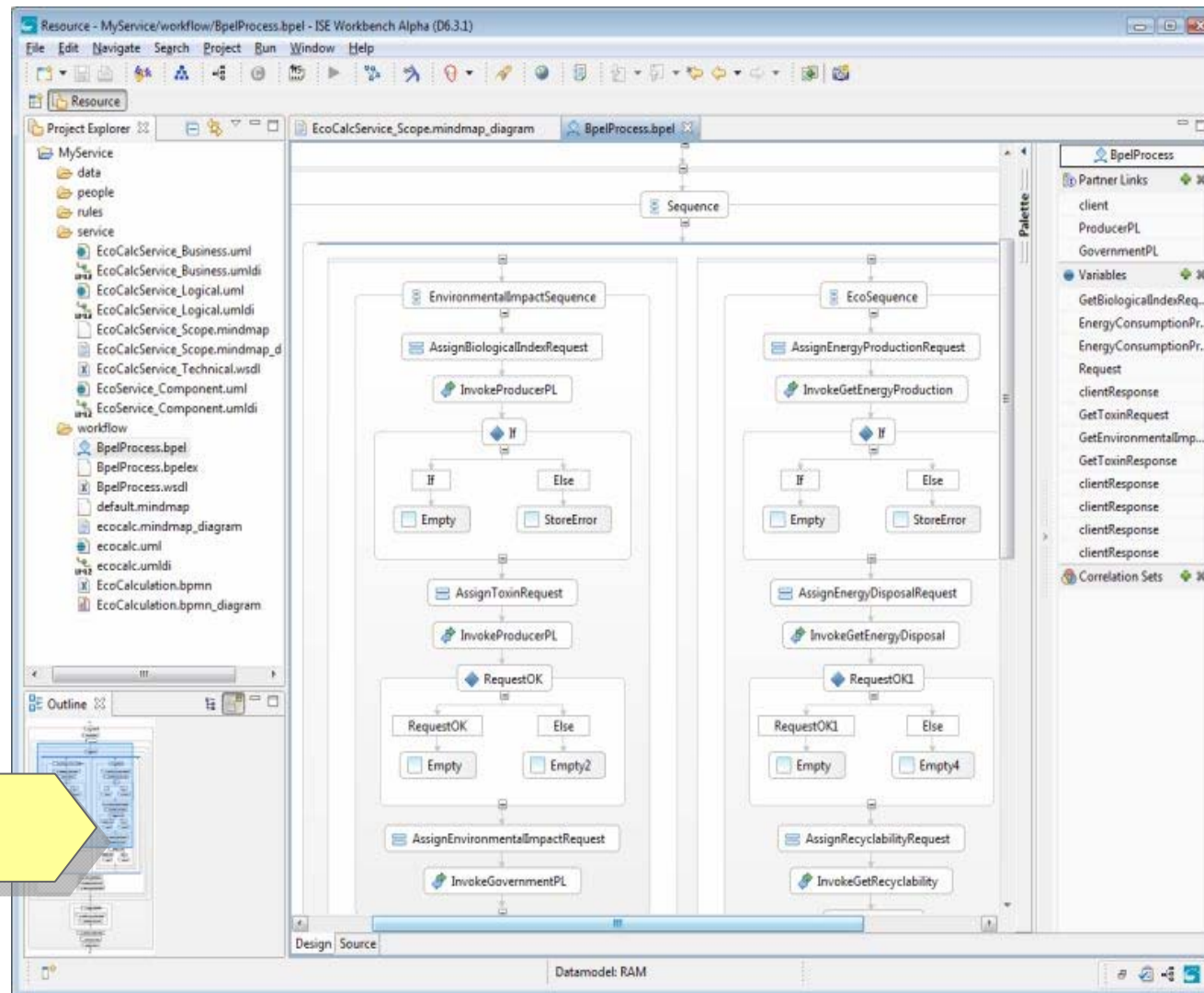
Manager



Business Analyst



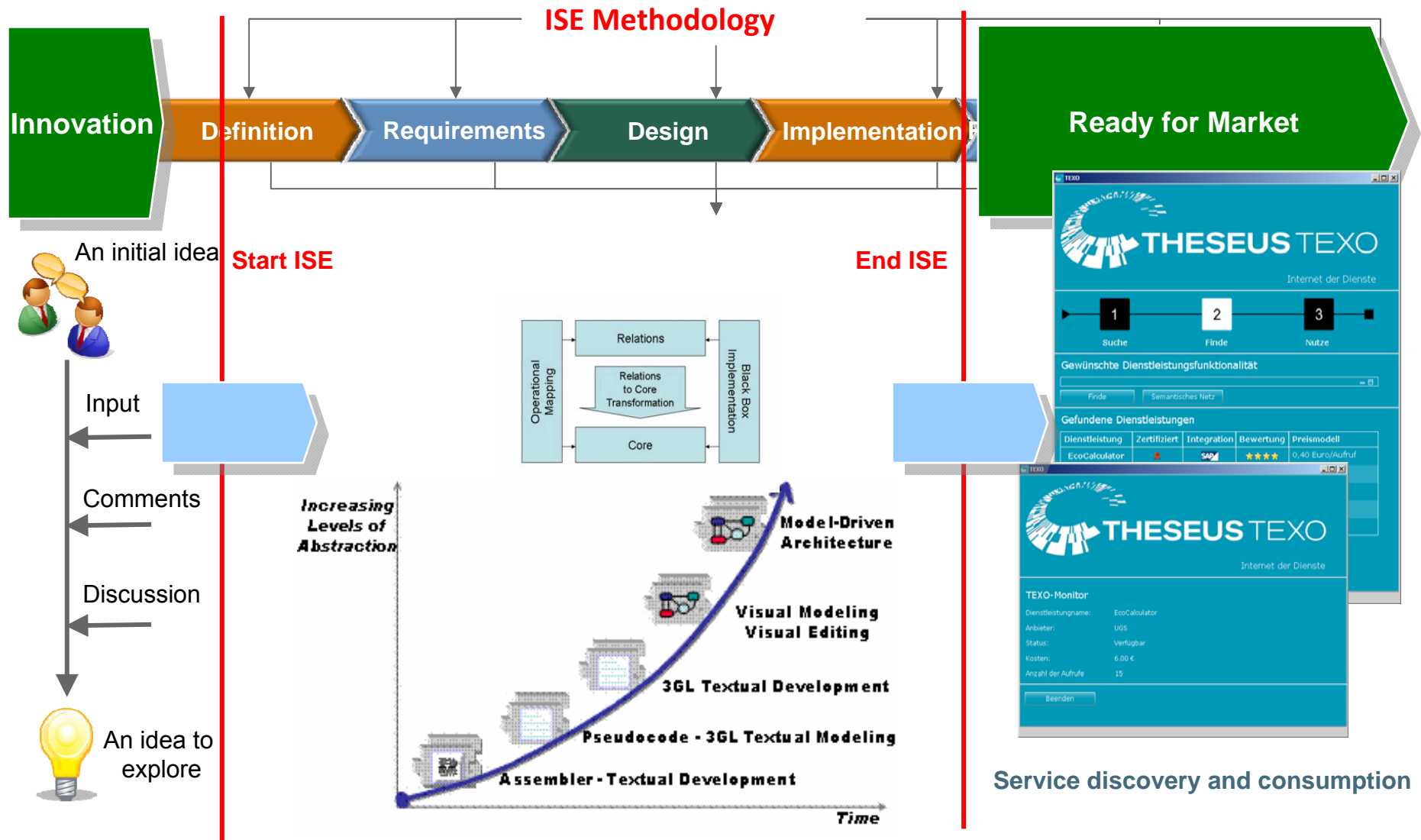
Process Architect



**SAP RESEARCH**



# Where does ISE starts and stops?





# Agenda

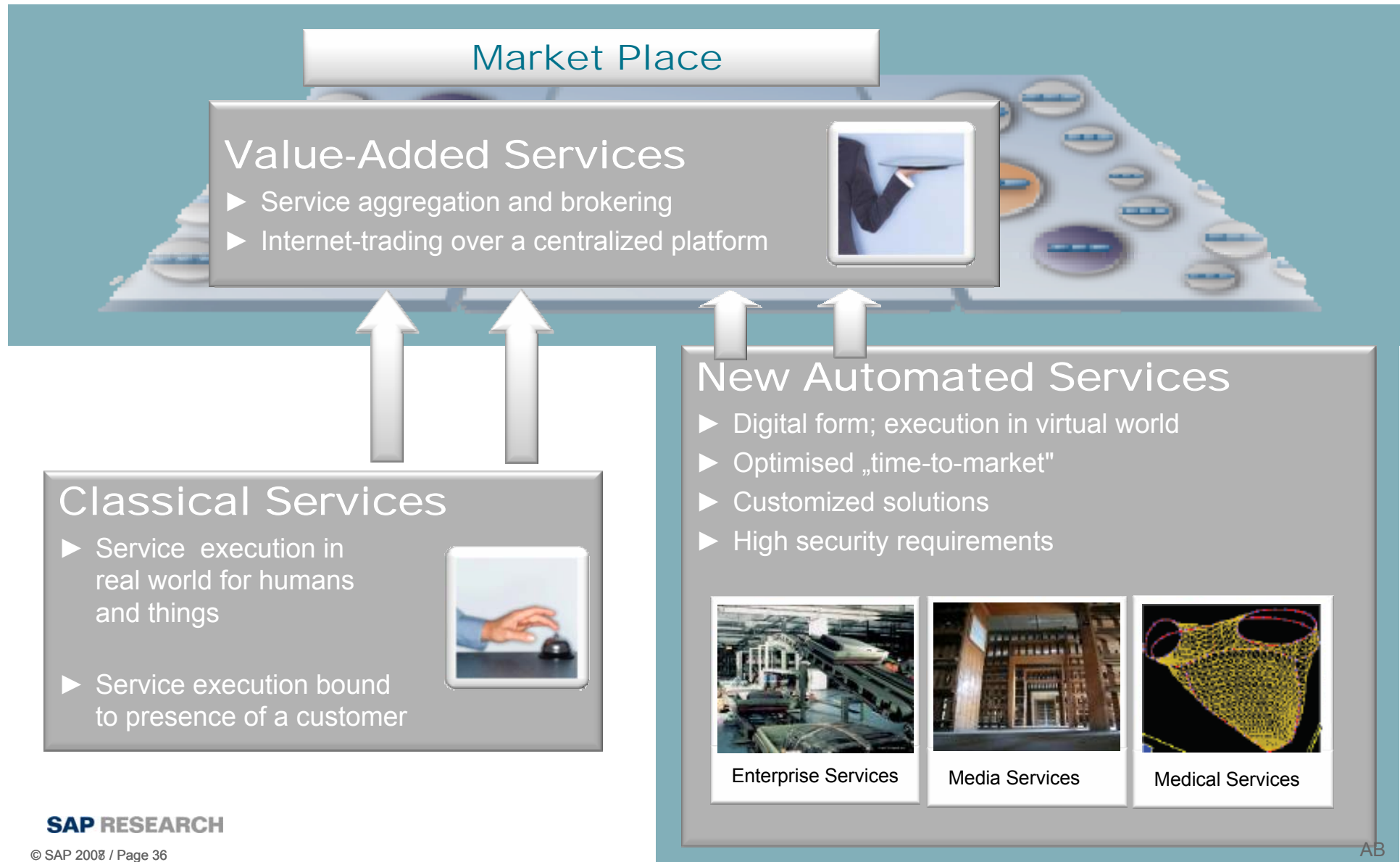


## Internet of Services

1. SAP Research @ CEC Dresden
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5. **Theseus/Texo**



# Internet of Services Project THESEUS/TEXO





# THESEUS National Research Program Structure and Partners



■ **TEXO:**  
“The Future  
Business Value  
Network”

■ “Scalable  
Semantic Image  
Search in Medicine”  
■ “The semantic  
enterprise”

■ “Organizing  
your digital life”

■ “The world is  
your audience”  
■ Management of  
cultural assets  
in digital form”

**Theseus  
Use Cases**

**Business Web**

**Medical Web**

**Consumer &  
Business Web**

**Consumer Web**

**Vision**

Market Leader for  
Business  
Applications

Market Leader for  
Applications in the  
Health domain

Market Leader for  
Content and  
Services

Content owners  
and providers



**Industry  
partners**



**Ecosystem**



# Partners



## ■ Industriepartner

- SAP (Mitarbeit in allen WPs, Management)
- Siemens (Plattform-Dienste, Community Mining)
- Empolis (Dienst-Suche und Hosting-Plattform)

## ■ KMUs

- Ontoprise (Werkzeuge für semantische Annotation)
- Intelligent Views (Management der Zugangsrechte)

## ■ Forschungsinstitute

- FZI (Semantik für das Business Web, Business Modelle)
- DFKI (Schnittstelle für mobile Nutzer)
- FhG IGD (Benutzerschnittstelle, Mash-up)
- FhG IAO (Dienst-Innovation)

## ■ Hochschulen

- TU Darmstadt (Dienst-Orchestrierung, Governance)
- TU Dresden (Dienst-Komposition, Datenströme)
- TU München (Dienst-Innovation, Performance-Analyse)
- TU Karlsruhe (Rechtsfragen)

**SAP RESEARCH**



Universität Karlsruhe (TH)  
Forschungsuniversität • gegründet 1825



# live demo of texo scenario



# Illustrating the Internet of Services Vision

## The Eco Calculator



PLM
Extra
Hilfe

Projekte
Dokumente
Anforderungen
Analysen

**Schreibung**

... Anforderungen an das Gewicht:

... nicht mehr als 34 kg wiegen (inklusive ... ng).

... n:

**Produktänderungen**

Detail	Datum	Geändert von
Qualitätsproblem gelöst	10.05.2007	Brosmann
Gewicht verringert	15.05.2007	Cruise
Rückenlehnen-Lieferant	30.05.2007	Arnold

\* Die Stückkosten dürfen bei 50.000 Stück nicht mehr als

**Produkt-3D-Darstellung**

ProduktNr: DMR2007

Volumen: 0,750 M3

Nettogewicht: 20,5 Kg

Bruttogewicht: 24,3 Kg

Setze Stücklistenstatus ▼

**Produktkomponenten**

Komponenten	Lieferanten
Kopfstütze, HR01	PDK
Rückenlehne, BR2003	KarSub
Sitzschale, SH2006	Autoliv
Drehknopf, RNO1999	Autoliv
Gurtschliesser, C343	Automatikteile

**Aufgaben**

- ☒ Einhaltung der ECO-Vor
- ☒ Sitzfarbe überprüfen
- ☒ Reise genehmigen
- ☒ Auswertung der Anweni

**Aufgabenbeschreibung**

☒ **Einhaltung der ECO-Vorschrift**

Die ECO Vorschrift „AUS-ECO-Balance 2007“ vom 1. Dezember 2007, setzt hohe Ökobilanz-Anforderungen an alle importierten Waren. Alle nach Australien importierten Waren müssen die Zielvorgabe 85% ECO Value nachweisen.

**ECO-Vorschrift**

Neu Starten
Weiterleiten
Übernehmen
Status setzen ▼

Verantwortet von: David de Signer

Fällig am: 23.12.2007

Priorität: hoch

Datum: 10.12.2007

Fortschritt: 80 %





- Growth of services worldwide
  - Service trade balance
- Convergence Physical products and services
- New technical infrastructures to deliver services
- Service Engineering
- Marketplaces for services
- Theseus and Texo
- Challenges for Service infrastructures
  - Semantic technologies
  - Innovation
  - Business models



Thank you!