

The Internet of Services

„TEXO and ADiWa“

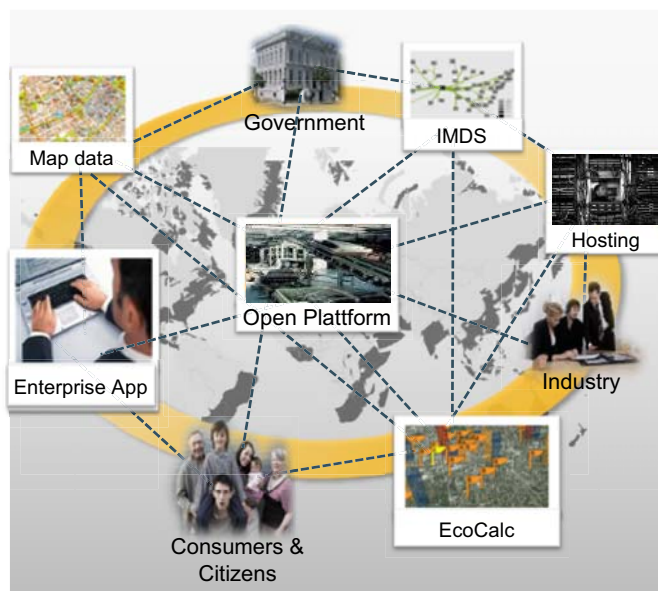
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The Internet of Services Vision

Services in a connected world



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

- resulting in -

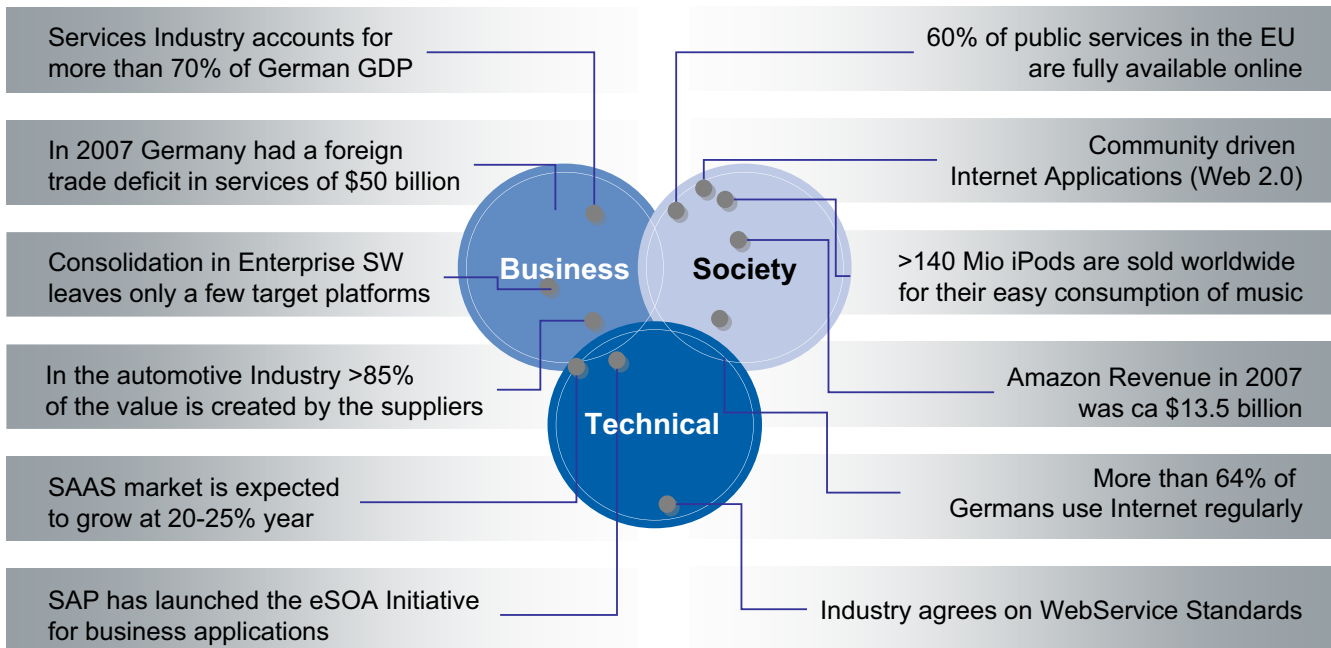
**A new way of organizing the
 interaction of stakeholders**

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Driving the Internet of Services

Motivating trends



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Outline

- Project objectives & involved partners
- The TEXO Service Lifecycle
- Selected TEXO outcomes along the lifecycle
- What is the DFKI working on in TEXO?
- Internet of Services vs. Internet of Things?

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TEXO Partners

Companies, Research Institutes, Universities

- Siemens AG
- Empolis GmbH
- SAP AG
 - jCOM1, b2m Software AG
- Ontoprise GmbH
- intelligent views GmbH
- DFKI: Prof. Wahlster
- FZI: Prof. Studer, Prof. Weinhard
- FhG IAO: Prof. Spath
- FhG IGD: Prof. Fellner
- TU Darmstadt: Prof. Gurevych, Prof. Mühlhäuser, Prof. Steinmetz
- TU Dresden: Prof. Lehner, Prof. Schill
- Uni Karlsruhe (TH): Prof. Dreier
- TU München: Prof. Bichler, Prof. Krcmar
- All in all ca. 55 full-time researchers work on the project



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TEXO Mantra

Project goal

Services will

- become **tradable &**
- **composed** from services of different providers
- be offered, delivered & executed automatically & **supported by IT**

TEXO will offer

- **customized & personalized** services
- **community** involvement to improve services, both for providers & consumers of services
- seamless & smooth adaptation and **integration of services into the user environment**

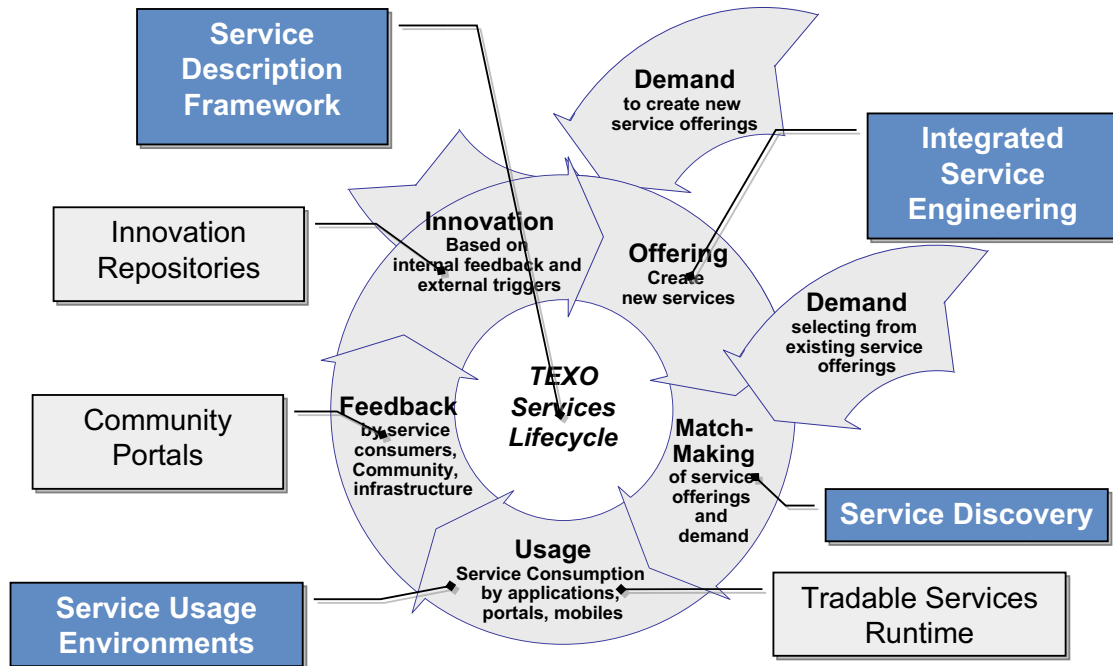
TEXO will provide the concepts, components and infrastructure for the Internet of Services



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TEXO addresses the complete services lifecycle which is driven by innovation and demand

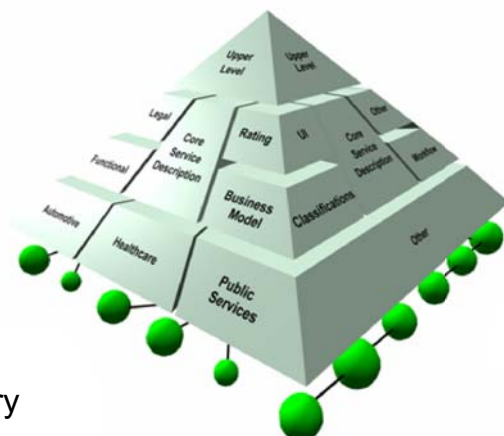
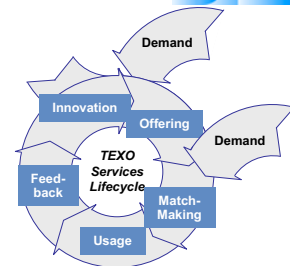


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Service Description Contribution to TEXO and benefits

- Normative means of service description required
- Existing WS* descriptors are not enough
- We need to consider also pricing, legal, marketing, etc. *aspects* spanning all *phases* of the service lifecycle
- TEXO contributes
 - Different layers of service description
 - To support different kinds of use cases
 - Reference processes for governance of service descriptions
- Benefits: Formal semantics, reasoning capabilities
 - Identification of legal consequences
 - Faceted service browsing
 - Context-aware semantic service discovery
 - ...

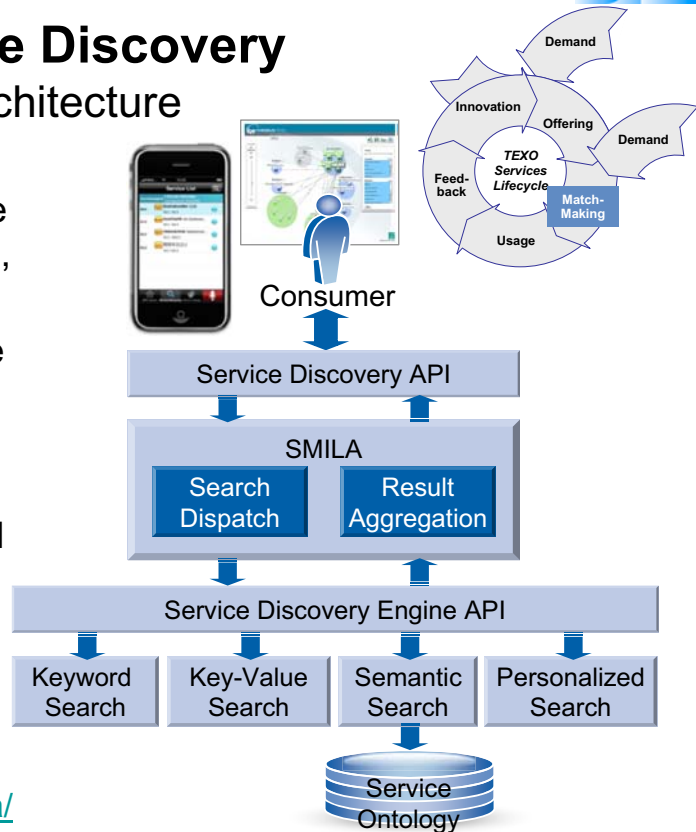


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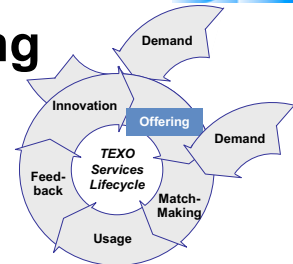
Service Discovery Architecture

- Service Discovery accessible via browser-based interfaces, RIAs, or mobile devices
- All these interfaces adopt the same unified discovery API
- This API is exposed by a SMILA component that acts as a meta search engine and as an integration point for diverse concrete search engines
- For more information on SMILA, see <http://www.eclipse.org/smila/>



Integrated Service Engineering Requirements

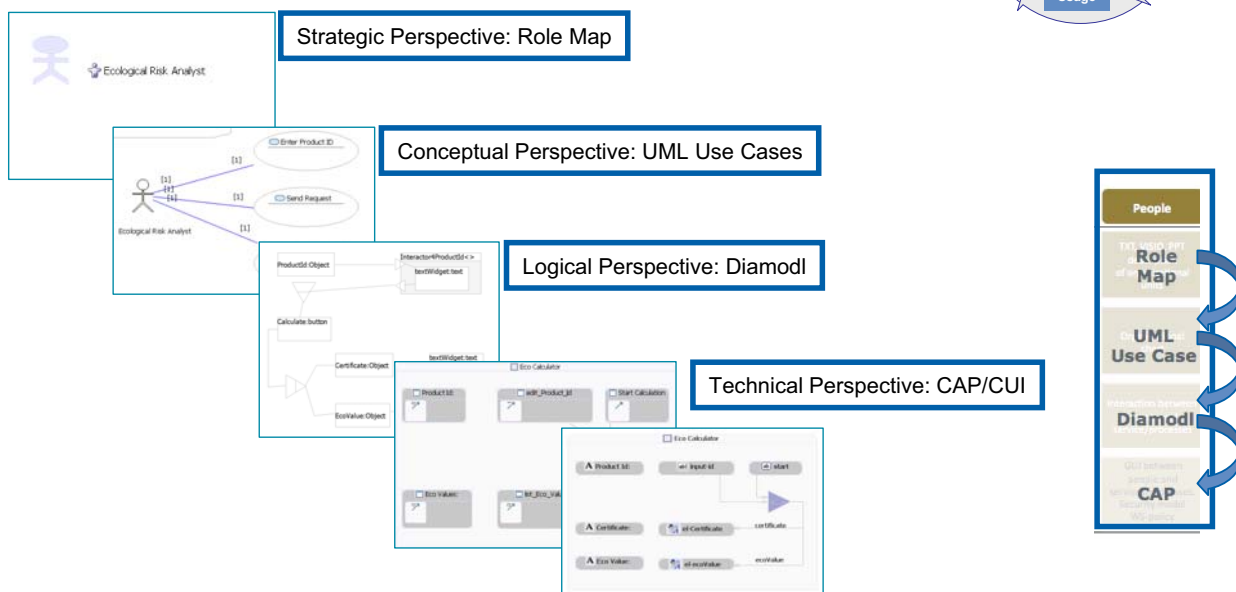
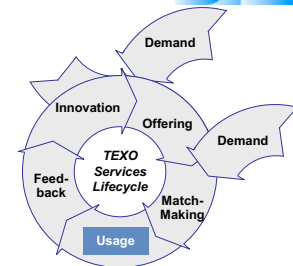
- Enable **holistic development** of services
 - Based on innovative ideas
 - Considering IT-related and business aspects
 - Supporting multiple and distributed stakeholders
- Allows the **service to be**
 - Offered and found
 - Composed
 - Traded
 - Delivered & executed
- **Approach** – Define and implement a structured development methodology



Integrated Service Engineering Methodology

		Dimensions				
		Service	Workflow	Data	People	Rules
Abstraction Layers	Strategic Perspective	TXT, VISIO, PPT description of services	TXT, VISIO, PPT description of the workflow	TXT, VISIO, PPT description of data assets	TXT, VISIO, PPT description of organizational units	TXT, VISIO, PPT Goals and strategy
	Conceptual Perspective	Formal definition of functional/non-functional requirements	Formal definition of functional/non-functional, BPMN	Interrelations between semantic data assets	Organizational chart	Business plan (rules and constraints)
	Logical Perspective	(semantic) Interface, message, format, data, etc	BPMN+	Semantic data model	Interaction between people and service/processes	Business rule model
	Technical Perspective	SAWSDL, WSDL, SOAP, WS-Policy, XML Schema, XML, WSMO, etc	WS-Policy, WS-CDL, WS-CI, BPEL	OWL, RDFS, XML Schema, XML	GUI between people and services/processes. Security model WS-policy	RuleML, SWRL

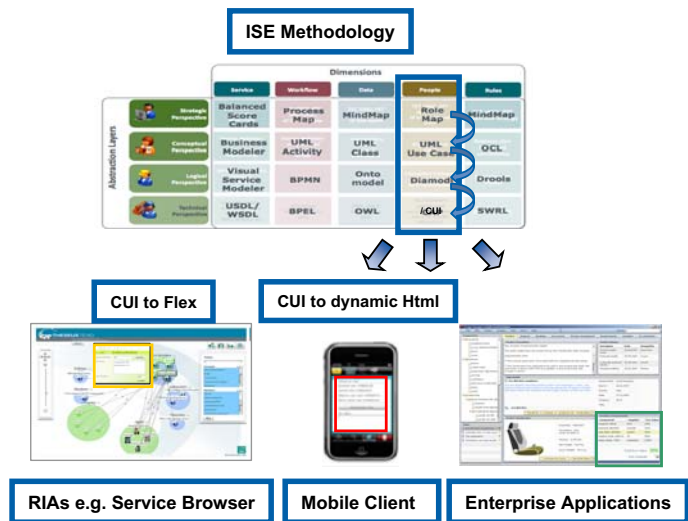
Service Usage Model-driven UI development



Service Usage

Different consumption channels

- Service UI transformation for different user environments
 - Rich Internet Applications e.g. Service Browser
 - CUI to Flex transformation with Open Architecture Ware
 - Mobile client
 - CUI to dynamic HTML transformation with OpenLaszlo Rich Internet Platform
 - Enterprise Applications



Multimodal mobile access to service ecosystems

That is what the DFKI is working on in TEXO

- Key-users must stay in touch with the most recent developments while on the go
- Enable them to do so, but
 - Hide complexity of the backend from the user, especially in a mobile setting.
 - Support the user to circumvent hardware restrictions/high cognitive load

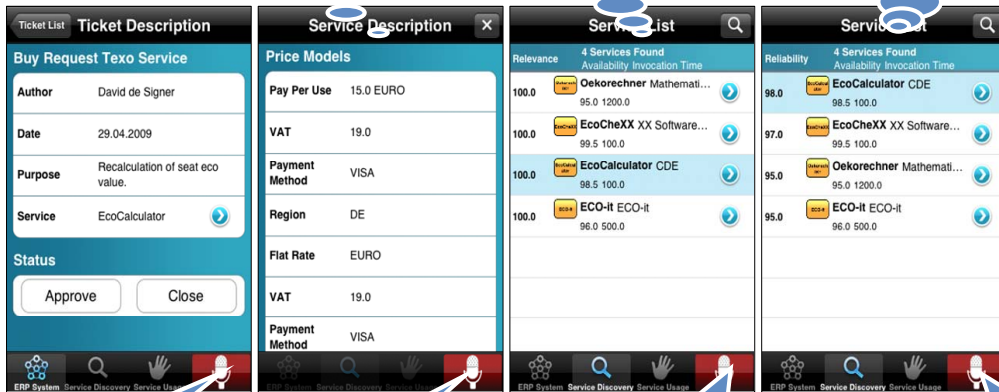
→ adopt multimodal interaction techniques, situation-awareness, user-adaptivity

Example (1) Service Discovery

I found two price models.

There are 4 alternatives.

I sorted the list in descending order according to reliability.



„Show me the price models of this service.“

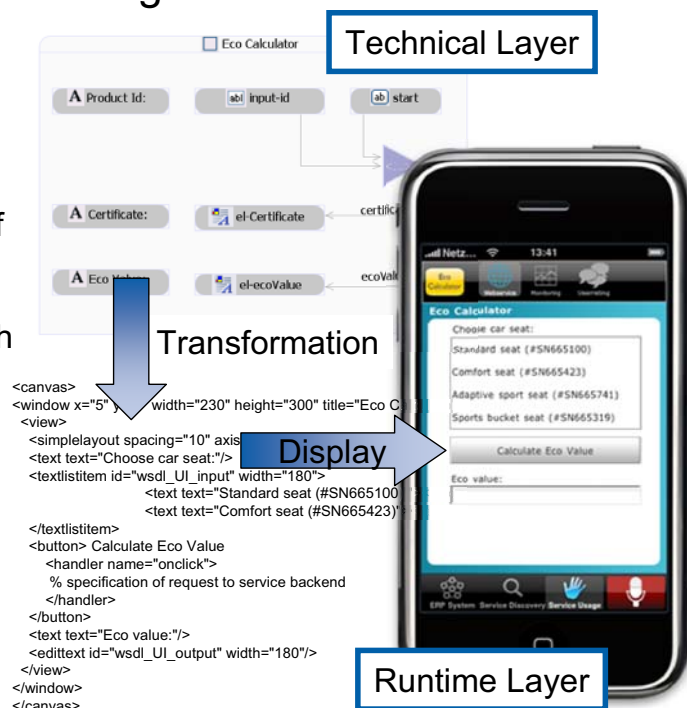
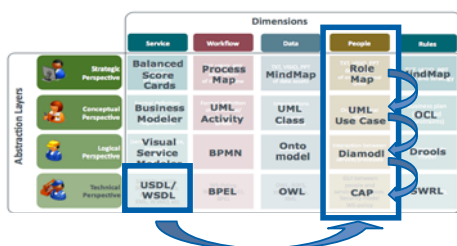
„Are there alternative services?“

„Sort the list according to reliability.“

„Show only services with an availability better that 99%.“

Example (2) Service Usage

- Provide mobile-specific UI transformations according to the ISE methodology
- Provide a horizontal integration of UI and business logic
- Enable multimodal interaction with (tradable) services
 - Requirements
 - Concepts
 - Implementation



Internet of Services vs. Internet of Things? (1)

From different perspectives towards the Internet of Future

- Relevant “Internet of Things”-projects with DFKI involvement

- **SemProM** (Semantic Product Memory)

- <http://www.semprom.org>

- Products keep a diary

- Capture, interpret, and exchange product sensor data (e.g. temperature)

- Funded by the BMBF (Ref. 525) with 16.46m €



- **ADiWa** (Allianz Digitaler Warenfluss)

- <http://www.adiwa.net>

- From the Internet of Things to intelligent business processes

- Sensor data/events trigger/adapt business processes in the Internet of Services

- Funded by the BMBF (Ref. 525) with 17.70m €



GEFÖRDERT VOM



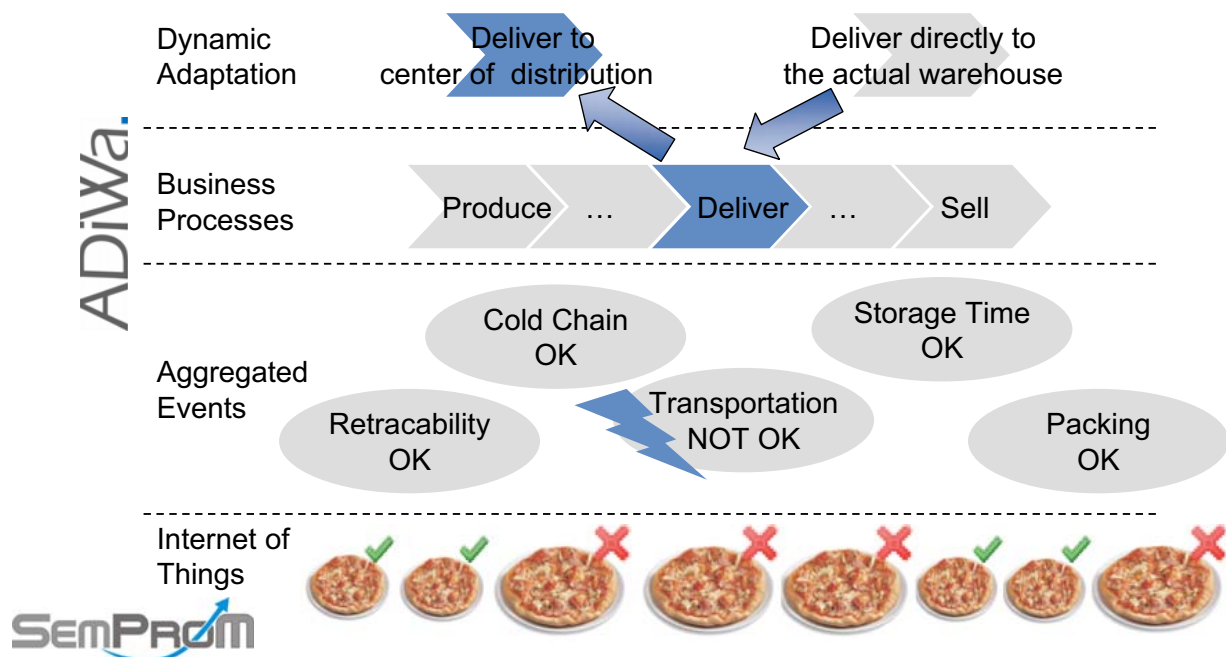
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Internet of Services vs. Internet of Things? (2)

SemProM and ADiWa cooperation – an example

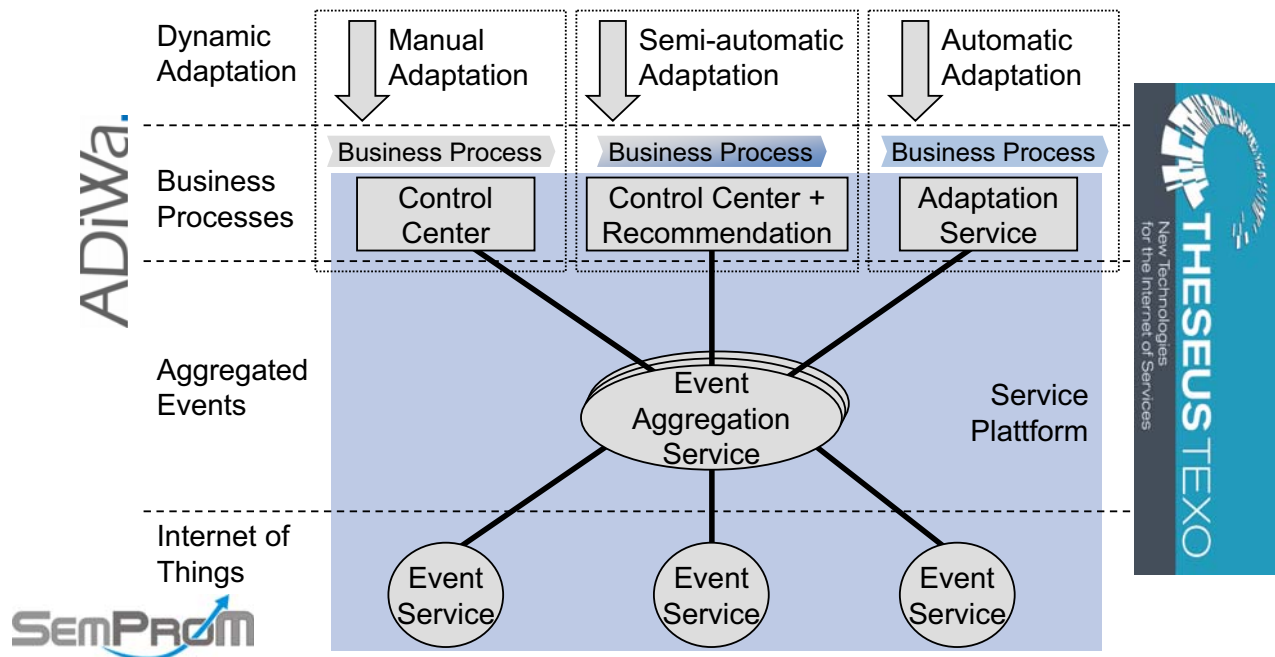


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Internet of Services vs. Internet of Things? (3)

ADiWa and TEXO – synergy effects



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Thank you for your attention!
Questions?

- THESEUS research programme
<http://www.theseus-programm.de/en-US/home/>
- SemProM
<http://www.semпром.org>
- ADiWa
<http://www.adiwa.net>

or

- Feel free to ask!