

Service Computing: Challenges and Achievements

ComputationWorld 2009

Athens 2009

GUESTS

- **Service Computing: Challenges and Achievements**
- **Moderator:** [Krishna Singh](#), Service Research & Innovation Institute (SRII)/IBM Almaden Research Center, USA
- **Panelists:**
 - Wolfgang Gentsch**, EU Project DEISA & Board of Directors OGF, EU
 - David Bernstein**, Special Chief Technology Officer, Huawei North America R&D, USA
 - Freimut Bodendorf**, University of Erlangen, Germany



ComputationWorld 2009
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Expert Panel

Service Computing: Challenges and Achievements

“Service Computing fuelled by Cloud Computing paradigm”

Wolfgang Gentsch

EU DEISA Project & Board of Directors of OGF

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Achievement: Clouds

- ubiquitous and pervasive services, as a utility
- anything, anytime, anywhere, anybody
- Service oriented: SaaS, PaaS, IaaS, HaaS
- IT resources provisioned outside corporate data center
- Resources accessed over the Internet
- A virtual computing environment (Vmware, Xen,...)
- Abstraction of the hardware from the service
- Variable cost of services (QoS)
- From CapEx to OpEx
- Flexible: public and private clouds
- Build and deliver, always-on, pay-per-use IT services
- Scaling up/down: computing, storage, database, services, users



Cloud Computing can be part of:

- peer-to-peer computing and grid computing, e.g. as an (external) node in a grid workflow
- mobile and sensor networks to process the huge amount of data
- a telecom services portfolio, driven by convergence of broadband, smart mobiles, and clouds
- service oriented start-up companies, on the fly

Clouds: computing platform for society & business services

Public (mail, schools, banking, financial, personal, real estate, health, government, insurance, hospitals, transportation, library);

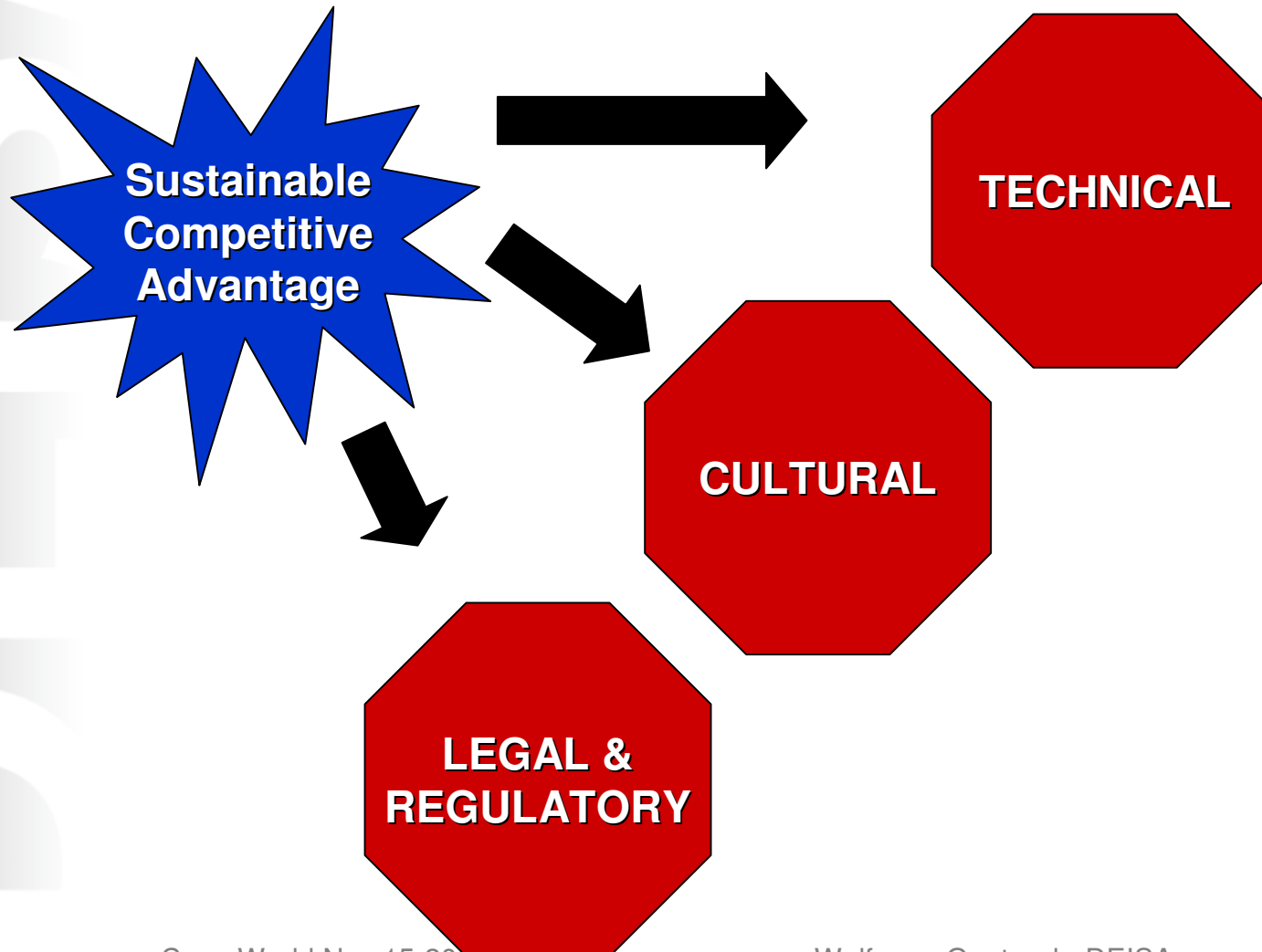
Utility (broadcasting & cable TV, printing & publishing, energy, Internet, hotels, retail, waste management, security, rental);

Entertainment (advertising, casinos & gaming, recreational, restaurant, travel);

Business (communications, specialty, technology, planning, supply chain management, marketing, design, wholesale distribution);

Business process management (business knowledge, business protocols, service level agreements, business licensing models, business financial models, and business advertising models.

Cloud Computing Challenges



Cloud Computing Challenges



- **Sensitive data**, sensitive applications (med.patient records)
- Different organizations have different Cloud **ROI**
- **Security** policies: consistent and enforced across clouds !
- **Interoperability** of components and clouds (standards ?)
- Current IT culture is not predisposed to **loosing control**
- Not all applications are cloud-ready or **cloud-enabled**
- “Static” **licensing** model doesn’t embrace cloud
- Protection of **intellectual property**
- **Legal** issues (FDA, HIPAA)



Solving the Cloud Challenges with private or hybrid cloud

- O.k.
- O.k.
- O.k.
- O.k.
- O.k.
- Not all applications are cloud-ready or cloud-enabled
- O.k.
- O.k.
- O.k.



Panel on Service Computing: Challenges and Achievements

Service Computing fuelled by Cloud Computing

Wolfgang Gentzsch, EU Project DEISA and Open Grid Forum, November 2009

One of the most important achievements in service computing during the past few years is Cloud Computing which provides a new platform for many of the services discussed at this conference. In the following we briefly present the benefits Cloud Computing enables, provide examples for applications and services which will benefit from Cloud Computing, followed by the challenges and roadblock Cloud Computing faces. Most of these challenges are at least partly eliminated by the introduction of the Private Cloud concept.

Cloud Computing enables:

- Ubiquitous and pervasive services, as a utility
- Anything, anytime, anywhere, anybody
- Service oriented: SaaS, PaaS, IaaS, HaaS
- IT resources provisioned outside corporate data center
- Resources accessed over the Internet, on demand
- A virtual computing environment (Vmware, Xen,...)
- Abstraction of the hardware from the service
- Variable cost of services (QoS) and Service-Level Agreements (SLA)
- From CapEx to OpEx
- Flexible, elastic: public and private clouds
- Build and deliver, always-on, pay-per-use IT services
- Scaling up/down: computing, storage, database, services, users

Cloud Computing will serve as the computing platform for all kinds of society and business services, such as

- Public (mail, schools, banking, financial, personal, real estate, health, government, insurance, hospitals, transportation, library);
- Utility (broadcasting & cable TV, printing & publishing, energy, Internet, hotels, retail, waste management, security, rental);
- Entertainment (advertising, casinos & gaming, recreational, restaurant, travel);
- Business (communications, specialty, technology, planning, supply chain management, marketing, design, wholesale distribution);
- Business process management (business knowledge, business protocols, service level agreements, business licensing models, business financial models, and business advertising models).

However, Cloud Computing has to cope with several challenges before it is widely accepted:

- Sensitive data, sensitive applications (med.patient records)
- Different organizations have different Cloud ROI
- Security policies: consistent and enforced across clouds !
- Interoperability of components and clouds (standards ?)
- Current IT culture is not predisposed to losing control • Not all applications are cloud-ready or cloud-enabled
- Static licensing model doesn't embrace cloud
- Protection of intellectual property
- Legal issues (FDA, HIPAA)

It is very interesting that the special concept of Private Cloud (i.e. intra-enterprise Cloud Computing) combined with external Cloud resources, will solve most of these challenges. In general, CIOs have to evaluate three different scenarios: (1) the Private Cloud: optimizing and virtualizing the company's internal enterprise IT infrastructure, including the data layer (here is where Momentum can help); (2) the Hybrid Cloud: do (1) and connect to external clouds; or (3) the Public Cloud: do (2) and successively move data (processing) to the external cloud provider. The choice for the best-suited scenario depends on many aspects: sensitive / competitive data and applications (e.g. medical patient records), individual return on investment, security policies, interoperability between private and public clouds, loosing control when moving data outside the corporation, cloud-enabling data and applications, the current software licensing model, protection of intellectual property, legal issues, and more. The good news is that CIOs can always start with a hybrid infrastructure in mind: combining private and public cloud resources, balanced according to specific requirements, providing the best of both worlds, thus avoiding the worst of each world individually.

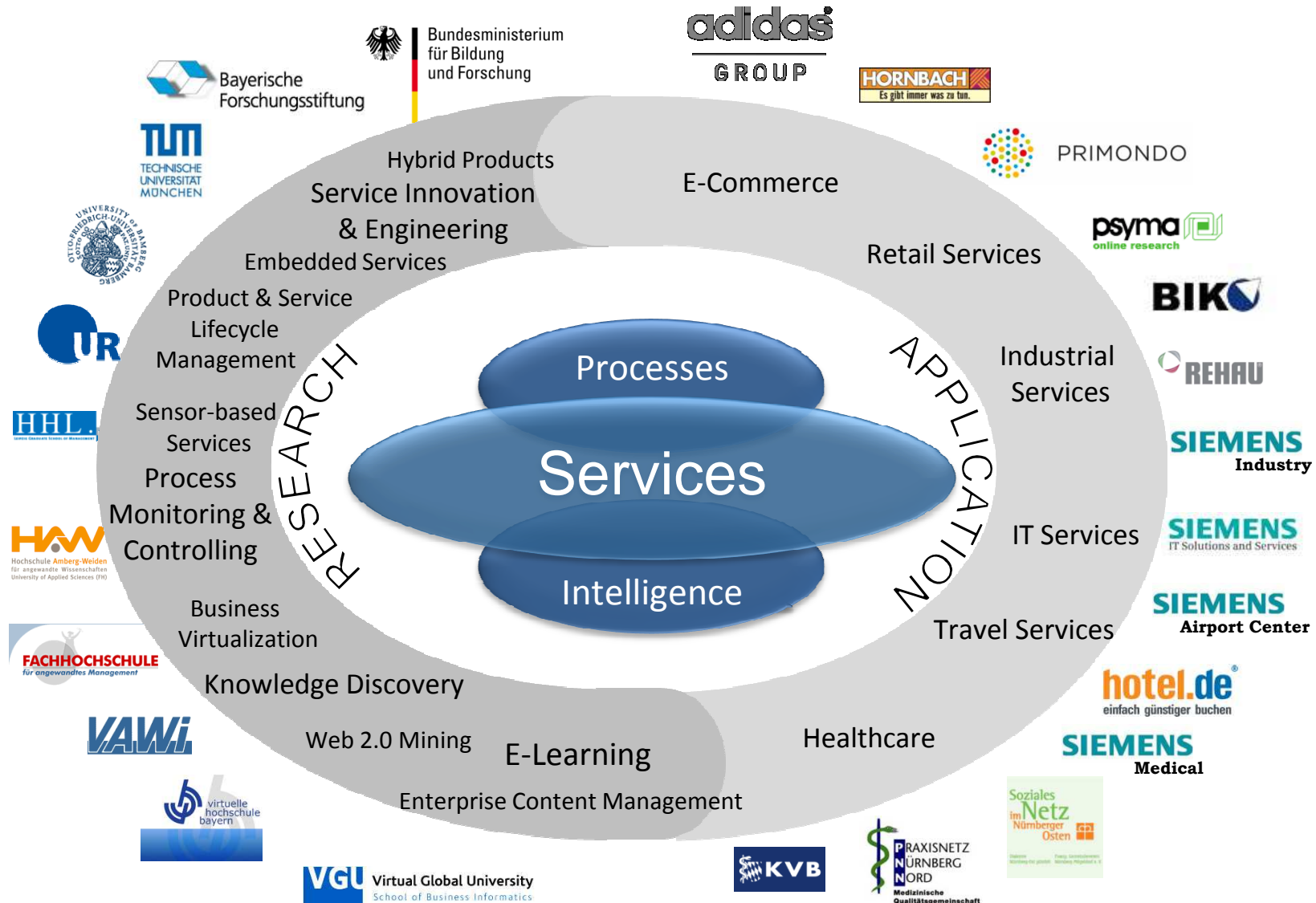


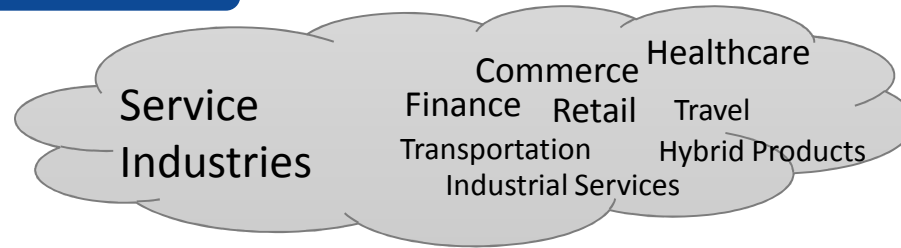
Expert Panel Service Computing
A Business Perspective & Vision

Freimut Bodendorf

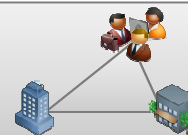








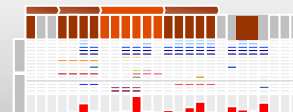
Business Strategy
Business Model

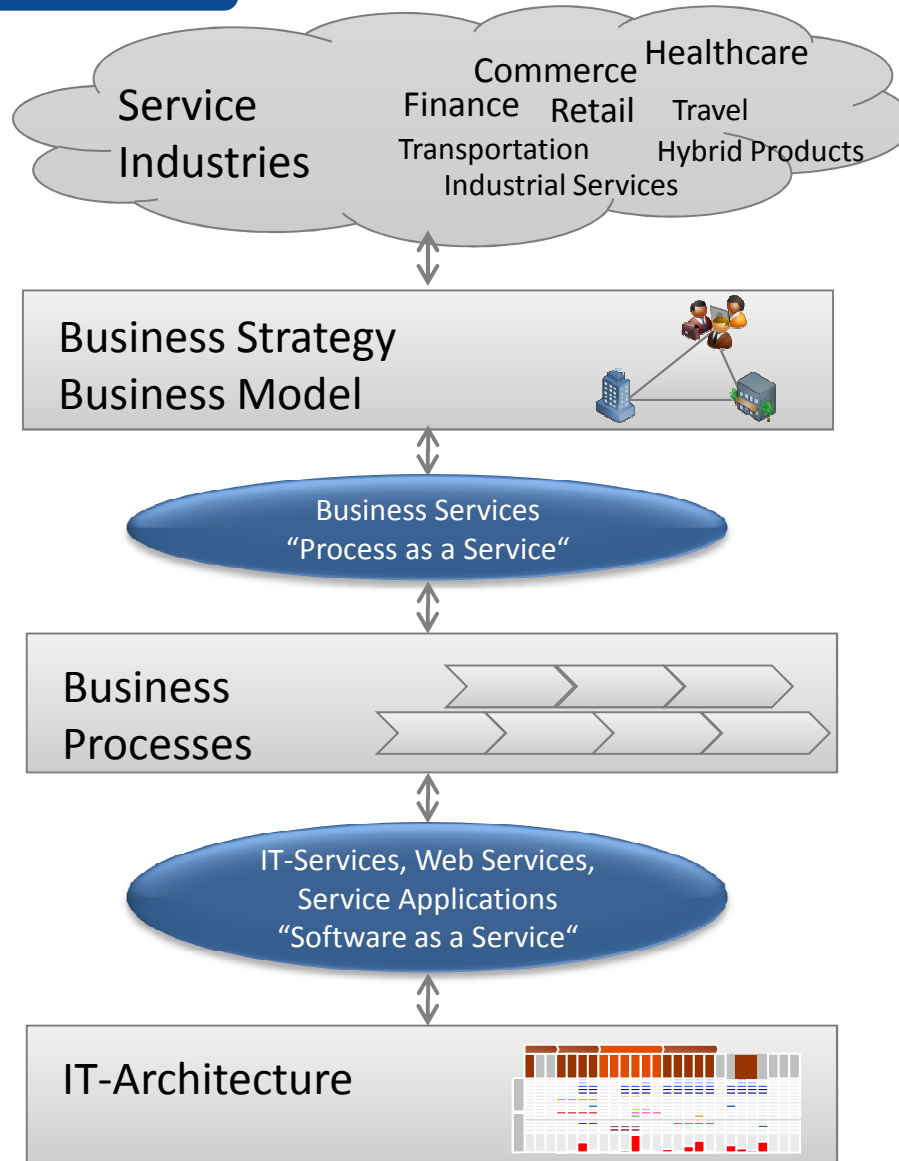


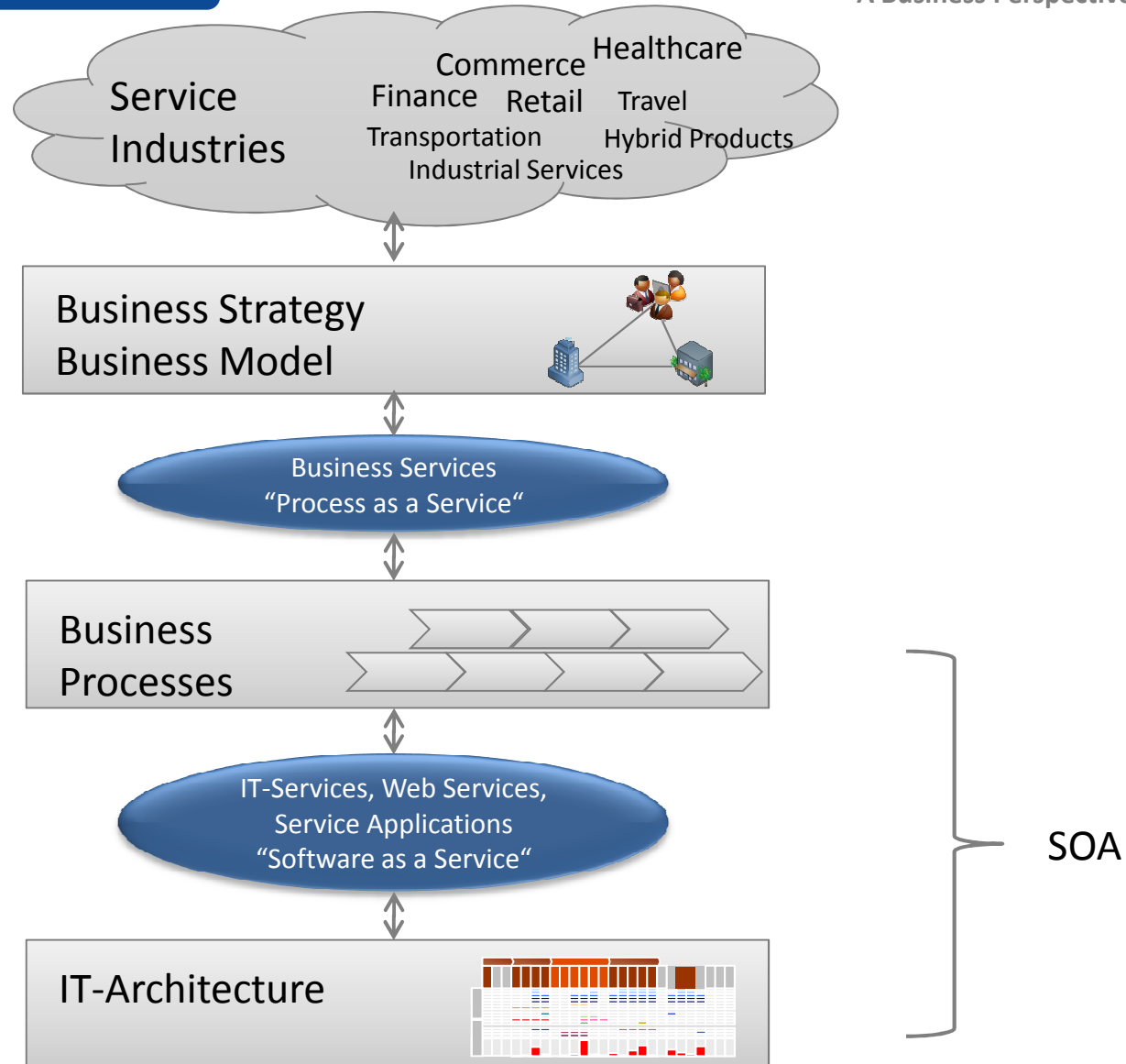
Business
Processes

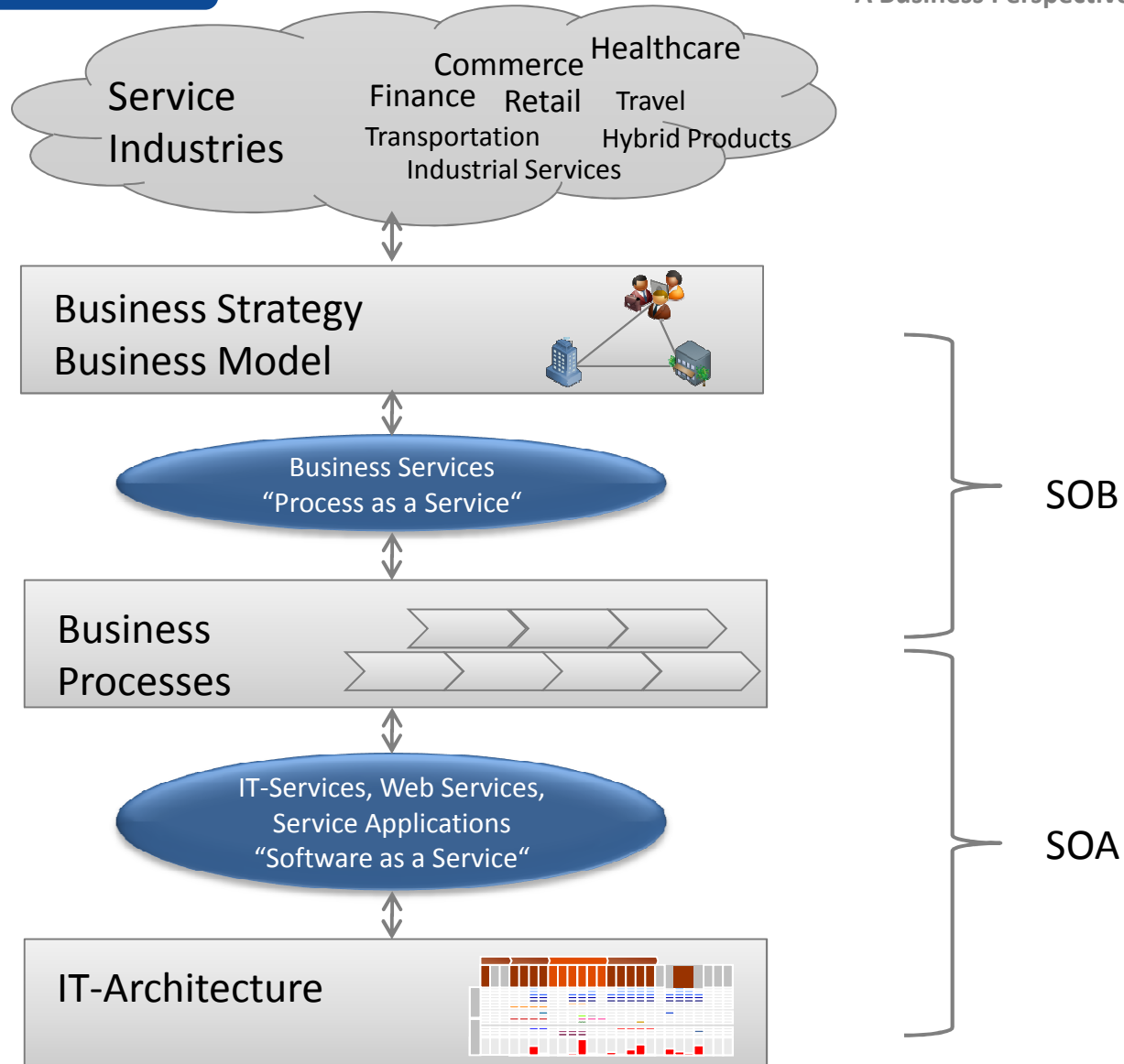


IT-Architecture

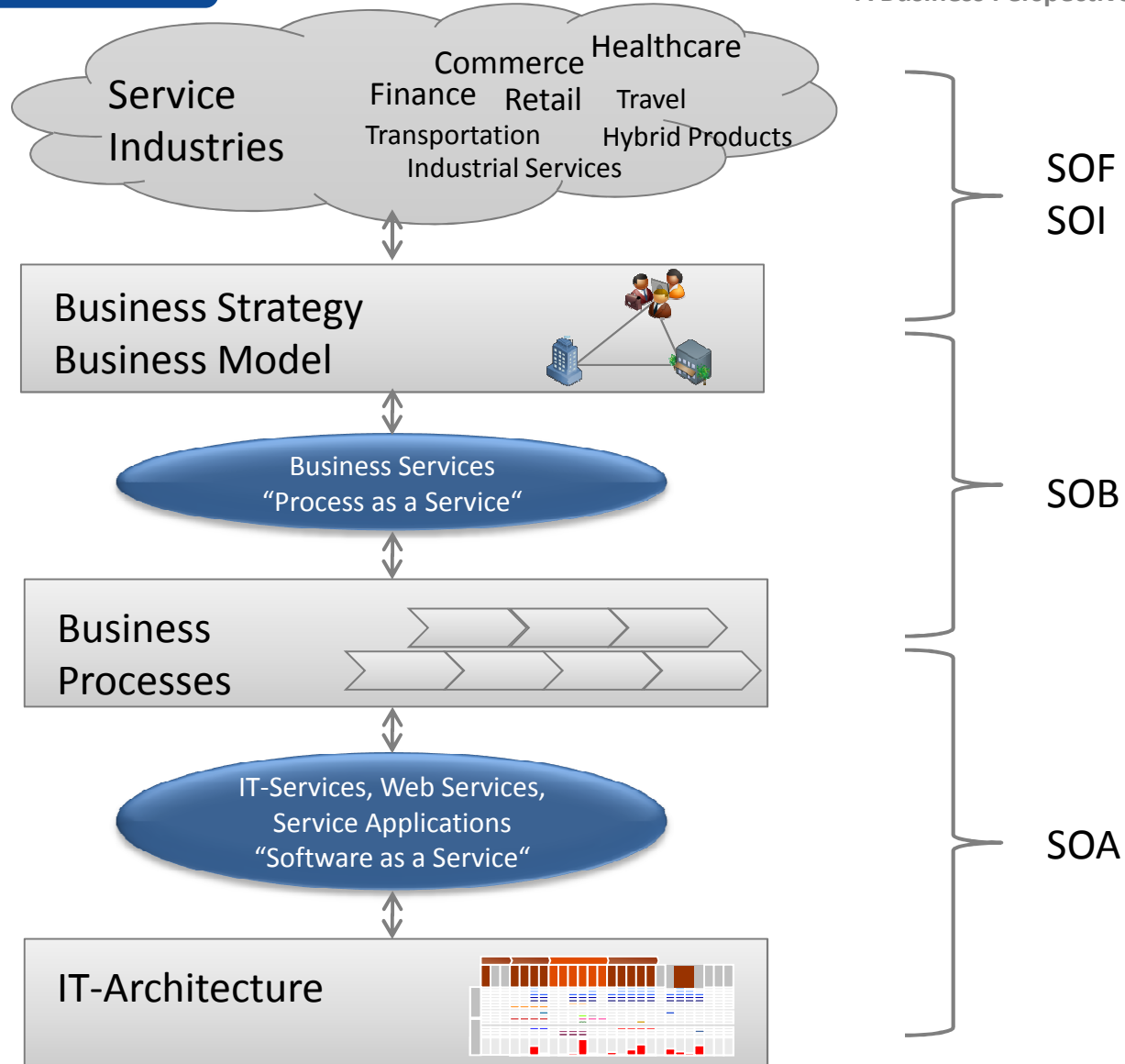


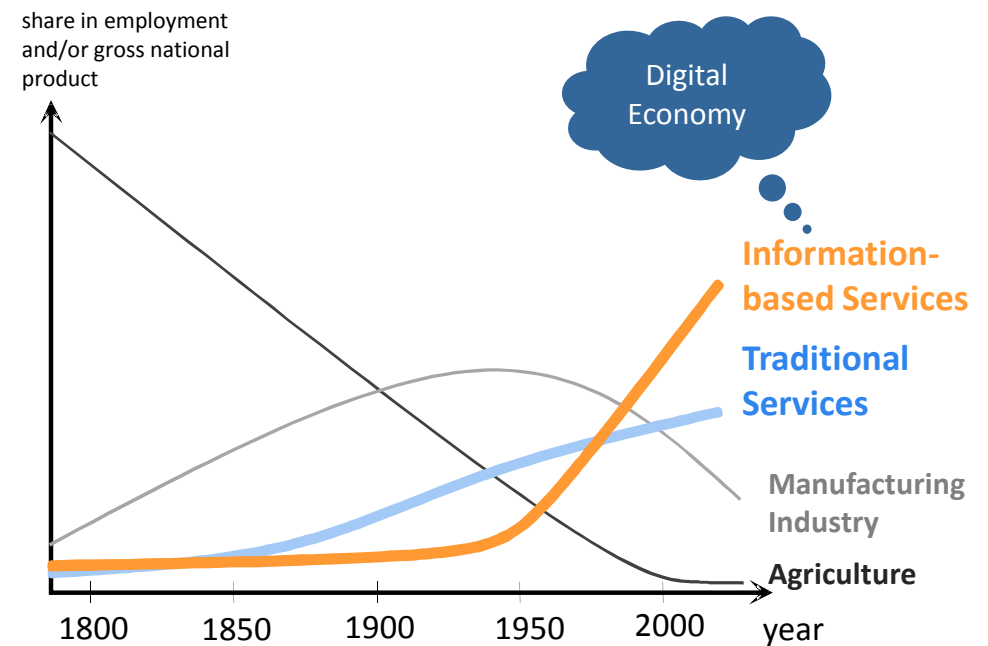
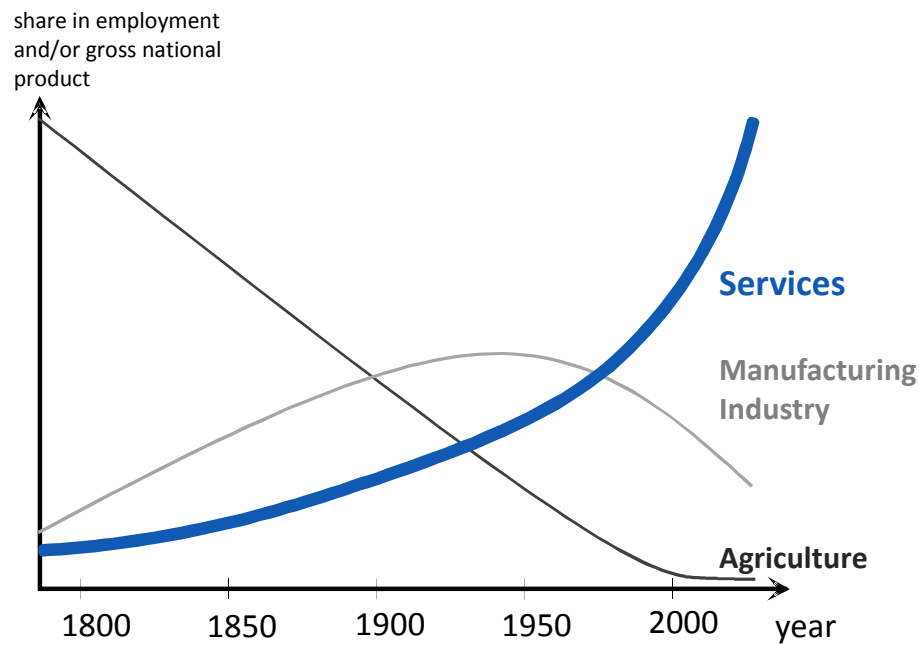


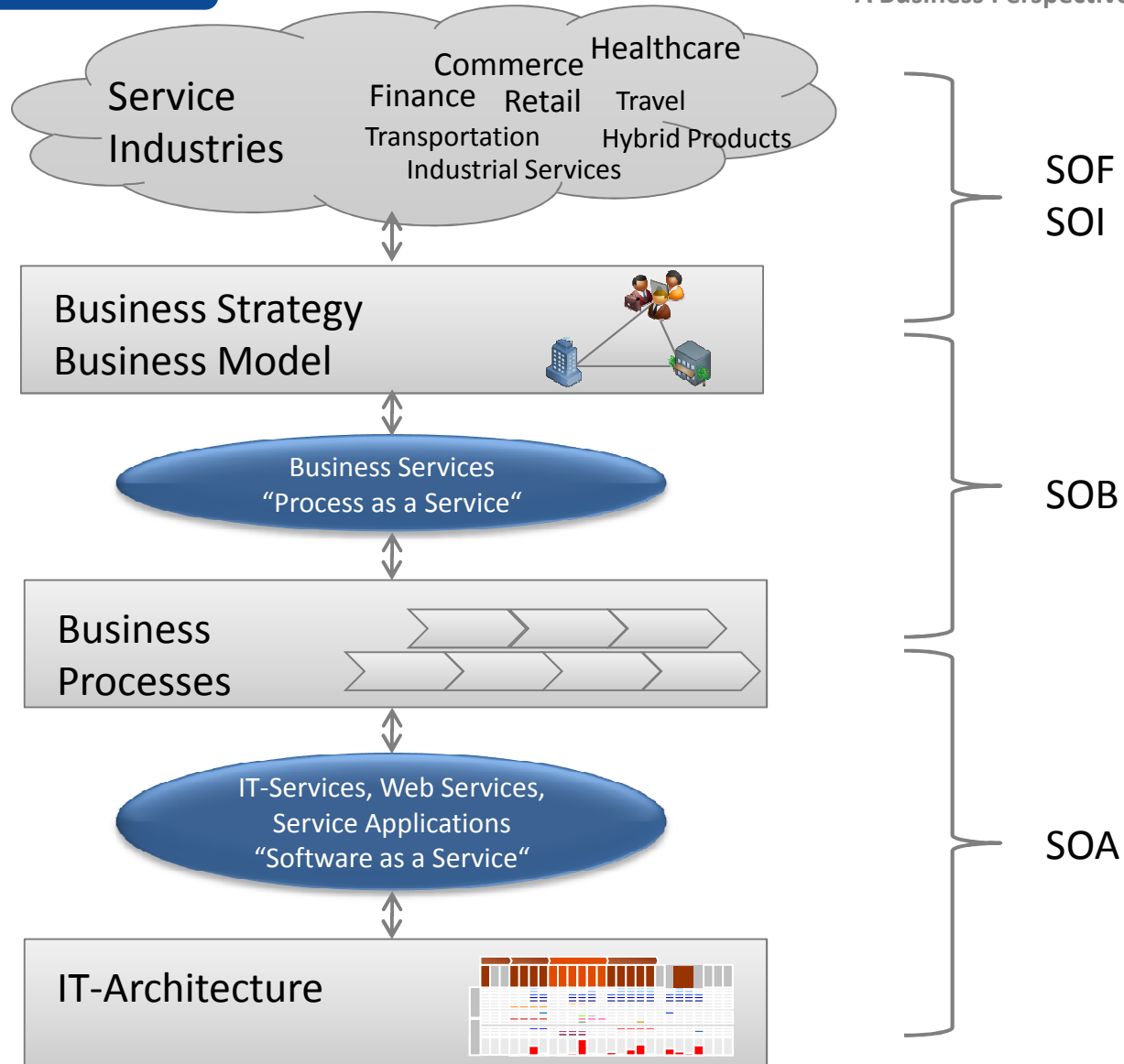




SOA: Service Oriented Architecture **SOB:** Service Oriented Business





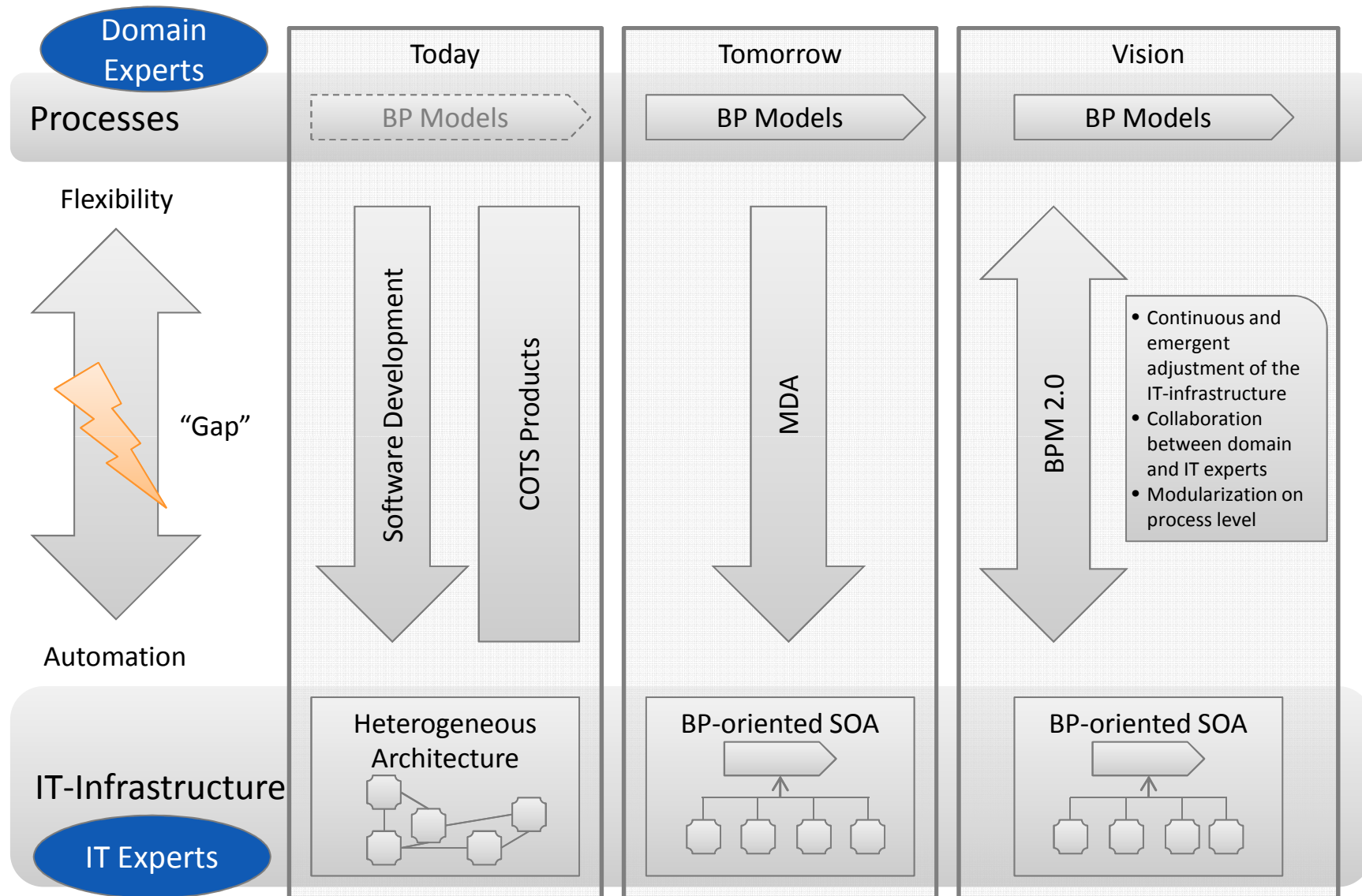


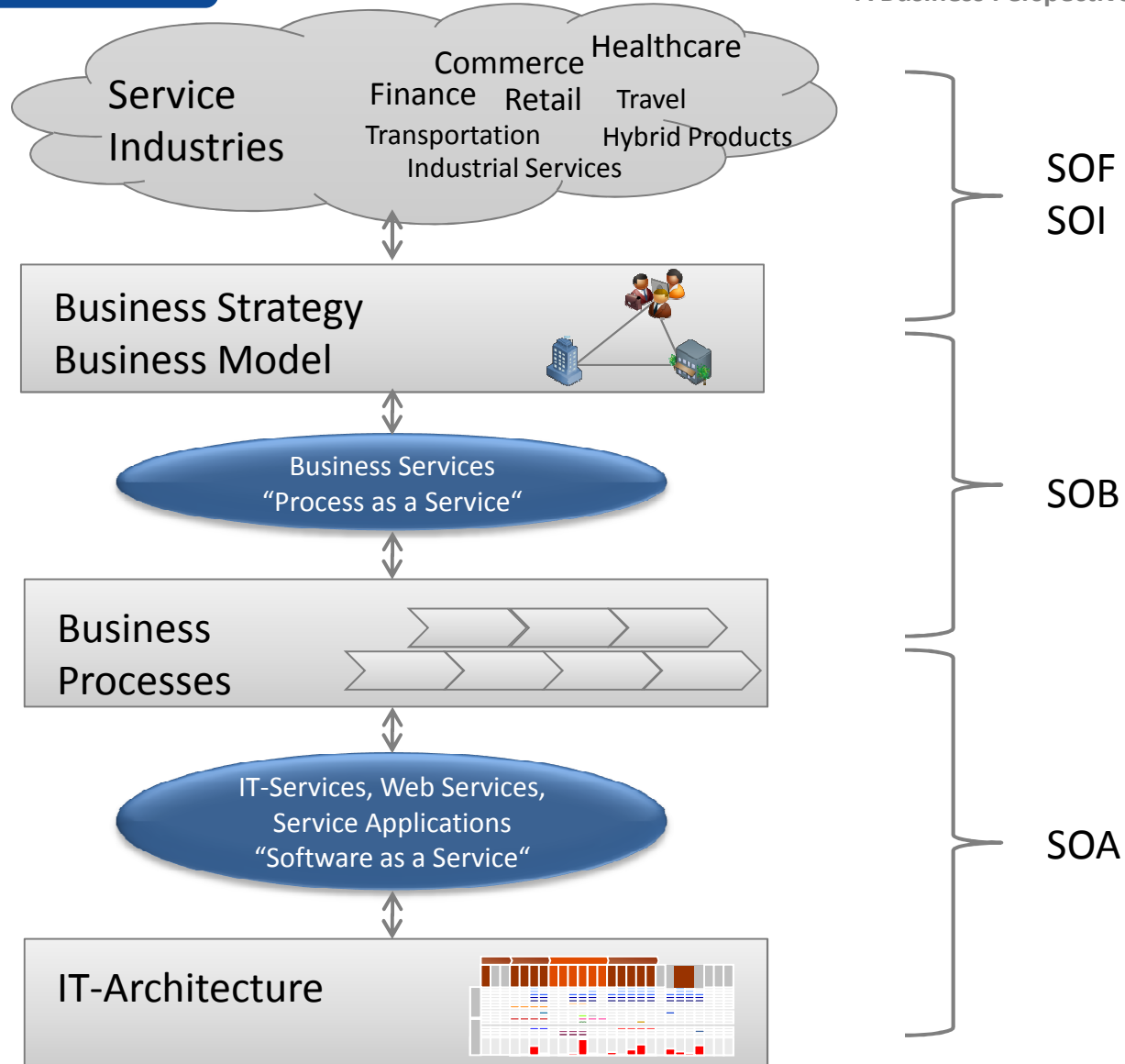


Process 2 IT

The diagram consists of two main elements: a light gray arrow pointing to the right, containing the text 'Process 2 IT', and a dark blue rounded rectangular button containing the text 'SOA'. The arrow is positioned to the left of the button, suggesting a flow or transition from the former to the latter.

SOA



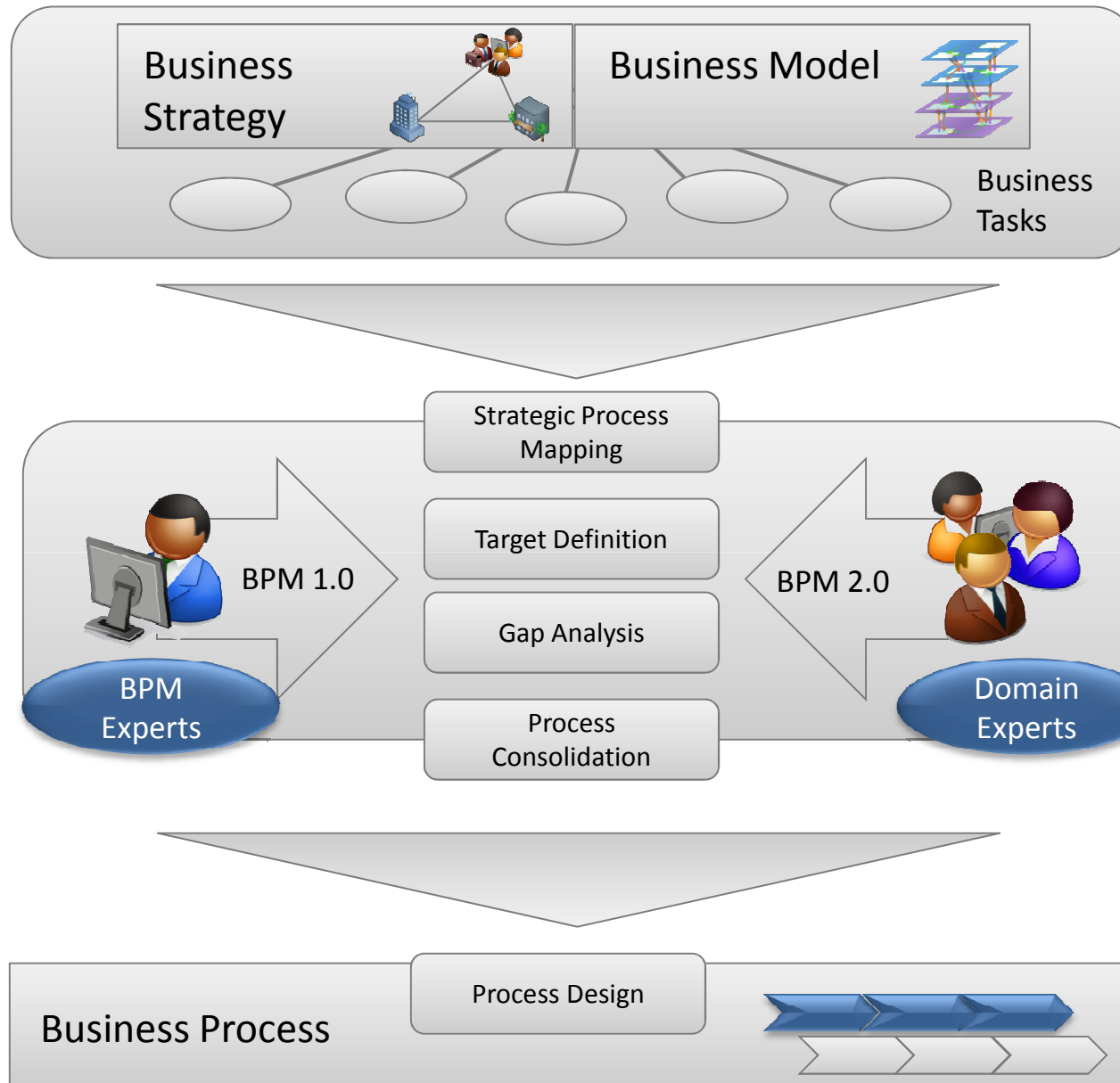


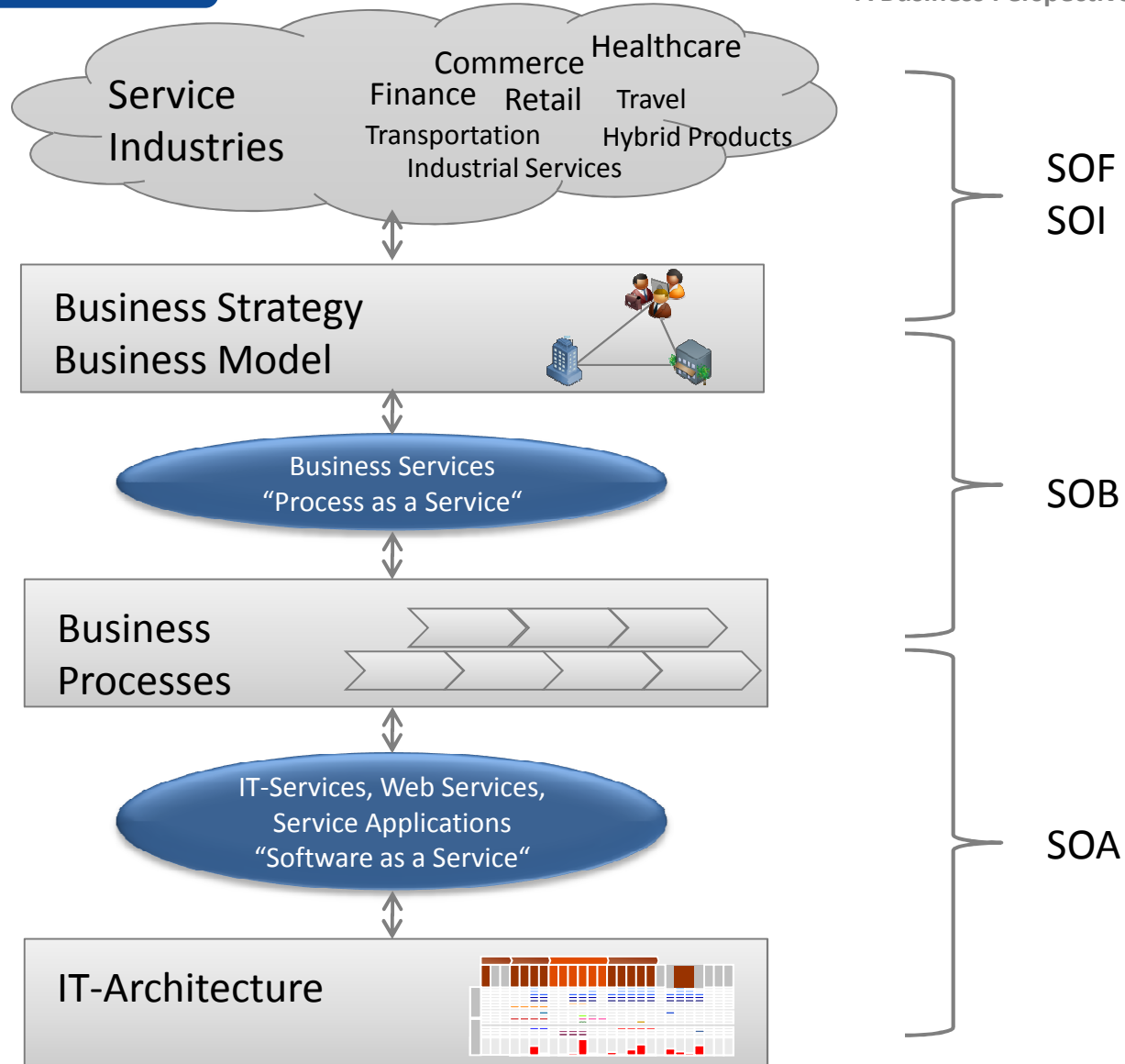
Business 2 Process

SOB

Process 2 IT

SOA





Service Networking & Reuse

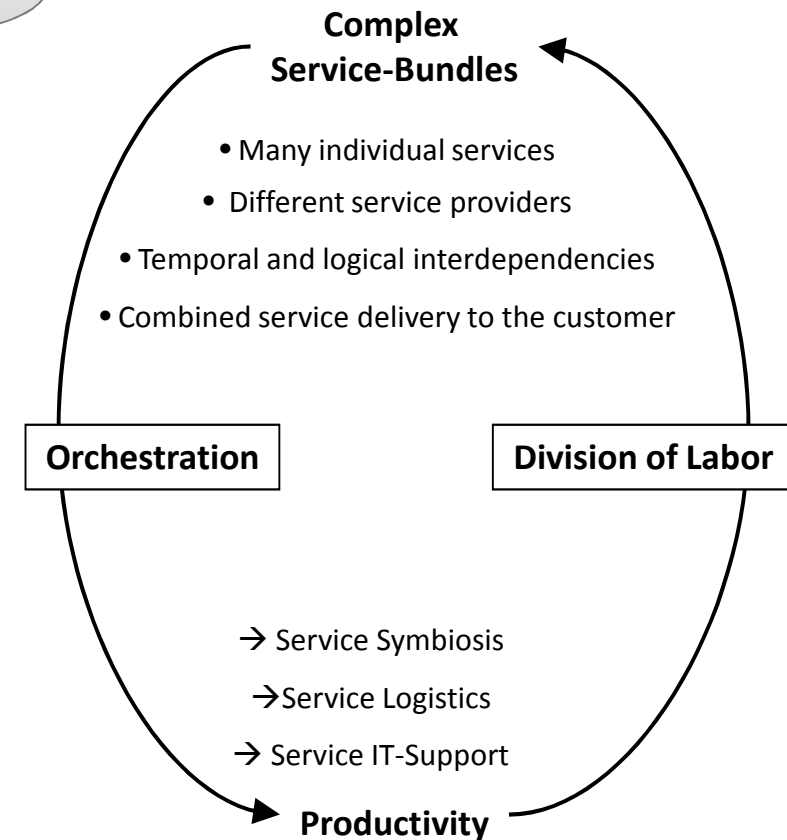
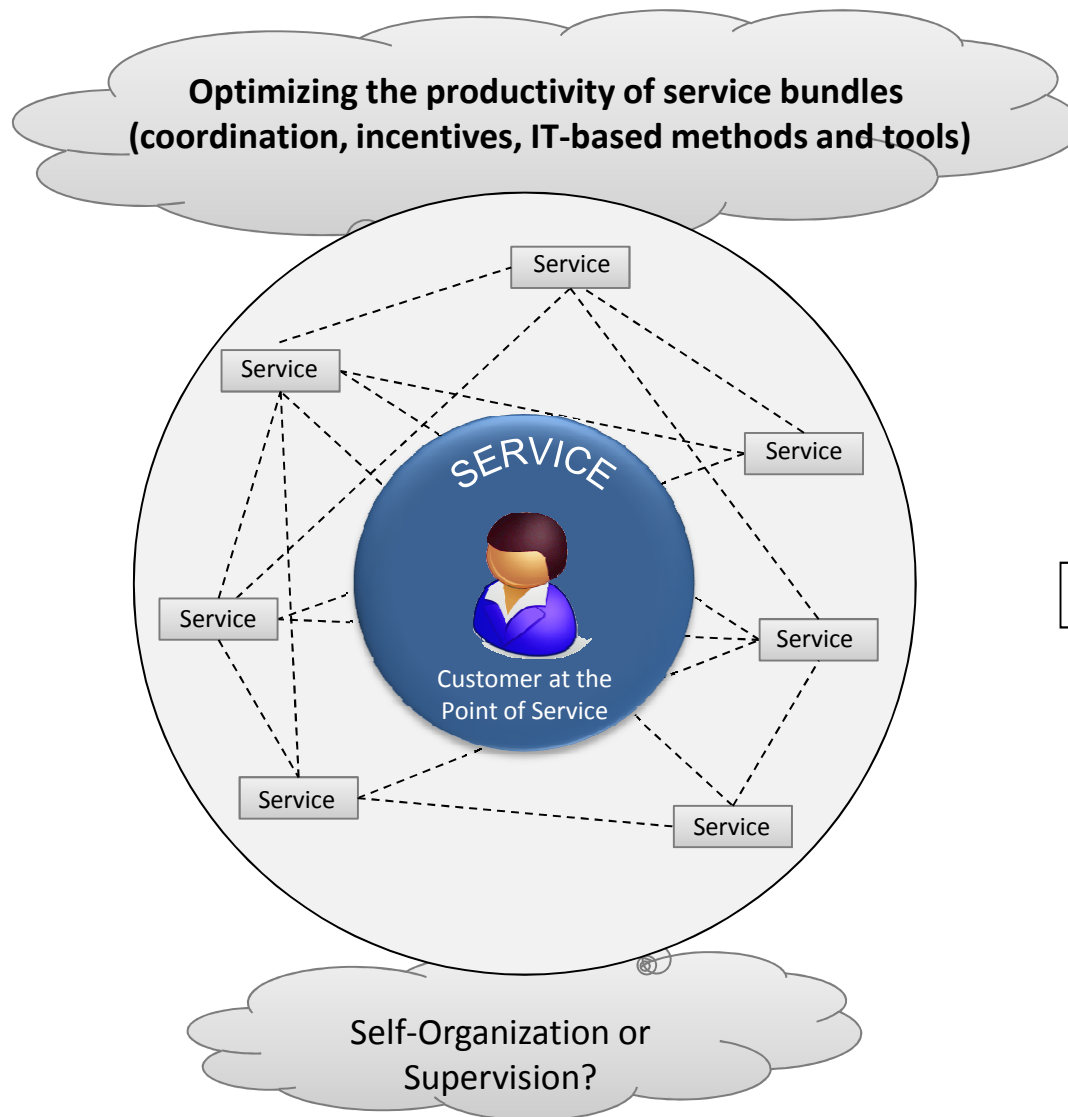
Bundling, Ecosystems

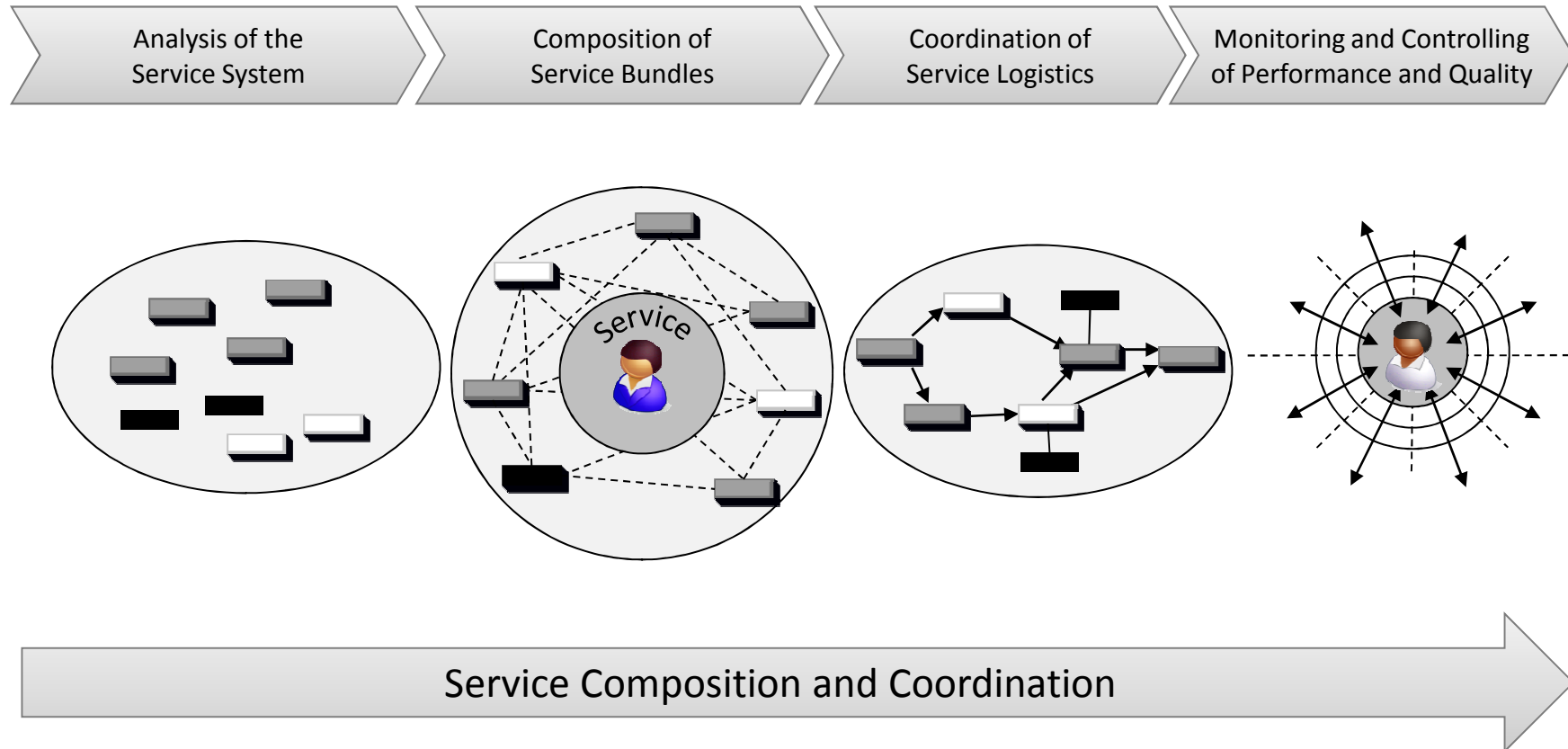
Business 2 Process

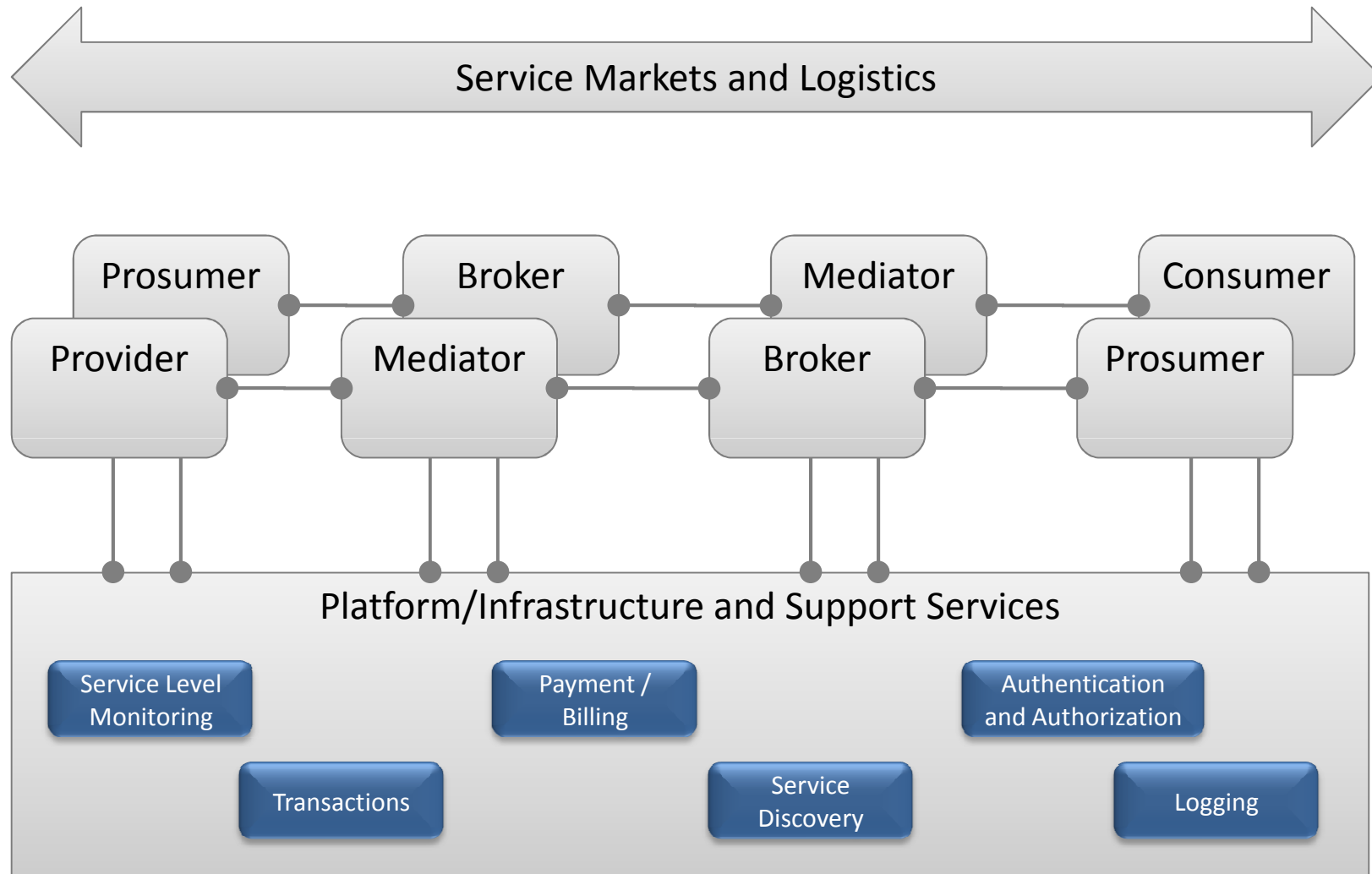
SOB

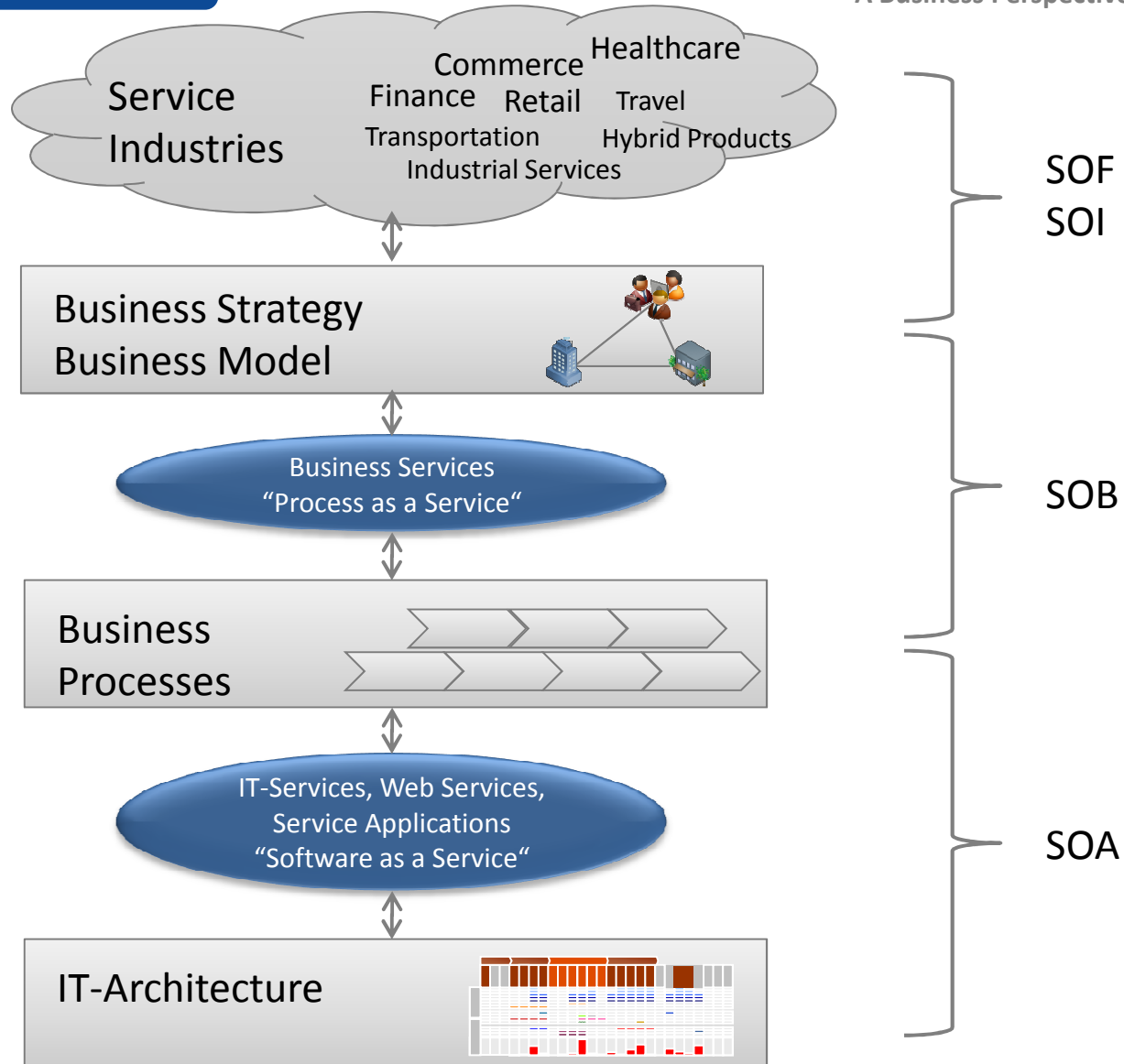
Process 2 IT

SOA









Technology Driven Service Innovation

Computer Aided
Services

Service Networking & Reuse

Bundling, Ecosystems

Business 2 Process

SOB

Process 2 IT

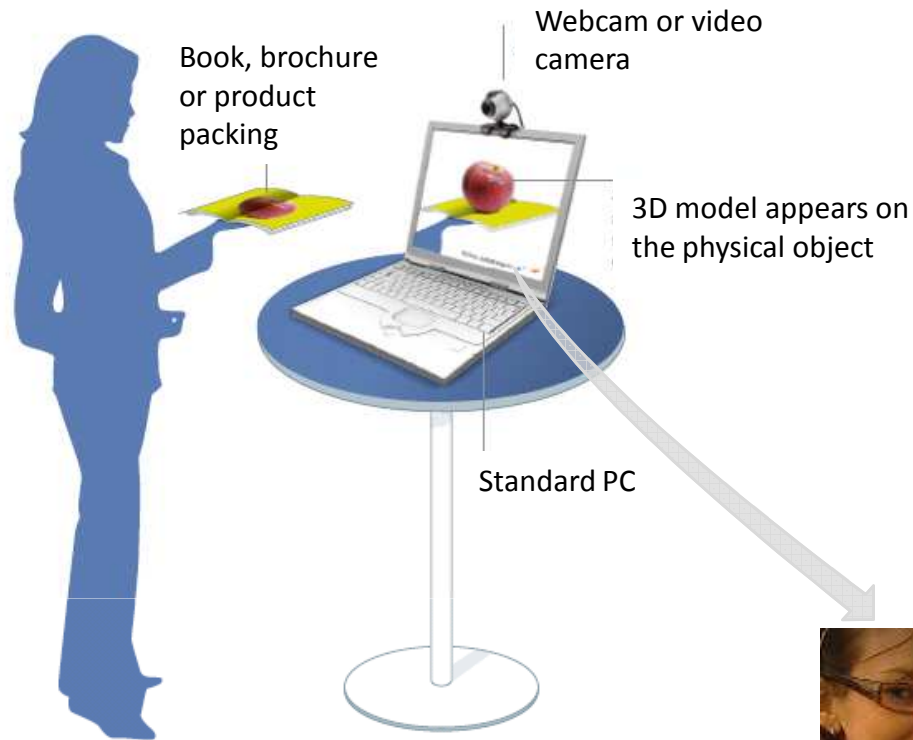
SOA

(E-) Service-Augmented Reality

(Software-) Agent-Based Autonomous Services

(E-) Mobility-Based Ubiquitous Services

Service Networks and Networked Services



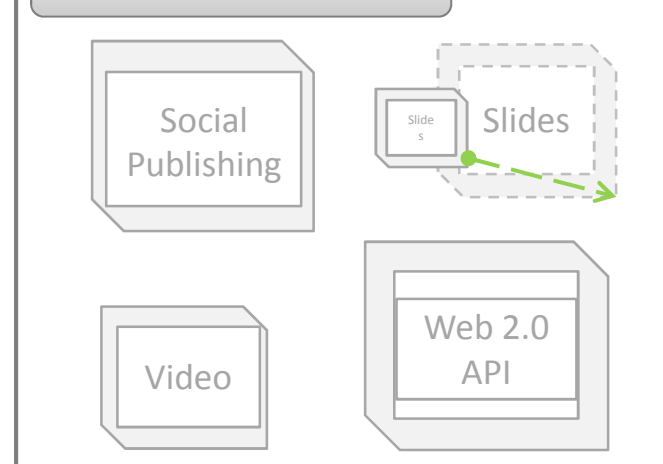
AR in Retail

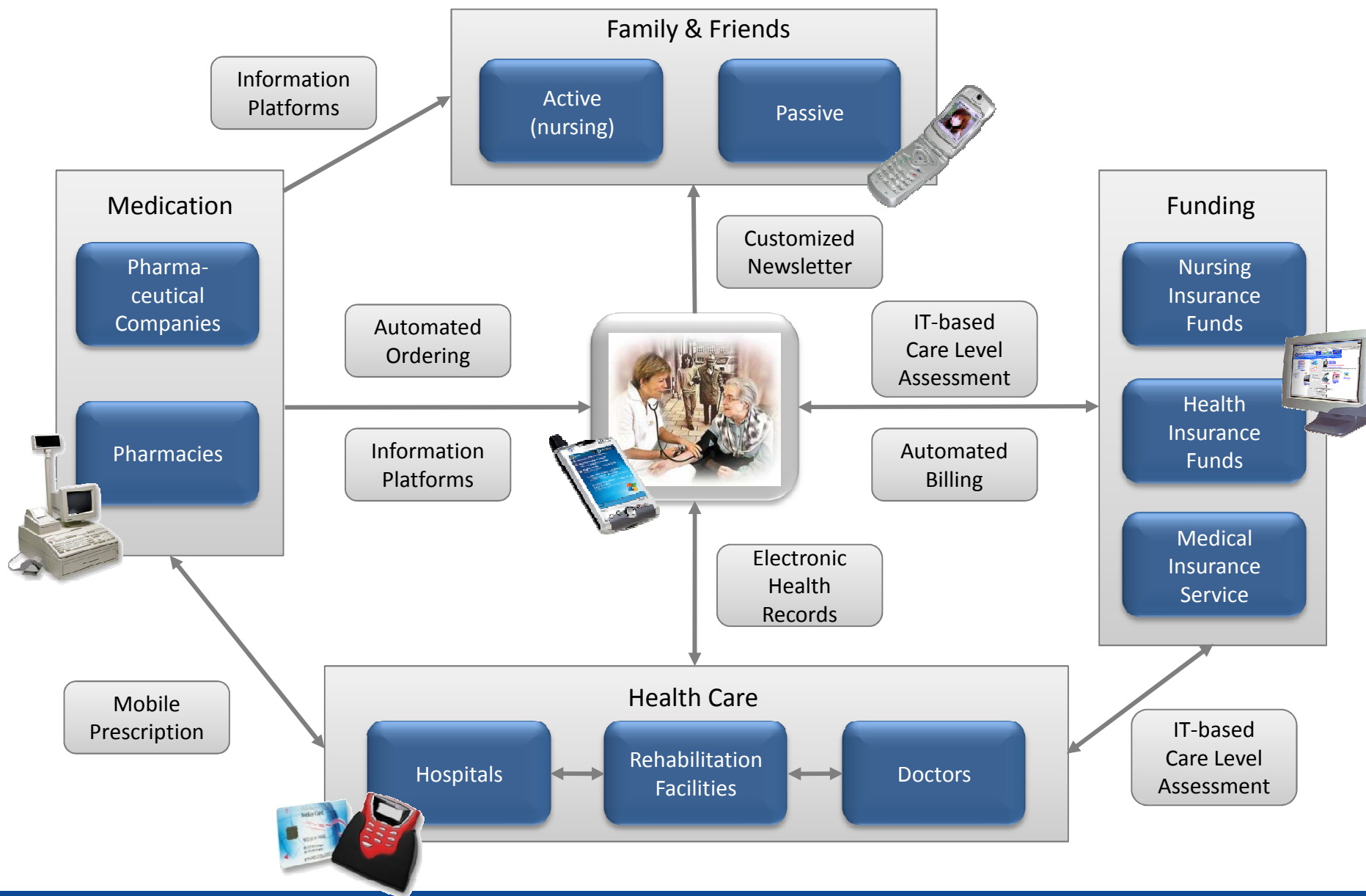
- Virtual Mirror
- Product Feature Explanation
- Augmented Reality Catalogue
- Product Presentation

Learning- & Presentation Platform "Castible"

Core Resources: Standard LMS Elements (Text, Audio, Video)
Additional Resources: Web 2.0 Content and Tools
Learning / Presentation: Personal Learning Environment (Contents, Layout, Information Flow)

Webtop-based Mashup





Services of the Future?

Future of Services?





thank you for
your attention

The floor is open for discussion





Expert Panel Service Computing
A Business Perspective & Vision

Freimut Bodendorf





Expert Panel Service Computing A Business Perspective & Vision

Comments on the presentation at the First International Conference on Advanced Service Computing
Athens, November 17, 2009

University of Erlangen-Nuremberg, Department of Information Systems (Prof. Freimut Bodendorf):
Research Focus = Business Services (e.g., in Retail, Health Care, Education, Tourism, Manufacturing)
and their connection to Business Processes (e.g., process as a service), Business Intelligence (e.g.,
knowledge-based services), and Technological Innovations (e.g., sensor-based services)

There are different "Worlds of Services" to be distinguished:

- World of IT: service-oriented infrastructures, software applications and IT services, web services ...
→ **SOA, Service Oriented Architecture**
- World of Processes: service-oriented value creation, process as a service, service as activity flows ...
→ **SOB, Service Oriented Business**
- World of Business: service-oriented business plans&models, service industries, new economy ...
→ **SOI, Service Oriented Innovation**

Service sector is gaining more and more importance, information-related services are the driving force
for innovation in the "digital economy" and the fundament of the "knowledge society" of tomorrow.
→ **SOF, Service Oriented Future**

Those "Worlds of Services" are closely interrelated:

- Business processes have to be supported and automated by apt (and flexible!) IT architectures
→ **Process 2 IT → Collaboration of domain and IT experts (SOB + SOA)**
- Business strategies and models have to be supported and implemented by business processes
→ **Business 2 Process → Collaboration of managers and domain experts (SOI + SOB)**

Business services face networking challenges (seamless integration of services and providers):

- customers expect and consume service bundles to supply a need in a certain situation / context
→ **challenge**: optimizing quality, flexibility, and productivity simultaneously
- providers have to build business networks and to coordinate service offerings and processes
→ **challenge**: optimizing service logistics and creating win-win-scenarios
- service markets and service ecosystems are evolving
→ **challenge**: optimizing synergies and win-win-...-win scenarios of "prosumer" communities

Technology plays a crucial role in service innovation. It has to "kill two birds with one stone":

- First, it should help to gain competitive advantage by fostering customer fascination
- Second, it should help to improve cost-effectiveness of business (service) processes

Technology in service innovation is important in each "World of Service", e.g., cloud computing on
SOA level, biometrics in self-service-systems on SOB level, sensors for context based services on
SOI level

There are many fields of technology driven service innovation. Examples: (e-)service-augmented
reality, (e-)agent-based autonomous services, embedded (e-)services in hybrid products, (e-)mobility-
based ubiquitous services, service networks and networked services,

→ **challenge**: align business frameworks to technology frameworks and vice versa, and provide open
architectures (business and IT) to facilitate the combination of service modules and service providers