

Architecture World '08

Enterprise architecture strategies, best practices from the Gurus!

Architecting enterprise BPM systems for optimal agility

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About me

- An enterprise solutions architect
 - ◆ From a programmer to a systems architect
 - ◆ Experience in scientific, international, governmental and industry environments
 - ◆ Have created systems which work without me
 - ◆ Practical adviser for design and implementation of enterprise solutions
- Current specialisation is improving business process management systems
 - ◆ effectiveness (“Do the right things”)
 - ◆ efficiency (“Do the things right”)
- Knowledge how to use together the following technologies:
 - ◆ BPM, SOA, EA, ECM and IT governance



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Overview

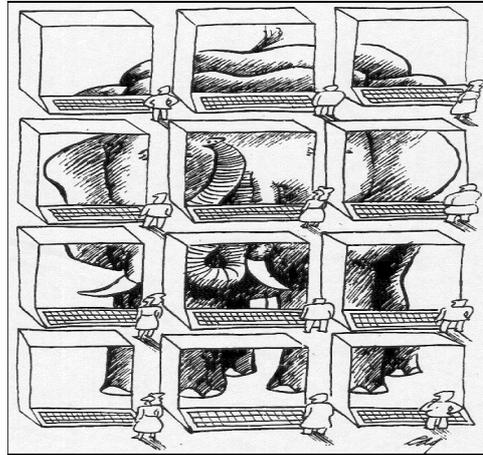
- ❑ *Enterprise architecture* (from Gartner, short version) is the process of translating business vision and strategy into effective enterprise change by creating, communicating and improving the key principles and models that describe the enterprise's future state and enable its evolution
- ❑ Vision – *enterprise architecture* is an applied science which provides **guidance and practical help** for the transformation of an enterprise to achieve certain desired characteristics (e.g. level of maturity, greater agility, better collaboration)
- ❑ 1st part of this presentation – a foundation
- ❑ 2nd part of this presentation – some practical examples

The goal – optimal agility (easy evolution of a BPM system)

- ❑ Experience shows that business wants separate requests for change to be implemented quickly
- ❑ These changes are typically small (from the point of view of the business) and unpredictable (from the point of view of IT)
- ❑ To carry out these changes easily and in a managed way, BPM systems must be properly **architected & implemented**

Challenge of optimal agility (1)

- Many stakeholders
 - ◆ top manager
 - ◆ business manager
 - ◆ process owner
 - ◆ super-users
 - ◆ users
 - ◆ business analysts
 - ◆ IT managers
 - ◆ IT architects
 - ◆ IT developers
 - ◆ IT operators
 - ◆ partners



Challenge of optimal agility (2)

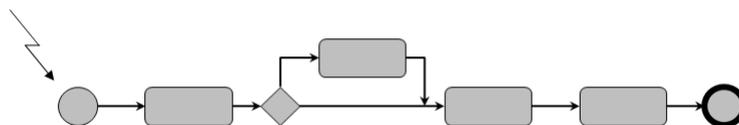
- Good news
 - ◆ there are many good business process improvement methods
 - ◆ BPM is appreciated as an enterprise-wide management discipline
 - ◆ there is understanding of the relationship between BPM and other business process improvement methods
 - ◆ “BPM suite” software products are available
 - ◆ agile development has been proven to be feasible
 - ◆ Service-Oriented Architecture (SOA) is maturing

BPM and BPM systems

- ❑ *BPM* (as a discipline) allows you to **model, execute, control, automate, measure** and **optimise** the flow of business activities that span your enterprise's systems, people, customers and partners within and beyond your corporate boundaries
- ❑ Obviously, all enterprises have their own BPM system, but often a BPM system
 - ◆ is a "problem" of its history,
 - ◆ suffers from problems of complexity, inefficiency
- ❑ Not surprisingly, many enterprises want to improve their BPM system

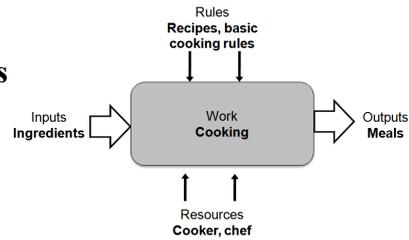
BPM view of the business (1)

- ❑ The business is driven by **business events**
- ❑ For each business event there is an associated **business process** to be executed
- ❑ A business process coordinates the execution of **business activities**
- ❑ The execution is carried out in accordance with **business rules**



BPM view of the business (2)

- ❑ Each business activity operates with some **business objects**
- ❑ A group of staff members (**business roles**) is responsible for the execution of each human activity
- ❑ The execution of business processes produces **audit trails** which are used for the calculation of **key performance indicators**



Architecting an enterprise BPM system (with systems thinking)

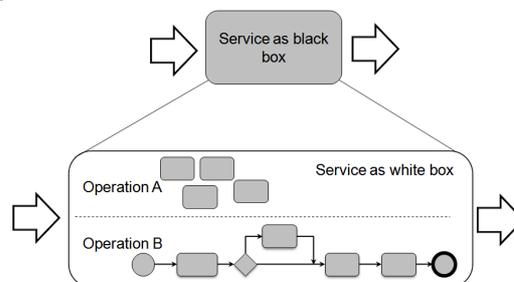
- ❑ A BPM system is a dynamic set of artefacts
- ❑ Artefacts are interconnected and interdependent
- ❑ We have to anticipate potential changes:
 - ◆ policies, priorities, compliance, technology, etc.
- ❑ Implementation of such changes necessitates the evolution of some artefacts and the relationships between them
- ❑ It must be easy to modify all artefacts and relationships without causing any negative effects

Principal artefacts: services and processes

- ❑ The business world understood a long time ago that services and processes are the backbones of most businesses
- ❑ The IT world recently “re-discovered” and accepted the notion of services, and so emerged SOA
- ❑ But IT is still not very comfortable with processes (often, an application is a mixture of data-entry and workflow-driven approaches)

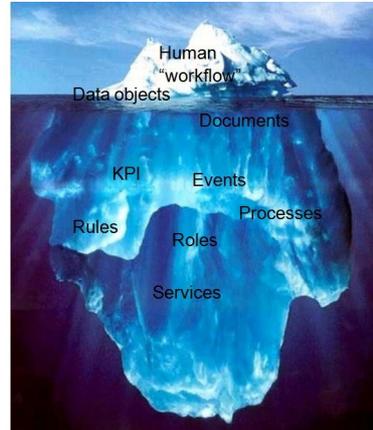
Relationships between services and processes

- ❑ All processes are services
- ❑ Some operation(s) of a service can be implemented as a process
- ❑ A process may include services in its implementation



All BPM artefacts

- ◆ added-value chain
- ◆ events
- ◆ processes
- ◆ rules
- ◆ activities
- ◆ roles
- ◆ objects (data structures)
- ◆ objects (documents)
- ◆ audit trails
- ◆ performance indicators
- ◆ services



Main architecting principles

- All artefacts must be evolved to become **digital, external** and **virtual**
- All artefacts must be **versionable** throughout their lifecycle
- All relationships between these artefacts are **modelled explicitly**
- All models are made to be **executable**

Improvement of artefacts

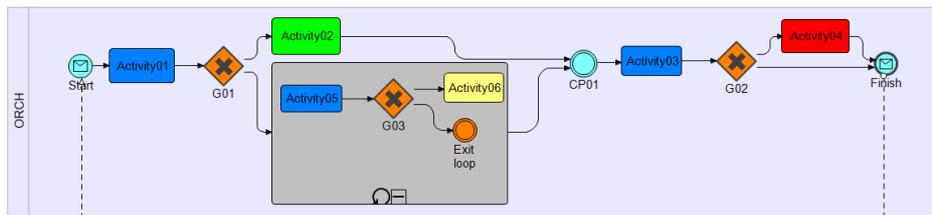
- ❑ Digital – available in electronic form
- ❑ External – available as separate entities with proper definition, naming, versioning, storage, security, traceability, etc.
 - ◆ e.g. transportation of objects between services
- ❑ Virtual – available independently of traditional IT resources (servers, databases, media, browsers) as services

Relationships between artefacts

- ❑ Reveal all hidden relationships and structure them – examples:
 - ◆ static (in design phase)
 - ◆ dynamic (in execution phase)
 - ◆ composition (from atomic artefacts to a composite artefact)
 - ◆ instantiation (from a template to instances)
 - ◆ compatibility (between different versions)
- ❑ If possible, model relationships as formal, explicit, traceable, testable, secure, SLA aware and executable

Explicit models

- Process model is an aggregation of
 - ◆ events, human and automated activities, roles, objects, rules, audits, etc.
- Versioning is vital



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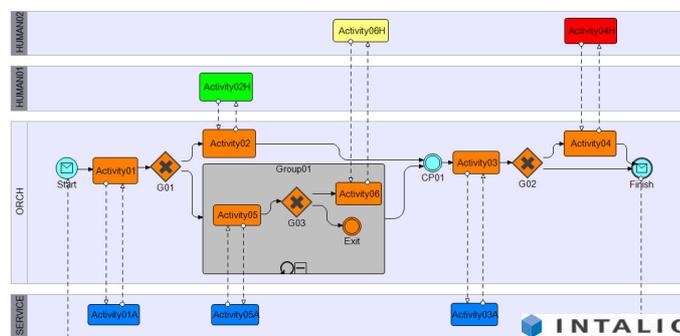


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Executable models

- In an implementation, a model acts as a skeleton or foundation to which we attach services (**what you model is what you execute**)



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Synergy between BPM and SOA

- ❑ SOA is an architectural approach for constructing complex software-intensive systems from a set of **universally interconnected** and **interdependent** building blocks, called services (stand-alone units of functionality)
- ❑ BPM, by revealing the artefacts and the relationships between them, provides the necessary context (e.g. granularity) for the definition of services
- ❑ SOA provides recommendations for the implementation, execution and governance of services

Role of architecture (1)

- ❑ Consider a complex and dynamic system with many
 - ◆ artefacts
 - ◆ relationships
 - ◆ potential changes
 - ◆ stakeholders
- ❑ Explain to each group of stakeholders
 - ◆ artefacts under their control
 - ◆ relationships under their control
 - ◆ how to address their concerns

Role of architecture (2)

- Provide the step-by-step improvement of a system (like the Deming wheel)
 - ◆ plan
 - ◆ do (or implement)
 - ◆ check (or validate)
 - ◆ act (or refactor)

- Consider together different technologies, such as BPM, SOA, ECM, EA and IT governance

- Build an agile system in an agile way

An architectural framework for improving BPM systems

- Documented in soon-to-be-published book
www.improving-BPM-systems.com

- **Practical implementation guide** with recommendations, models, patterns and examples of how to transform existing disparate IT systems into a coherent, agile and flexible BPM/SOA solution

- Subsequent slides are examples of what this framework brings to different stakeholders

Strategy: top managers

- ❑ The architectural framework is not about how to make your products better, different and more attractive for the market place – this is for the managers to decide
- ❑ What it offers is to help managers reduce the overheads in doing so – your flexible BPM system will become an enabler for your business innovations

Example – a new EA unit

- ❑ Mission statement
 - ◆ The mission of an EA unit is to provide to all stakeholders with coherent guidance and practical help for transforming the enterprise business system
- ❑ Objectives
 - ◆ The EA unit develops and maintains the enterprise architecture framework as a comprehensive **implementation guide** (a set of recommendations, models, patterns, examples, tools and training materials)
 - ◆ such an implementation guide explains to stakeholders how the enterprise architecture framework addresses their concerns
 - ◆ such an implementation guide helps the stakeholders to participate effectively and efficiently in the transformation process

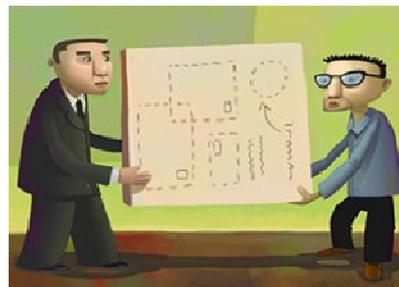
Business: enterprise architects

- Help in the definition of the different types of architecture

Maturity level	Technology architecture	Application architecture	Data architecture	Business architecture	Enterprise architecture
Optimising					
Managed					
Defined					
Under development					
Initial					
None					

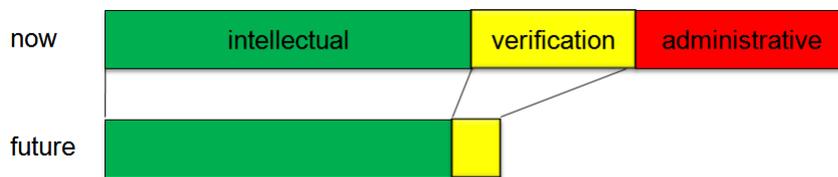
Business: managers

- The architectural framework goal is to help you to streamline your critical business processes by
 - ◆ automating their management
 - ◆ eliminating work which does not add value
 - ◆ integrating existing applications around the business needs
 - ◆ evolving information systems in an architected and coordinated manner
- Should make use of the synergy that exists between business needs and IT potentials



Business: process owners

- ❑ The architectural framework explicitly classifies all human activities as intellectual, verification or administrative
- ❑ The goal is that the humans should perform only intellectual activities, and all other activities should be automated (which incidentally may also improve their quality)

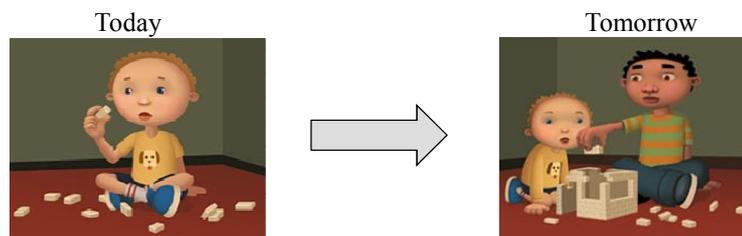


Business: super-users

- ❑ Proactive control over execution of business processes
- ❑ Delegation of complex tasks to less-qualified staff members
- ❑ Control of some artefacts and the relationships between them without **systematic involvement** of the IT

Project: managers

- ❑ Achievement of common understanding within a project through clarification of the different views of artefacts
- ❑ Better visibility of artefacts
- ❑ Shorten the gap between modelling and implementation



Example – selection of a single tool

- ❑ Situation
 - ◆ 30 different tools for electronic publishing
 - ◆ 2 years of heated discussions without a result
- ❑ Task
 - ◆ Define criteria for the selection of a single tool
- ❑ Action
 - ◆ Modelling of business processes to determine common services
- ❑ Result (after several meetings)
 - ◆ An agreed list of services as selection criteria

Example – real agility achieved

- Micro-projects – agile implementations of new features
 - ◆ are carried out in a manner similar to Deming’s wheel
- Meta-projects – architectural framework governance for the management of many micro-projects
 - ◆ looks like maintenance rather than development

Project: business analysts

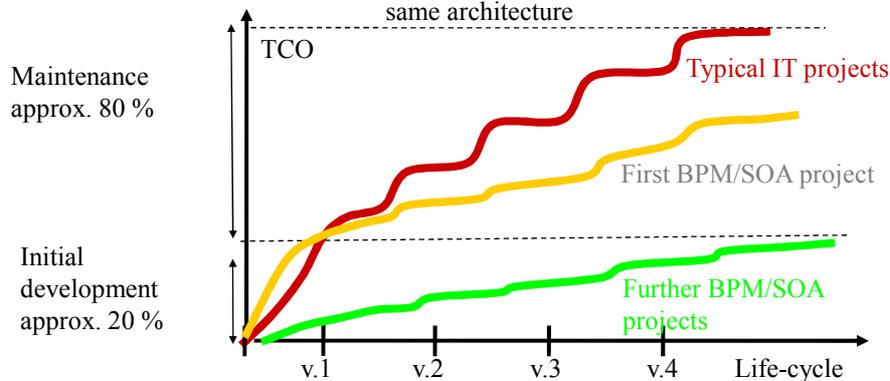
- A modelling procedure
 - ◆ four-phase guidance to produce executable models
 - ◆ diagramming style
 - ◆ naming conventions
 - ◆ several practical patterns
- Promoting joint work between the business and IT
- Quick iterations for building an operational prototype

Example – early industrialisation of a business system

- ❑ Intensive training for business process modelling
- ❑ Use of open source BPM suite for modelling in BPMN
- ❑ Tailoring of the modelling procedure for the organisational needs
- ❑ Common modelling in two previously disparate major projects
 - ◆ new ECM
 - ◆ new ERP

IT: managers

- ❑ Considerable reduction of Total Cost of Ownership (TCO)
Each subsequent solution is cheaper because it reuses the same tools, the same services, the same architecture



Example – a production system in place for several years

- Complexity
 - ◆ 3 000 complex products per year
 - ◆ 60 persons for about 50 different tasks
 - ◆ 3 production chains
 - ◆ 6 repositories
 - ◆ 40 IT services

- The maintenance and evolution of this production system required several times less resources

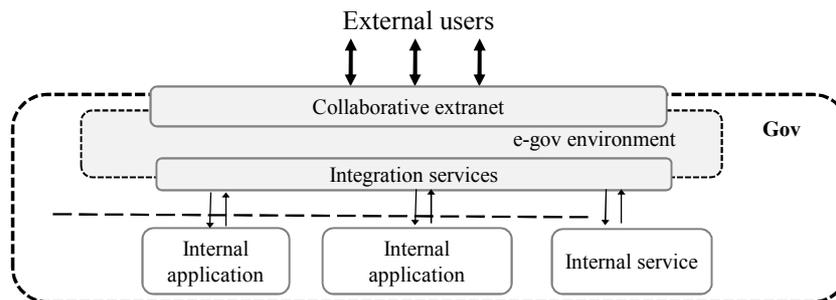
- Several successful (and easy to do) migrations were undertaken

IT: enterprise architects

- Architected flexibility – your BPM system is easy adaptable to practically all aspects of the organisation
 - ◆ policies and priorities
 - ◆ constantly changing business processes
 - ◆ business innovations
 - ◆ computer knowledge and culture of the users
 - ◆ IT systems
 - ◆ size and complexity
 - ◆ data
 - ◆ SLA

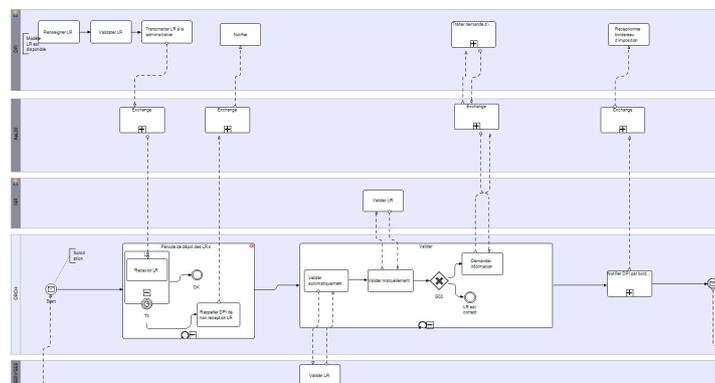
Example – Solution architecture for “e-government” (1)

- ❑ Minimum disruptions for internal applications
- ❑ Direct participation of external users in internal business processes
- ❑ Maximum traceability (easily certified)



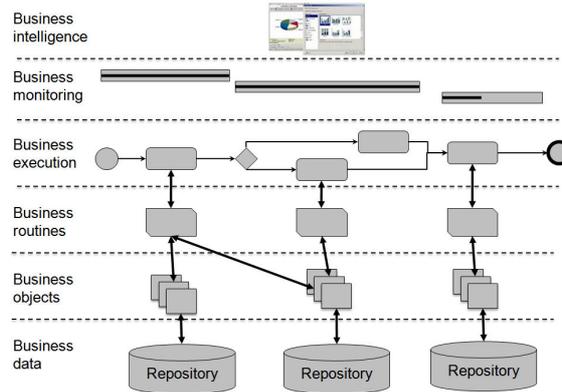
Example – Solution architecture for “e-government” (2)

- ❑ One of the pools (second from the top) serves as an insulation layer



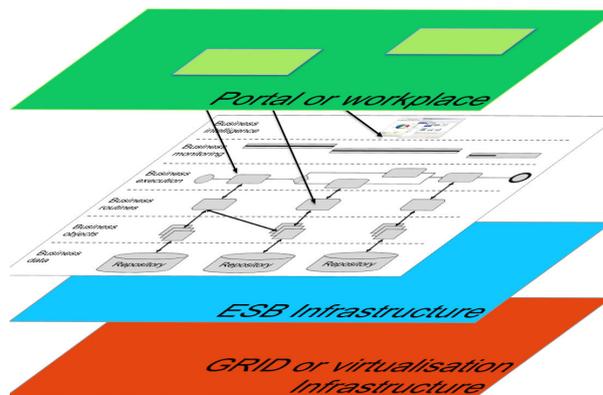
IT: architects (1)

- Relationship between artefacts as implementation layers



IT: architects (2)

- Relationship of BPM/SOA with other technologies

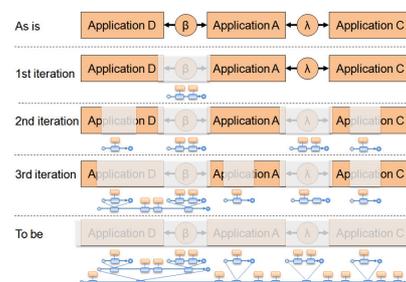
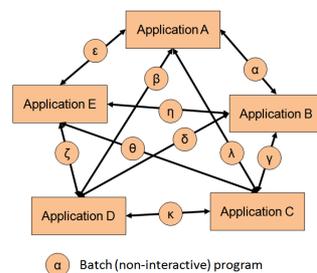


Example – complete redesign of a business system

- The following guidelines were provided
 - ◆ principles for building BPM systems
 - ◆ typology of BPM artefacts for the understanding and construction of artefacts
 - ◆ architecting flexibility of BPM systems, e.g. rules for versioning, conventions for WSDL and XSD, etc.
 - ◆ design considerations for implementation of artefacts

IT: developers

- Incremental transformation from typical inter-application data flows to end-to-end coordination of services



Example – typical timing of micro-projects

- The architectural framework provides the big picture which is
 - ◆ represented graphically (and therefore easily understood), agreed internally by consensus, addressing BPM and not “parachuted in” by consultants or a vendor

- Many projects become very agile
 - ◆ definition phase: 1 hour
 - ◆ specification / conception phases: a few hours
 - ◆ development / test / validation phases: a few hours / days (depending on the user’s availability)
 - ◆ production phase: practically instant

IT: operators

- The architectural framework helps to manage the complexity of a mixture of interconnected and interdependent services by making explicit all relationships between services

- It thus allows a correct evaluation of the availability of business-facing services from the known availability of technology-related services

Example – efficient error handling

- ❑ Error handling is carried out by everyone:
 - ◆ the business users process their errors themselves (and not through an IT helpdesk)
 - ◆ the IT staff treat their errors before they impact the business
- ❑ Monitoring of all services (dummy data are necessary)
- ❑ Error recovery is taken into account in the design of the business process

Summary – Main ways of achieving optimal agility

- ❑ actionable enterprise architecture
- ❑ addressing BPM
- ❑ guaranteeing flexibility by design
- ❑ digitalisation, externalisation and virtualisation of BPM artefacts
- ❑ formalising (via executable models) more and more relationships between BPM artefacts
- ❑ shortening the loop between modelling and implementation