BUSINESS PROCESS MODELLING

Business Process Reengineering

by
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• BPMN in a nutshell
• Business Process Modelling Tools
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Business Process

Transformation

Input -> Process <-> Output

Feedback

Control

Single vs Cross-functional vs Common across the enterprise vs Inter-organizational
Fundamental challenge with business process governance

Processes designed and documented ≠ Processes implemented in system ≠ Processes executed in business

Model

“A model is a simplifying mapping of reality to serve a specific purpose” (Stachowiak: Allgemeine Modelltheorie, 1973)

- **Mapping**: representation of natural or artificial originals that can be models themselves

- **Simplifying**: only those attributes of the original that are considered relevant (abstraction)
  - Models focus on specific aspects of reality and degrade or ignore the rest

- **Pragmatics**: model is used by modeler in place of original for a certain time and a certain purpose

- A model can be expressed with symbols, math types, words and represents the description of entities, processes or attributes and their relations.

- A model is particularly useful when it facilitates descriptions, makes more understandable a complex situation and helps communicating the concepts it includes.
Guidelines of Modelling

1. **Correctness:**
   relates to the mapping, capture attributes of the original correctly

2. **Relevance:**
   abstract from those aspects that are not relevant

3. **Economic Efficiency:**
   Keep an eye on the purpose of modeling task

4. **Clarity:**
   the model should be intuitive to understand for involved stakeholders

5. **Comparability:**
   Use a similar mapping for similar aspects

6. **Systematic Design:**
   define interfaces to related models
Examples of Models - I

\[ k = \frac{1}{2} \rho C_d A \]
\[ q = \sqrt{\frac{T - mg}{k}} \]
\[ x = \frac{2ka}{m} = 2 \frac{\sqrt{(T - mg)k}}{m} \]
\[ t = \frac{1}{T} \]
\[ v = q \frac{1 - e^{-xt}}{1 + e^{-xt}} \]
\[ y_1 = -\frac{m}{2k} \ln \left( \frac{T - mg - kv^2}{T - mg} \right) \]
Examples of Models - II
Business Process Modelling

- Business process modelling is a **means of representing the business activities, the information flow and decision logic** in business processes.
- With the power of **visualization**, it is used to communicate information regarding a process and the interaction it includes within / between organizations either among the persons reading a model or the persons who create it.
- It **externalizes the business knowledge** with a view to agree and bind all stakeholder in a representation that is shared within an organization and is reflected in its information systems.
- It presents **multiple granularity levels**: from simple depiction of the workflow to simulation and execution.
- It **addresses complexity** by emphasizing on specific aspects and by reusing models.
- It achieves a **common understanding** of business knowledge between an organization and IT experts and thus drives the design and implementation of software systems.
When it comes to Software Design...

AS FOR THE NEW PROJECT, WE'LL HAVE TO FIT A LOT OF TEXT INTO THE SITE BUT PERHAPS YOU COULD DYNAMICALLY SHOW AND HIDE CHUNKS OF IT WITH OUR JAVA APPLET.

YOU MEAN THE JAVASCRIPT. OF COURSE!

SHE SAID JAVA - OH MY GOD!!!

RIGHT, JAVASCRIPT. - NEXT POINT: AS YOU ALL KNOW, OUR CLIENT WANTS A FORUM ...

IS IT A FORUM? - IT RATHER LOOKS LIKE AN ORDINARY DISCUSSION BOARD TO ME.

YES, IT'S A COMMON MISTAKE FOR AMATEURS TO CONFUSE THE TWO ...

OKAY, YOU WIN; IT'LL BE MUCH BETTER IF YOU WRITE THE CONCEPT. I SIMPLY DON'T HAVE THE KNOW-HOW.

TOUCHDOWN! THEY ALWAYS FALL FOR THIS TRICK.
Business Process Modelling types

- **Dynamic Model Types.** Whenever a model type is supposed to show process relevant information that can be put in a chronological, time dependent manner, this model type is referred to as a "dynamic model type". All model types that represent a process flow (like Event Driven Process Chains or Value Added Chain Diagrams) are dynamic model types.

- **Static Model Types.** Static model types represent structures that do not provide time dependency. This includes the modeling of organizational structures, of information carriers like forms or the modeling of relationships between business objects.
Business Process Modelling addresses questions like…

**What...**

- *Does it represent a process that can eventually work in real-life?*
- *How is all information interconnected?*
- *How do we know which are the process requirements and responsibilities?*
- *How can we be sure an activity flow is correctly defined?*
- *How important an activity is and how is it efficiently executed?*

**How?**

- Takes into account all parameters and simulates all alternatives
- Depicts and models the correlations
- Defines priorities and intelligently routes the “traffic”
- Incorporates the business rules, the legal framework requirements and all supportive information to explain why everything is happening
- Describes the resources needed with appropriate roles assigned
Business Process Modelling Maturity Level

- **Basic**: No enterprise models exist, only localised ad-hoc models. BPM Lifecycle: N/A. Typical models: Process only. Scope: Individual Level.

Added value in quantitative terms

- Reduced process costs: 10 - 15%
- Increased process quality/reduced number of errors: 20 - 30%
- Reduced process throughput times: 10 - 30%
- Reduced training time/expenses: 10 - 30%
- Reduced number of (internal) support requests: 15 - 30%
- Reduced number of customer complaints: 20 - 30%
- Increased forecast accuracy: 15 - 30%

>> The processes in the individual work areas could be streamlined and shortened considerably. For example, processing time dropped drastically(…). In the Dealer Service Center (DSC), process costs dropped by 58 percent and staff requirement by 67 percent.>>

Source: IS Report, 7+8/2005, BMW Financial Services Switzerland project report on the use of ARIS.
How Modelling practically works

• Through a modelling language and notation like UML (Unified Modelling Language) or BPMN (Business Process Modelling Notation) which is:
   Easily understandable by non-IT experts
   Sufficient to model complex business environments

• Through a modelling framework which:
   Covers the business process lifecycle spanning from requirements analysis to disposal
   Focuses on diverse aspects of the enterprise process hiding the parts of the model that are not relevant to the specific perspective
   Supports reuse of models or of their parts

 Within an overall Enterprise Architecture
BUSINESS PROCESS MODELLING FRAMESWORKS & STANDARDS
Enterprise Architecture

Enterprise architecture (EA) is the process of translating business vision and strategy into effective enterprise change by creating, communicating and improving the key requirements, principles and models that describe the enterprise's future state and enable its evolution. [Gartner]

Source: 2006 FEA Practice Guidance of US OMB
Enterprise Architecture Rationale

Indicative Enterprise Architectures & Modelling Frameworks

• **Zachman Framework for Enterprise Architecture**: Proposed by John Zachman in 1987 and completed after 5 years

• **CIMOSA Framework for Modelling**: Developed in the context of the European Project AMICE (ESPRIT)

• **GERA Modelling Framework**: Recommended by the IFIP/IFAC Task Force on Architectures for Integrating Manufacturing Activities and Enterprises in 1999

• **ARIS (Architecture of Integrated Information Systems)**: Initiated as the academic research of Prof August-Wilhelm Scheer in the 1990s and constitutes the foundation of the ARIS Modelling Suite
**Zachman Framework for Enterprise Architecture**

<table>
<thead>
<tr>
<th>Scope (Contextual)</th>
<th>Planner</th>
<th>Business Model (Conceptual)</th>
<th>Owner</th>
<th>System Model (Logical)</th>
<th>Designer</th>
<th>Technology Model (Physical)</th>
<th>Builder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data</strong></td>
<td>List of Things Important to the Business</td>
<td>e.g. Semantic Model</td>
<td>E.g. Logical Data Model</td>
<td>E.g. Physical Data Model</td>
<td>E.g. System/Design</td>
<td>E.g. Program</td>
<td>E.g. Data Definition</td>
</tr>
<tr>
<td><strong>Function</strong></td>
<td>List of Processes the Business Performs</td>
<td>e.g. Business Process Model</td>
<td>E.g. Application Architecture</td>
<td>E.g. Technology Architecture</td>
<td>E.g. Network Architecture</td>
<td>E.g. Security Architecture</td>
<td>E.g. Data</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>List of Locations in which the Business Operates</td>
<td>E.g. Business Logistics System</td>
<td>E.g. Distributed System Architecture</td>
<td>Node = IIS Function (Process/Service etc) Link = Line Characteristics</td>
<td>People = User Work = Screen Format</td>
<td>e.g. Timing Definition</td>
<td>E.g. Program</td>
</tr>
<tr>
<td><strong>People</strong></td>
<td>List of Organizations Important to the Business</td>
<td>e.g. Work Flow Model</td>
<td>E.g. Human Interface Architecture</td>
<td>E.g. Presentation Architecture</td>
<td>e.g. Control Structure</td>
<td>e.g. Rule Specification</td>
<td>E.g. Function</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>List of Events/Cycles Significant to the Business</td>
<td>e.g. Master Schedule</td>
<td>E.g. Processing Structure</td>
<td>E.g. Processing Structure</td>
<td>E.g. Time Execution Cycle = Component Cycle</td>
<td>E.g. Time: Interrupt Cycle = Machine Cycle</td>
<td>E.g. Schedule</td>
</tr>
</tbody>
</table>

**Functioning Enterprise**

- **Data**: e.g. Data Definition
- **Function**: e.g. Program
- **Network**: e.g. Network Architecture
- **Organization**: e.g. Security Architecture
- **Schedule**: e.g. Time Definition
- **Strategy**: e.g. Rule Specification

*John A. Zachman, Zachman International*
CIMOSA Framework for Modelling
ARIS House

Evolution in the world of business process management

- **2003**: Model, Improve Business Processes, SCOR, eTOM, ITIL
- **2008**: Decline of 6 Sigma; Rise of Lean/TPS, Emphasis on Services rather than Manufacturing
- **2013**: BPM & Balanced Scorecard, BPM CoE Management, EA’s Seek to Define Business Architecture Transformation, Emphasis on Complex, Dynamic Processes

**Changes in Business Process Concerns**
- 2003: SCOR, eTOM, ITIL
- 2008: Decline of 6 Sigma; Rise of Lean/TPS
- 2013: BPM & Balanced Scorecard, BPM CoE Management

**Changes in BPM Software Offerings**
- **2003**: ERP, Workflow/EAI Control of Execution
- **2008**: BPMN-1: Workflow buy EAI & Vice Versa, Business Services
- **2013**: BPMN-2: Process Mining, BPM buy Data Mining Tools

**Changes in Infrastructure**
- **2003**: Client Server
- **2008**: The Web/XML, Service Oriented Architecture
- **2013**: Smart Phones iPads, Cloud, Social Media, Big Data

http://www.bptrends.com/publicationfiles/advisor20130326.pdf
UML – Unified Modelling Language

• Unified Modeling Language (UML) is a standardized, general-purpose modeling language in the field of software engineering (for specifying, documenting and supporting development of software systems and visualizing a system's architectural blueprints).
• It includes a set of graphic notation techniques to create visual models of object-oriented software-intensive systems.
• Core concepts in UML include: actor, attribute, class, interface, object, activity, event, message, state, use case, association, composition, depends, generalization, inheritance, multiplicity, role
• Developed by Grady Booch, Ivar Jacobson and James Rumbaugh at Rational Software in the 1990s, adopted by the Object Management Group (OMG) in 1997, and has been managed by this organisation ever since. In 2000 the Unified Modeling Language was accepted by the International Organization for Standardization (ISO) as industry standard for modeling software-intensive systems.
• The current version of the UML is 2.4.1 published by the OMG in August of 2011.
UML Diagrams

Diagram

Structure Diagram
- Class Diagram
- Composite Structure Diagram
- Deployment Diagram
- Object Diagram
- Package Diagram

Behaviour Diagram
- Activity Diagram
- Use Case Diagram
- Interaction Diagram
- Communication Diagram
- Interaction Overview Diagram
- State Machine Diagram

Notation: UML

Decision Support Systems Laboratory, NTUA

Business Process Reengineering 2013 - Process Modelling
UML Diagrams Examples

Use Case Diagram

Sequence Diagram

Component Diagram

State Machine Diagram
BPMN – Business Process Management Notation


- Provides a notation that is easily conceivable by all users:
  - Business analysts that create drafts of the process models
  - Technical developers that implement the processes
  - Business people that manage the processes

- Provides advanced capabilities for depicting concepts like exception handling, transactions and compensation

- Offers interconnection with and depiction of the business process models in execution languages like BPEL (Business Process Execution Language)
Business Process Modelling Hourglass

Audiences:
- Strategy Consultants
- Business Analysts
- Process Designers
- Software Engineers

Business Environment
- BPMN
- BPEL
- Intersection Point
- BP Scope

Technology Implementation

Purposes:
- Modeling
- Execution

Source: Stephen A. White, Introduction to BPMN, IBM Software Group
BPMN Business Process Diagrams

• Actually represent:
  ❖ The activities of a business process
  ❖ The information that is exchanged during the implementation of a process
  ❖ The control check-points that define the sequence with which the activities are implemented and the data are exchanged
  ❖ The roles involved in the business process and the necessary resources
  ❖ The supportive information systems
  ❖ The business rules and the legal framework that regulates the business process implementation

• According to the Greek Interoperability Framework it bears three types / perspectives:
  ❖ Private Business Process
  ❖ Public Business Process
  ❖ Collaboration Business Process
Private Business Process

- All activities that happen internally in an organization
- The departments that assume responsibility for each task
- The documents that are exchanged
- The business and legal rules that regulate the process and its steps
- The information systems that support the activities

*Every private business process can be mapped to an executable BPEL file.*

*Schema from Greek Interoperability Framework, Documentation Model, Version 3.0*
Public Business Process

• Focuses on representing the communication and interactions between an internal process of an organization and other processes executed by other organizations

• Doesn’t provide any insights regarding the organization structure, business / legal aspects or the information systems

... A public business process contributes to the identification of the inbound / outbound communication interfaces.
Collaboration Business Process

- Depicts all interactions among all the organizations that are involved in a business process
- Doesn’t dive into any details regarding the process execution that happens internally in each organization
- Contributes to the identification of the necessary web services to support the electronic execution of a process
Modelling Concepts in BPMN

Activity

Event

Gateway

Connector
BPMN Symbols Notation per Category

**Flow Objects**
- Event
- Task
- Gateway

**Connecting Objects**
- Sequence Flow
- Message Flow
- Association

**Swimlanes**
- Pool
- Lane

**Artifacts**
- Document
- Group
- Comment
Activities

- **Task**
  - An atomic activity that is included within a process.
  - The work in the process cannot be broken down to a finer level of Process Model detail.

- **Sub-Process**
  - A compound activity that is included within a process.
  - Can be broken down into a finer level of detail (a Process) through a set of sub-activities.

- **Activity Looping**
  - The attributes of Tasks and Sub-Processes will determine if it is repeated or performed once.

Examples:
- Application Submission
- Periodic VAT Payment
- Product Quality Control
Events

A Start Event indicates where a particular process will start.

Intermediate Events occur between a Start Event and an End Event. It will affect the flow of the process, but will not start or (directly) terminate the process.

An End Event indicates where a process will end.
Common Start Event Types

None
The modeler does not display the type of Event. It is also used for a Sub-Process that starts when the flow is triggered by its Parent Process.

Message
A message arrives from a participant and triggers the start of the Process.

Timer
A specific time-date or a specific cycle (e.g., every Monday at 9am) can be set that will trigger the start of the Process.

Rule
This type of event is triggered when the conditions for a rule such as “S&P 500 changes by more than 10% since opening,” or “Temperature above 300C” become true.

Link
A Link is a mechanism for connecting the end (Result) of one Process to the start (Trigger) of another. Typically, these are two Sub-Processes within the same parent Process.

Multiple
This means that there are multiple ways of triggering the Process. Only one of them will be required to start the Process. The attributes of the Start Event will define which of the other types of Triggers apply.
<table>
<thead>
<tr>
<th>Event Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Used to indicate some change of state in the Process.</td>
</tr>
<tr>
<td>Message</td>
<td>A message arrives from a participant and triggers the Event.</td>
</tr>
<tr>
<td>Timer</td>
<td>A specific time-date or a specific cycle (e.g., every Monday at 9am) can be set that will trigger the Event.</td>
</tr>
<tr>
<td>Rule</td>
<td>Triggered when a Rule (an expression that evaluates some Process data) becomes true.</td>
</tr>
</tbody>
</table>
Common Intermediate Event Types - II

### Compensation

*Used for compensation handling--both setting and performing compensation. It reacts to a named compensation call when attached to the boundary of an activity.*

### Link

*A mechanism for connecting an End Event (Result) of one Process to an Intermediate Event (Trigger) in another Process. Paired Intermediate Events can also be used as “Go To” objects within a Process.*

### Multiple

*There are multiple ways of triggering the Event. Only one of them will be required. The attributes of the Intermediate Event will define which of the other types of Triggers apply.*

### Error

*Used for error handling--both to set (throw) and to react to (catch) errors. It sets (throws) an error if the Event is part of a Normal Flow. It reacts to (catches) a named error, or to any error if a name is not specified, when attached to the boundary of an activity.*
Common End Event Types

None
The modeler does not display the type of Event. It is also used to show the end of a Sub-Process that ends, which causes the flow goes back to its Parent Process.

Message
A message is sent to a participant at the conclusion of the Process.

Terminate
All activities in the Process should be immediately ended. This includes all instances of Multi-Instances. The Process is ended without compensation or event handling.

Compensation
The Compensation identifier will trigger an Intermediate Event when the Process is rolling back.

Multiple
There are multiple consequences of ending the Process. All of them will occur (e.g., there might be multiple messages sent).

Link
A Link is a mechanism for connecting the end (Result) of one Process to the start (Trigger) of another. Typically, these are two Sub-Processes within the same parent Process. A Token arriving at Link End Event will immediately jump to its corresponding target Start or Intermediate Event.
Gateway Types

- **AND**: Data-based
  - Restricts the flow such that only one of a set of alternatives may be chosen based on conditional expressions during runtime.

- **OR**: Event-based
  - Restricts the flow such that only one of a set of alternatives may be chosen based on an event that occurs at that time.
  - In a branching, the flow may follow one or more alternative paths.
  - In merging, it combines 2 or more parallel incoming flows in one outgoing flow.

- **XOR**: XOR: exclusive decision and merging
  - In a branching, the flow may follow one or more alternative paths.
  - In merging, it combines 2 or more parallel incoming flows in one outgoing flow.

- **Complex**: Depicts complex circumstances (e.g. 3 incoming and 5 outgoing flows).
  - Dividing of a path into two or more parallel paths where activities can be performed concurrently, rather than sequentially.
  - Combining of two or more parallel paths into one path.
E-Mail Voting Process in BPMN 1.0 Specification
BUSINESS PROCESS MODELLING TOOLS
Evolution of BPM Tools

Source: BPTrends (2010). BPM Product Report Introduction and Overview
A Business Process Management Software Platform

BPM Software Platform (BPM Suite)

- BPM Tools
  - Process Modeling Environment
  - Enterprise Modeling Environment
  - Process Monitoring/BI Environment
  - Business Rules Management Tool
  - Software Performance Tool

- BPM Server/Engine
  - Workflow Engine
  - EAI Engine
  - Rules Engine

- Management Interface
- Programming Interfaces/Tools

- Language/Middleware Architecture
  - J2EE
  - .NET/Biztalk
  - SOA
  - XML
  - BPEL

Repository (Database in which Process Knowledge is stored)

Source: BPTrends (2010). BPM Product Report Introduction and Overview
General Features of Business Process Modelling Tools

- Intuitive graphic user interface with rich functionalities and configuration potential.
- Compliance with international Enterprise Modelling methodologies and notations like BPMN and UML
- Advanced capabilities for:
  - Modelling documents, roles, systems, legal rules in addition to modelling business processes
  - Simulating business processes
- Potential to store the business process models and their interrelations to a database
- Import / export of the business process models (together with their interconnections) for transfer from / to other tools
- Automatic reporting and documentation creation in word and html format
Business Process Modelling Tools

- BPM-BPR Tools: ADONIS, ARIS, OSSAD Process Design
- Design Tools: MS Visio, MS PowerPoint
- Open Source Modelling Tools: Intalio BPMS, Bonita Studio
- Other tools: Mo2Go, Cubetto Toolset, Bonapart
Gartner Magic Quadrant for BPM Suites

Source: Gartner (February 2009)
Criteria to select a Business Process Modelling Tool

• Architecture (1-tier, client/server, n-tier)
• Scalability by inserting new components and / or libraries
• Support for a series of methodologies and notations
• Availability of a Business Process Models Library
• Potential to automatically translate a business process to code
• Integration with other business process tools
• Unified management of models created by multiple users
• Existence of a web user interface
• Users management, privacy and access rights
• Provision for multilingual content
• Maturity
• Technical support and frequent new versions
• Licencing schema and cost
ADONIS Core Features

- Supports the core activities of BPM methodologies, including information acquisition, modeling and design, analysis, simulation, and evaluation.
- Provides an underlying meta-modeling technology that allows users to define new modeling notations and mechanisms for domain-specific or customer-specific needs.
- Provides various import/export facilities, Web and standard publishing capabilities, and administration tools. Optional add-on components are available for Web-based modeling, activity-based costing, workforce and capacity planning, and call center management.

- ADONIS (v5.0) by BOC operates as either a stand-alone tool on desktops or laptops, or in a multi-user environment utilizing a central repository.
- In February 2009 BOC launched a freeware edition called “The ADONIS Community Edition” (ADONIS:CE) (currently in v2.0)
ADONIS Architecture

**ADONIS Process Portal (APP)** (role-specific web-access)

**ADONIS Modeling Toolkit** (user login)
- Modeling
- Analysis
- Information Acquisition
- Import/Export
- Publishing
- Simulation
- Evaluation
- Integration and Plug-in Interfaces
- Add-on Components, Scripting

**ADOnet (Web Services Interface)**
- XLS, XML, RTF, ...
- Website (HTML)

**Administration Toolkit** (administrator login)
- Admin Components
- Metamodel
- Users

**Database**
- Repository
- DB Management Tools
- Model Transformer
- Model Localizer

**XML ABL UDL**
ADONIS Screenshots - 1

Administration Toolkit in ADONIS

Data Modelling in ADONIS
ADONIS Screenshots - II

Roles and Systems in ADONIS
ADONIS Screenshots - III

Process Map in ADONIS

BPMN Collaboration Diagram in ADONIS
ARIS Core Features

- Easy-to-Use Design Tool for the enterprise business processes. Describe the resources needed for the processes and environment in which they operate—organizationally, by IT system, data, products and risks, for example. Link business strategy to process and IT implementation.
- ARIS Business Architect & Designer (v9.0) by SoftwareAG supports the entire process design lifecycle and has **200+ model types** for describing the complete business enterprise.
- Presents process information and business dashboards via **smart phones** and tablet devices to enable process improvement on the go.
- Provides individual user perspectives combined with **social networking** capabilities.
- Introduces ARIS Connect that runs in a **private cloud architecture** in your data center. ARIS Connect combines process publishing and design with social collaboration to tap the full potential of “crowdsourcing” for process improvement.
- Delivers advanced **(big data) analytical** capabilities.
- Provided as stand-alone tool (commercial and free, ARIS Express) or as a SAP NetWeaver component or in the Oracle BPA Suite.

Bundesagentur für Arbeit employs ARIS to improve processes:
According to BPTrends, “ARIS offers an integrated and complete software tool portfolio for strategy, design, implementation and controlling of business processes and enterprise architecture management approaches”
CASEWISE Corporate Modeller Core Features

• Links together business and IT modeling within one multi-user environment for Business Process Analysis and Improvement, Business Process Management, and Enterprise Architecture as well as Governance, Risk & Compliance efforts.

• CaseWise (v10 as of BPTrends Report in 2007) is available in 3 versions: Standard, Enterprise and Web Portal

• Informs via email the process owners when they need update, approval or control
CaseWise Framework

The CaseWise Framework provides an organized approach to evaluating business success. It includes the following steps:

1. **Data**: What do you need to understand about the current state of your business?
2. **Function**: How does your business function today?
3. **Network**: What is the current network and its capabilities?
4. **People**: Who are the key players in your business?
5. **Process**: What are the key processes in your business?
6. **Time**: How does your business operate over time?
7. **Motivation**: What is the motivation for these changes?

The framework is designed to be scalable and adaptable, allowing for the identification of key areas for improvement and the development of a comprehensive strategy for business transformation.
Intalio built the first and leading Open Source Business Process Management System (BPMS) (currently in v6.1).

- Embraces open standards and is independent of any proprietary technologies.
- Provides all the components required to design, deploy and manage the most complex business processes, including business activity monitoring, business rules management, document and content management, system integration, business-to-business protocols and web portal tools.

"Because Intalio is open source, the problem of a heavy investment upfront and shelfware is drastically reduced. Businesses can try the product out; and then through a small amount of investment via training and/or onsite consulting create a prototype project for proof of concept."
—Neville Bradbury, OpenSoft Australia
Bonita Open Solution

• Open-source BPM and Workflow suite, created in 2001
• Bonita Studio allows the user to graphically modify business processes following the BPMN standard.
• Allows the user to design graphically the forms that will be shown to the end user in order to interact with the process.
BUSINESS PROCESS MODELLING STEP-BY-STEP IN PRACTICE
Core Modelling Principles to be followed

• Compliance with BPMN (Business Process Modeling Notation)
• Consistency of models with the purpose for which they are intended
• Depiction of the as-is situation and identification of bottlenecks and activities that need improvements
• Unique expression of information
• Maintenance and easy management of models
• Potential to utilize the models during runtime through BPEL Scripts
• Independency of tools
• Reuse of existing models / libraries

• In the case of a public organization, eGIF imposes a set of guidelines, i.e: adding service metadata to the Interoperability Registry apart from creating appropriate BPMN models.
Naming and Design Decisions

• All names and descriptions are at the language an enterprise / organization prefers
• No acromyns and shortcuts should be used in any modelling element
• The notation may be expanded with additional artifacts yet they should not collide with existing modelling elements:
  • By modelling in a different way the same concept
  • By modelling in the same way different concepts
• The core modelling concepts (Events, Activities, Gateways, Flow) should not be modified in any way
Core Design Principles - I

• Only 1 start event and 1 end event should appear for every alternative flow of each stakeholder in a business process

• The flow depicted in the diagrams should be from up to down or from left to right (with the exception of loops that may have a different direction)

• The organizations involved in a business process are depicted as swimlanes in the diagrams while the documents that are exchanged can be placed between the swimlanes

• For readability purposes, all Flows should not coincide, to the extent that it is possible.
Core Design Principles - II

• Before a gateway (that represents a decision), an activity proceeds in order to partly describe the decision process.

• Comments are used to provide details for the process or the properties of objects (e.g. Depending on the notation and tool used, the legal rule or the information system that is relevant to a specific step of a business process).

• The flow symbols may have labels indicating their name or any other description appearing above or below the symbol.
Version Management

- The process models indicate their full version in the filename:
  \(<\text{BP Code}\> \ <\text{BP Title}\>-vn-m\)
  
  where \(n\) and \(m\) represent the major and minor version, and \(v\) is the latin symbol “\(v\)”. 

- A new major version is created when significant and non-backward compatible changes take place, i.e. Business process reengineering, and may indicatively include:
  - Deleting or updating activities
  - Changing the type of events
  - Modifying the gateways and their types

- In a minor version of a business process model, a series of small or backward-compatible changes is noticed, e.g. Deleting or adding alternative flows
Models Exchange: How?

• Dedicated Adaptors that interconnect the various BPM tools

• With the help of standards like:
  
  • XML Metadata Interchange (XMI): An OMG proposal (Version 2.1 – December 2007) for exchanging UML Models. It integrates UML, XML, MOF (Meta Object Facility). It transforms the models into XML, e.g. The UML Class Diagrams in XML Schemas

  • Model Driven Architecture (MDA): Developed by OMG in 2001. it decouples the IT system functionality specification from the implementation of such functionality in a specific platform

  “Design once, build it on any platform”
Modelling Step by Step

• Consult with the experts, the people managing and working with the process.
• Identify the stakeholders: What roles are involved in the processes?
• Identify the boundaries: Where does the process begin? Where does it end for each stakeholder?
• Identify the steps: What is done first? What is done next? By whom?
• Identify the decision points: What are the alternatives? What determines which alternative is chosen?
• Draw an initial process flow: Draw and label the swim lanes using standard symbols.
• Check for completeness: Are all stakeholders represented? Are all processes shown? Are there any alternatives that have not been considered? Refine and finalise.
• Review with the experts to ensure completeness.
DEMO IN A BPR TOOL
E-Mail Voting Process in BPMN 1.0 Specification

1. Start on Friday
2. Receive Issue List
3. Review Issue List
4. Any issues ready?
   - Yes: Discussion Cycle
   - No: Review Issue List

Discussion Cycle:
- Issue Announcement
- Vote Announcement
- Deadline Warning

Collect Votes
- Timed Out [1 week]

Prepare Results
- Post Results on Web Site
- E-Mail Results of Vote

Vote
- Yes: 2nd Time?
  - Yes: Reduce to Two Solutions
  - No: E-Mail Voters that have to Change Votes
- No: Deadline Warning

Have the members been warned?
- Yes
  - Did Enough Members Vote?
    - Yes: Reduce number of Voting Members and Recalculate Vote
    - No: Re-announce Vote with warning to voting members
- No: Vote announcement with warning

Vote Results

Issues with Majority?
- Yes
- No: Change Vote Message
Invoicing in Greece – Public diagrams
GENESIS Project nominated as the OMGm “Best BPM Application that demonstrates the use of one or more business process standards”
Find the errors
How BPM contributes to BPR

• By depicting in a visual manner an organization and its environment

• By providing the potential to simulate alternative scenarios in order to decide:
  • How the processed can be modified / optimized
  • Which points prevent the normal workflow (bottlenecks, inconsistencies, etc)

• By guiding (through the models) the implementation of the redesigned processed
An example of a Service in the Greek Public Sector today...

- A citizen needs to collect all supportive documents from multiple public organizations.
- The public organizations typically communicate through telephone, fax or via post.
- Controls and processed that have been already undertaken by another department / organization are repeated.
An example of a Service in the Greek Public Sector tomorrow... After BPR

- The citizen sends only his application and declares his ID
- The intra-communication between public administrations is achieved with the help of web services
- Unique tasks and processes across the public sector.
CASE STUDIES
Case Study I: ADONIS at Telefónica

- Telefónica is a world leader in the telecommunications sector, with market presence in Europe, Africa, and Latin America.

- The main challenge for Telefónica was to create a common language for business process modeling to facilitate and improve communication between departments, including communication of corporate strategy. Another key challenge was the introduction of a horizontal business organization, involving end-to-end processes, instead of the existing vertical (departmental) approach.

- Telefónica has benefited from using ADONIS in various ways.
  - ADONIS helped Telefónica to devise (and follow) a single procedure for its BPM projects, whereby processes are analyzed and redesigned, while business functions are defined and then assigned to processes.
  - Telefónica has modeled nearly all of its relevant business processes (including process maps, org charts, and process models); the repository contains about 20,000 models managed with ADONIS. As a result, Telefónica has gained better knowledge of its operations across the entire group. This allows best practices consolidation and sharing, especially for specific critical areas.
  - ADONIS has also made it easier for Telefónica to get process certification according to the ISO 9001:2000 standards by integrating different quality management systems.
  - ADONIS models are shared via the company's intranet. Thus, all employees may browse published models and get up-to-date information about Telefónica's operations, process accountabilities, or their roles within the value-chain.

Case Study II: ARIS in Cargolux Airlines International S.A.

- Founded in 1970, Luxembourg-based Cargolux Airlines International S.A. is now one of the largest scheduled all-cargo airlines in Europe with a global network.
- To better meet the requirements of a highly competitive market, Cargolux was searching for a way to identify inefficiencies in its organizational processes, reporting and data management.
- Phase one of the project, called “process mapping,” lasted 12 months. The Cargolux divisions learned how to map processes with ARIS Platform products to get an overview on the existing as-is processes. More than 600 different process models were built and validated to be integrated into one central process library.
- Cargolux has benefited from using ARIS in various ways.
  - Process integration opportunities materialized in the form of 180+ improvement proposals
  - Improved process and IT system transparency formed a foundation for IT strategy moving forward
  - Total BPM project investment represented less than 20 percent of the identified and validated savings potential
Case Study III: Intalio|BPM in Finnair

- Finnair, one of the world's oldest operating airlines, was established on November 1st, 1923. Its operations focus on transporting passengers between Europe and Asia, via Helsinki.

- Using Intalio|BPM, Finnair solved its under-load problem in First and Business class by enabling eligible passengers to request last-minute upgrades via text messages with any cellphone, leading to a full return on investment in less than six months.
Case Study IV: The Greek Interoperability Registry

Decision Support Systems Laboratory, NTUA

Business Process Reengineering 2013 - Process Modelling

Interoperability Registry (Data, BPMN, XML Tools)

- Provided Services
- Internal Processes
- Documents
- Systems
- Legal Framework
- Operational Data
- Overall Policy
- Administration - Specific Issues
- BPM Methods
- Simulations - Heuristics
- Interoperability Standards
- SOA Methods
- Software Tools

Phase A: Modelling
- Process Modelling
- Data Modelling
- Operations & Related Information Capturing
- Generalised Process Standards, Core Components, Overall KPI's

Phase B: Transformation
- Process Transformation
- Data Transformation
- Key Performance Indicators Setting
- Digital Service Definitions, XML schemas, Common Codelists

Phase C: Digital Provision
- Final Digital Services
- Interoperability Services
- Public Service Portals
- Web Services
The application of an Interoperability Registry in eGovernment
## Population of the Registry as of April 2009

<table>
<thead>
<tr>
<th>Entity</th>
<th>Population</th>
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<tr>
<td>Public Administration Organisations</td>
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<tr>
<td>IT Systems Definitions</td>
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<td>Episodes</td>
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<tr>
<td>Business Information Entities (CCTS)</td>
<td>109</td>
</tr>
</tbody>
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Example: Services Data and Metadata Editing

Service Edit

GENERAL INFO
Title: Family Status Certificate Issuing
Identification: 00002
Is a Generic Service: Yes
Is Final Service: No
Is Final Service: Yes
Category: Certificate Issuing
Providing Public Body: Municipality
Business Event: n/a
Life Event: n/a

MANUAL SERVICE PROVIDED INFO
Demand On Presence in Submission: Yes
Demand On Presence in Receipt: No
Manual Authentication Types: Identity Card OR Passport

Electronic Service Provision INFO
Website: http://www.ypes.gov.gr
Protocol Method: Browser
Current Electronic Provision Level: n/a
Target Electronic Provision Level: n/a
Multilingual Service: Yes
offline Provision Unavailability: Yes
XML File Occurrence: Yes
Process Monitoring Support: Yes
Electronic Authentication Type: Username / Password

Digital Authentication Framework INFO
Data Type: n/a
Trust Level: n/a
Confirmation Level: n/a
Authentication Mechanism: n/a
Registration Level: n/a

Service SIGNIFICANCE INFO
Frequency (transactions number / Year): n/a
International Entity: Yes

SERVICE REGISTRATION INFO
Information Source: http://www.ypes.gov.gr/SupportPortal/Citi
tizenGuide/CitizenGuideCl/CitizenGuideCl?PAGET=100&lang=el
Date of Last Update: 14/6/2007
Data Completeness Status: Final

ATTACHMENTS (Verbal Description, BPMN Models etc.)
- Title: 1.0
  - Description: Description of the service
  - Date: 12/20/2009
  - Date Updated: 12/20/2009
  - User Updated: EPH
  - Type: DOC
- Title: 1.1
  - Description: Description of the service
  - Date: 12/20/2009
  - Date Updated: 12/20/2009
  - User Updated: EPH
  - Type: DOC

Add New

Return to the top
QUESTIONS?

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