


UNIVERSIDAD DE SEVILLA
Escuela Técnica Superior
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Departamento de Lenguajes
y Sistemas Informáticos

Introduction to Business Process Modeling

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Department of Computer Languages and Systems
University of Seville
October 2015*

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Introduction to Business Process Modeling

- Learning objectives
 - Understand the **need** for **modeling business processes** during the process of information systems development.
 - Know **BPMN** as a **graphical notation** to model business processes.
 - **Develop** simple business processes models using BPMN.


1. Why business modeling?

2. How to model business processes?

3. BPMN examples

4. Key BPMN notation

5. Basic BPMN notation



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Introduction to Business Process Modeling

• Why modeling business processes?

– Information systems should help their organizations to...

• Make competitiveness **strategic decisions**.

• Make business **tactical decisions**.

• Perform **business processes** and their related **operations**.

– Most information systems developments are **operational**-level oriented.

business processes

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Introduction to Business Process Modeling

• Why modeling business processes?

– Designing an information system without knowing customers' organization operations (**business processes**) is a recipe for **failure**.

– A **technically correct** product can be developed, but it will not succeed because of **being useless** for their users.

SUCCESS
FAILURE


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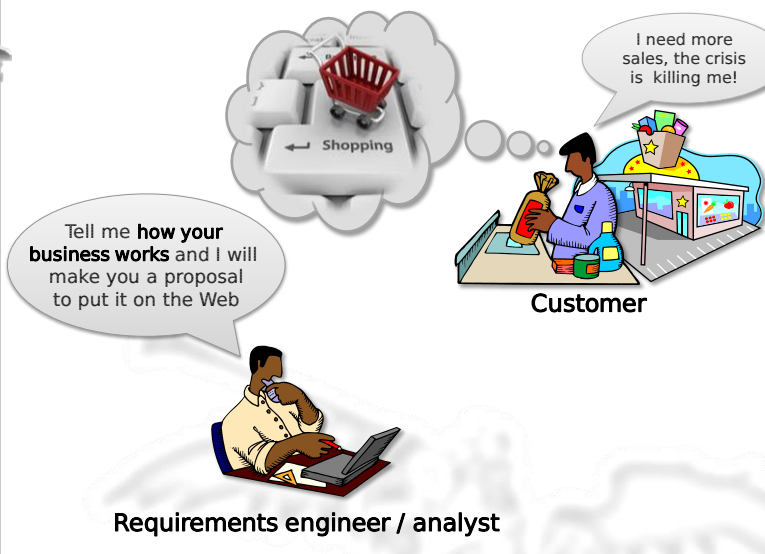
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- 1. Why business modeling?
- 2. How to model business processes?
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Introduction to Business Process Modeling

- Why modeling business processes?




Customer

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- How to model business processes?
 - **Textually:** description in natural language.
 - **Diagrammatically:** description using a diagram
 - EPC diagrams (*event-driven process chain*)
 - UML activity diagrams
 - BPMN diagrams (*Business Process Modeling Notation*)
 - The most recommended practice is to **combine** both types of descriptions, complementing the diagrams with textual descriptions.

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Introduction to Business Process Modeling

• How to model business processes?

– EPC diagram example

```
graph TD
    subgraph Sales_Service [Sales Service]
        CWR{{Car Wash Requested}} --> SCW[Sell Car Wash]
        SCW --> SC{{Sale Completed}}
    end
    subgraph Car_Wash_Service [Car Wash Service]
        CW([Car Washer]) --> WC[Wash Car]
        WC --> CW{{Car Washed}}
    end
    CWR --> WC
```

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• How to model business processes?

– UML activity diagram example

```
graph TD
    subgraph Manager
        Start(( )) --> RNB[Register new book]
        RNB --> RB[Remove book]
        RB --> End(( ))
    end
    subgraph Librarian
        RL[Register loan] --> RT[Register return]
        RT --> D{ }
        D -- "[book OK]" --> RB
        D -- "[book KO]" --> RL
    end
    subgraph User
        UB[Read book] --> RT
    end
    RNB --> RL
```

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Introduction to Business Process Modeling

• BPMN examples: private process

```
graph LR
    subgraph Pool
        direction TB
        subgraph Facturación
            RecibirPago[Recibir Pago]
        end
        subgraph Gestión_de_Pedidos
            RecibirPedido((Recibir Pedido))
            EnviarFactura[Enviar Factura]
            EntregarPedido[Entregar Pedido]
            CerrarPedido[Cerrar Pedido]
        end
        subgraph Producción
            SatisfacerPedido[Satisfacer Pedido]
        end
    end
    RecibirPedido --> Split{ }
    Split --> EnviarFactura
    EnviarFactura -- Factura --> RecibirPago
    Split --> SatisfacerPedido
    SatisfacerPedido -- Pedido --> EntregarPedido
    EntregarPedido --> CerrarPedido
    CerrarPedido --> End(( ))
```

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Introduction to Business Process Modeling

• BPMN examples: collaboration (I)

```
graph LR
    subgraph Paciente
        Petición[Petición de Consulta]
        Datos[Datos de la Cita]
        Síntomas[Síntomas]
        Receta[Receta]
    end
    subgraph Consulta_del_Médico
        direction TB
        subgraph Enfermera
            RecibirPetición[Recibir la Petición de Consulta]
            EnviarCita[Enviar la Cita]
        end
        subgraph Médico
            AtenderPaciente[Atender al Paciente]
            RecetarMedicinas[Recetar Medicinas]
        end
    end
    Petición --> RecibirPetición
    RecibirPetición --> EnviarCita
    EnviarCita -- Datos --> RecetarMedicinas
    EnviarCita -- Síntomas --> AtenderPaciente
    AtenderPaciente --> RecetarMedicinas
    RecetarMedicinas -- Receta --> Receta
    RecetarMedicinas --> End(( ))
```

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• BPMN examples: collaboration (II)

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Introduction to Business Process Modeling

• BPMN examples: the pizza collaboration*

* Source: BPMN 2.0 by Example


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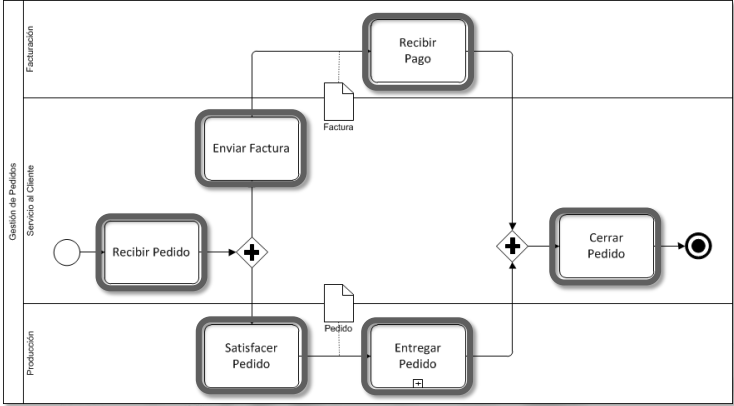
4. Key BPMN notation

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Introduction to Business Process Modeling

• Key BPMN elements


– Task: any activity which is performed during a business process.



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Introduction to Business Process Modeling


• Key BPMN elements

– Task: different types of tasks in BPMN.



Manual

Manual: performed by a person without using any software system. E.g. a telephone technician installing a telephone at a customer location



User

User: performed by a person using a software system. Usually scheduled through a task list manager. E.g. a phone operator updates a customer record.

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Introduction to Business Process Modeling

• Key BPMN elements

– Task: different types of tasks in BPMN.

Service

Service: performed automatically by a software system. E.g. calculate payroll.

Receive

Receive: it waits until a message from an external participant arrives. Equivalent to

Send

Send: it sends a message to an external participant. Equivalent to

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Introduction to Business Process Modeling

• Key BPMN elements

– Flow: it indicates the order in which the tasks must be performed.

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Introduction to Business Process Modeling

• Key BPMN elements

– Gateway: it represents a fork or a join in the process flow.

```
graph LR
    subgraph Facturación
        EF[Enviar Factura]
        RP[Recibir Pago]
    end
    subgraph Gestión_de_Pedidos [Gestión de Pedidos]
        RPd[Recibir Pedido]
        EP[Cerrar Pedido]
    end
    subgraph Producción
        SP[Satisfacer Pedido]
        EPd[Entregar Pedido]
    end
    RPd --> G1{+}
    G1 --> EF
    G1 --> SP
    EF --> RP
    SP --> EPd
    EPd --> G2{+}
    RP --> G2
    G2 --> EP
    EP --> End(( ))
    Factura[Factura] --> EF
    Pedido[Pedido] --> SP
```

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Introduction to Business Process Modeling

• Key BPMN elements

– Gateway: basic gateway types in BPMN.

• Exclusive gateway (fork): process flow can take **only one** of several possible paths.

• Exclusive gateway (join): **at least one** path must be completed before continuing with the process flow.

```
graph LR
    In(( )) --> G1{X}
    G1 --> T1[ ]
    G1 --> T2[ ]
    G1 --> T3[ ]
    T1 --> G2{X}
    T2 --> G2
    T3 --> G2
    G2 --> Out(( ))
```

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Introduction to Business Process Modeling

• Key BPMN elements

– Gateway: basic gateway types in BPMN.

• Parallel gateway (fork): process flow takes all possible paths.

• Parallel gateway (join): all paths must be completed before continuing with the process flow.

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Introduction to Business Process Modeling

• Key BPMN elements

– Gateway: balanced process models

• The same type of gateway must be used for forking and joining, i.e. the process flow must be **balanced**.

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• Key BPMN elements

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• The same type of gateway must be used for forking and joining, i.e. the process flow must be **balanced**.

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• Key BPMN elements

– **Events:** they represent the start of a process, its ending, and other type of events.

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Introduction to Business Process Modeling

• Key BPMN elements

– **Pools and swimlanes:** they represent the process organization and the roles performing the tasks.

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• Key BPMN elements

– Pools and swimlanes: they represent the process organization and the roles performing the tasks.

```
graph LR
    subgraph Paciente
        Start(( )) -- "Petición de Consulta" --> Recibir[Recibir la Petición de Consulta]
    end
    subgraph Enfermera
        Recibir --> Enviar[Enviar la Cita]
    end
    subgraph Consulta_del_Medico [Consulta del Médico]
        Enviar -- "Datos de la Cita" --> Atender[Atender al Paciente]
        Atender -- "Síntomas" --> Recetar[Recetar Medicinas]
        Recetar -- "Receta" --> End((( )))
    end
```

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• Basic BPMN elements

– Data objects: information flowing through the process, e.g. documents.

```
graph LR
    subgraph Facturacion
        RecibirPago[Recibir Pago] --> CerrarPedido[Cerrar Pedido]
    end
    subgraph Gestion_de_Pedidos [Gestión de Pedidos]
        Start(( )) --> RecibirPedido[Recibir Pedido]
        RecibirPedido --> EnviarFactura[Enviar Factura]
    end
    subgraph Produccion [Producción]
        EnviarFactura -- "Factura" --> SatisfacerPedido[Satisfacer Pedido]
        SatisfacerPedido -- "Pedido" --> EntregarPedido[Entregar Pedido]
    end
    EntregarPedido --> RecibirPago
    CerrarPedido --> End((( )))
```

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• Basic BPMN elements

– Message flows: they represent communication between two organizations (pools).

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• Basic BPMN elements

– Message flows: they represent communication between two organizations (pools).

• Receiving and sending messages can be represented through message events.

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• Receiving and sending messages can be represented through message events.

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• Basic BPMN elements

– Temporal events: the most used together with message events.

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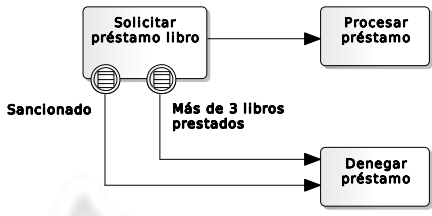
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Introduction to Business Process Modeling

• Basic BPMN elements

– Conditional events: they are usually associated with business rules.




```
graph LR; Start(( )) --> Solicitar[Solicitar préstamo libro]; Solicitar --> Procesar[Procesar préstamo]; Solicitar -- "Más de 3 libros prestados" --> Denegar[Denegar préstamo]; Solicitar -- "Sanccionado" --> Denegar;
```

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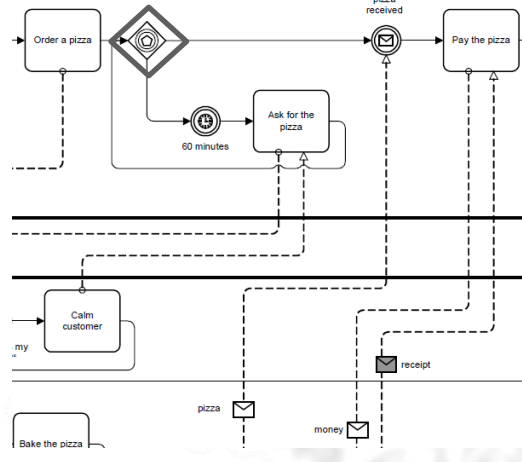
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Introduction to Business Process Modeling

• Basic BPMN elements

– Event gateways: they select an output flow depending on which event happens first.



```
graph LR; Start(( )) --> Order[Order a pizza]; Order --> Gateway{ }; Gateway --> Ask[Ask for the pizza]; Gateway --> Pay[Pay the pizza]; Ask -- "60 minutes" --> Gateway; Pay --> End(( )); Order -.-> Calm[Calm customer]; Calm -.-> Bake[Bake the pizza]; Bake --> Pizza[pizza]; Pizza --> Pay; Pay --> Receipt[receipt]; Receipt --> Money[money]; Money --> Pay;
```

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- Basic BPMN elements
 - Sub-processes:** tasks which contain another business process.
 - Connectors:** they allow the flow to continue elsewhere in the diagram.
 - Comments:** they add information to any element in the diagram

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- Comments, suggestions, ...



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