Process-oriented topic: Process modelling using BPMN

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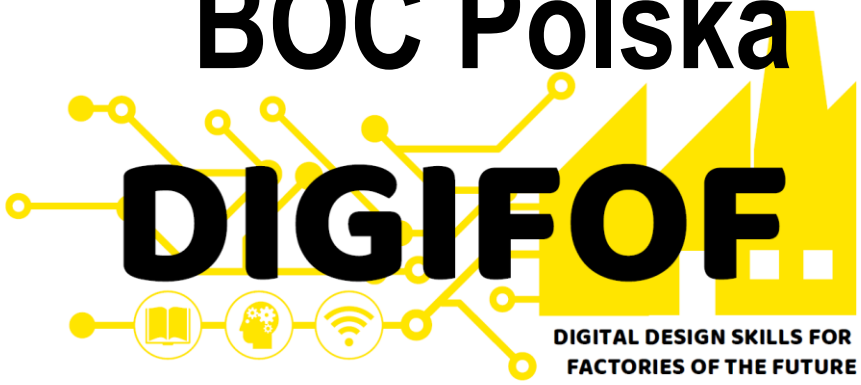

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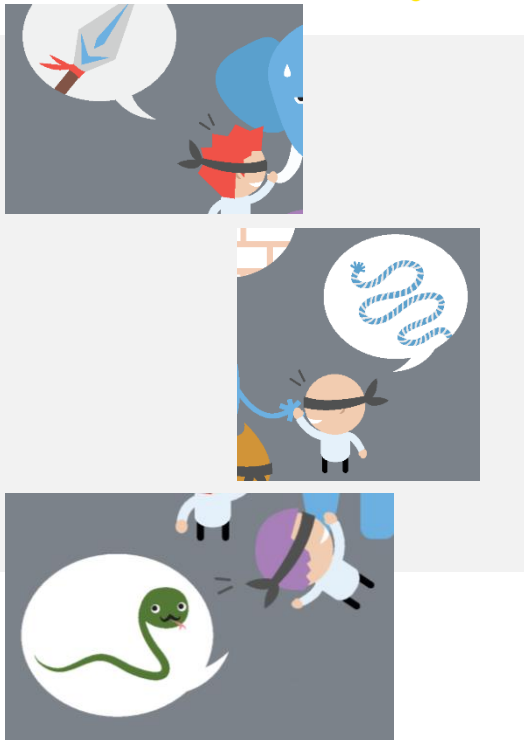
Agenda

- **Process modeling – overview of methods and purposes of diagrams**
- Basics and history of BPMN
- Descriptive modelling
- Analytic modelling
- Advanced BPMN and automation based on BPMN diagrams

Why Models?



Each person/department has a different view
of the organization

Models allow us to see a full picture („connected view”) and facilitate better communication!

We use Models Every Day!

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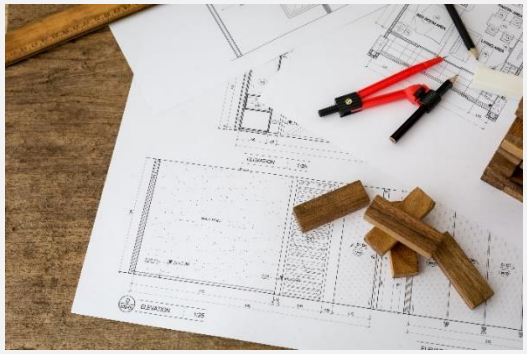
„The most that can be expected from any model is that it can supply a useful approximation to reality:
All models are wrong; some models are useful"

George Box
Famous British statistician

Models can have different purposes



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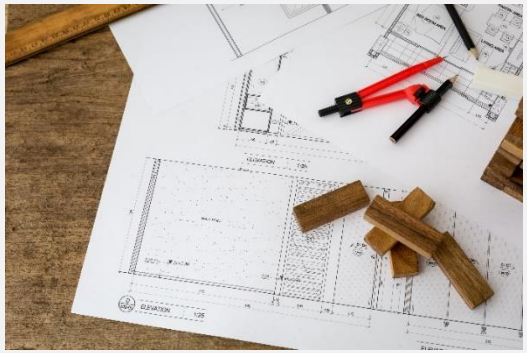
There are various Types of Models

Models can describe existing reality

They can also be used to plan new reality



Models should be adjusted to the Audience Needs

Even one concept can be described with various models:
depending on the purpose, audience, level of formality etc.

How to make sure our Model is useful?

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Each modelling language, programming language or spoken language has some properties

Syntax

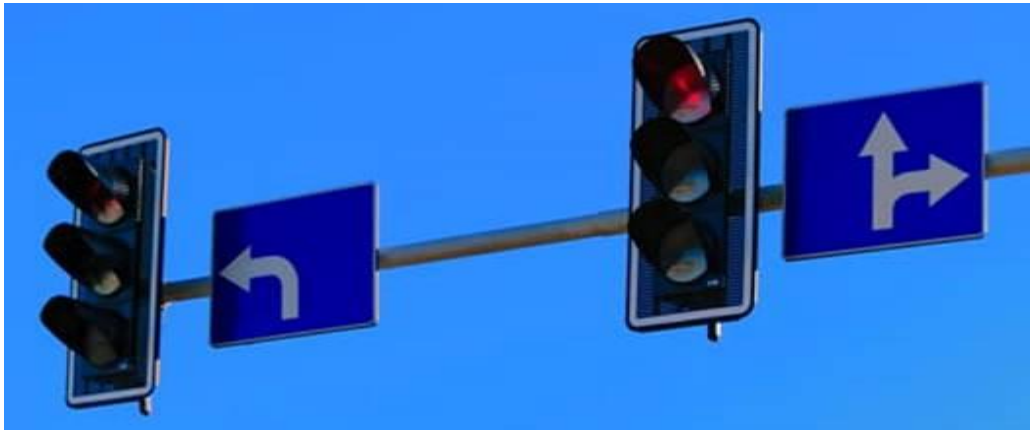
Grammar rules

Semantics

Meaning

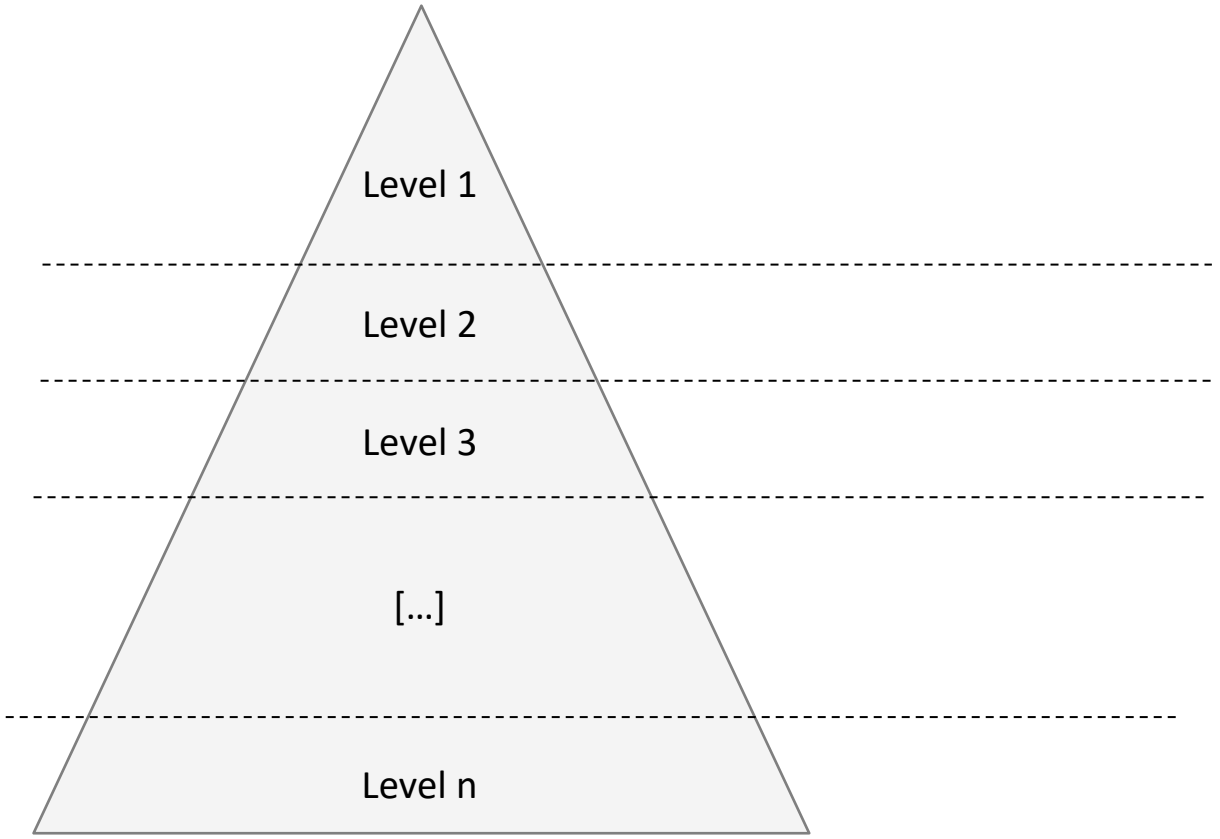
And sometimes also
Pragmatics
(best practices)

Interpretation depending on the Situation



Different Models are used in Business

- There are special notations for modelling organizations
- Some notations are used on a strategic level, others on a more operational level



Value chains
Company maps

IGOE*
SIPOC**
Company maps

Flowcharts
Business process models
Business Process Model and Notation diagrams
…

* IGOE is an acronym for Inputs, Guides, Outputs, Enablers. It was developed by Roger Burlton
** SIPOC is an acronym for Suppliers, Inputs, Process, Outputs, Customers

Process Modelling Notations

- The history of process modelling starts in the 1920s, when Frank Gilbreth and Lillian Gilbreth proposed standard symbols for so called Process Charts
- Since this time many more notations were created for various purposes (business, academic, technical)
- Some of the more popular notations that allow modelling business processes are:

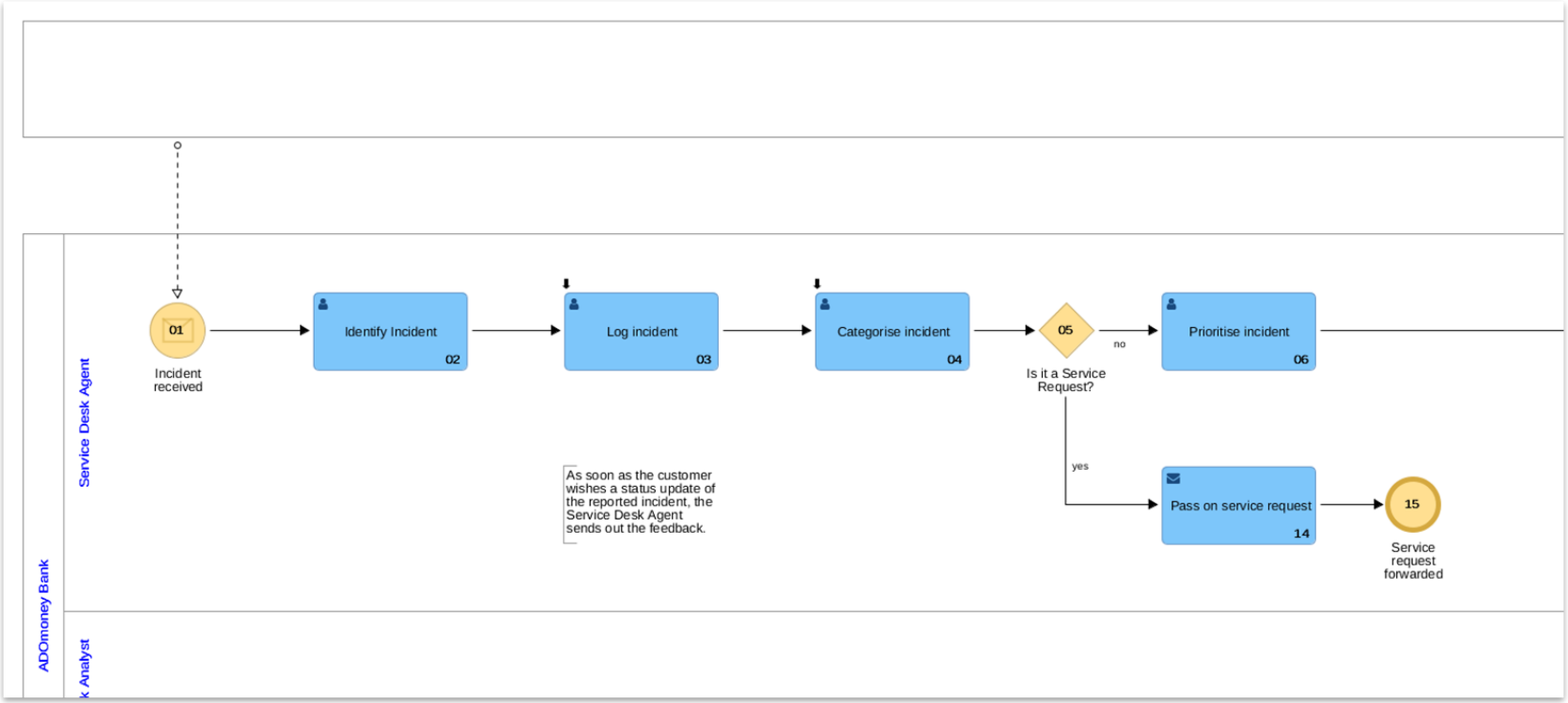
Flowcharts (inspired by Gilbreth)	Event-driven process chains (EPC)	Scope diagrams (alternative name for IGOE)	Suppliers, Inputs, Process, Outputs, Customers (SIPOC)
Value Stream Maps	Activity Diagrams from UML (Unified Modelling Language)	Business Process Model and Notation (BPMN)	And many more (Petri-Nets, IDEF0,…)

Agenda

- Process modeling – overview of methods and purposes of diagrams
- **Basics and history of BPMN**
- Descriptive modelling
- Analytic modelling
- Advanced BPMN and automation based on BPMN diagrams

BPMN

- For a more detailed depiction of processes BPMN is currently the de-facto standard
- It is showing HOW we do perform a process
- It can contain more or less details – depending on the need of the end users / process purpose



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Why do we need Standards?

The story of the Tower of Babel explains the confusion of tongues: variation in human language.

Problems with Communication

Common problem of many organizations – different „languages" used by…

IT	Business	Managers	Etc.

This often leads to problems, which can be summarized as:
„I thought you understood what I meant!"

BPMN – Brief History

- Original name **B**usiness **P**rocess **M**odeling **N**otation
- Created by the Business Process Modeling Initiative consortium
- Open standard for modelling, implementation and presentation of business processes
- v1.0 in 2004
- Maintained by OMG (Object Management Group)
- v2.0 in 2011 (now BPMN stands for **B**usiness **P**rocess **M**odel and **N**otation)
- Current version v**2.0.2 = ISO/IEC 19510:2013**

Why BPMN?

- Common language for processes
- Vendor-independent standard (with 200+ implementations)
- BPMN Diagram Interchange (DI) as standard to exchange diagrams (e.g. from Business Process Analysis tools to Process Automation tools)
- Centralized support and further development of the standard by OMG
- Freely available at http://www.omg.org/spec/BPMN/Current
- Widely accepted

Common complaint: BPMN has 100+ symbols…

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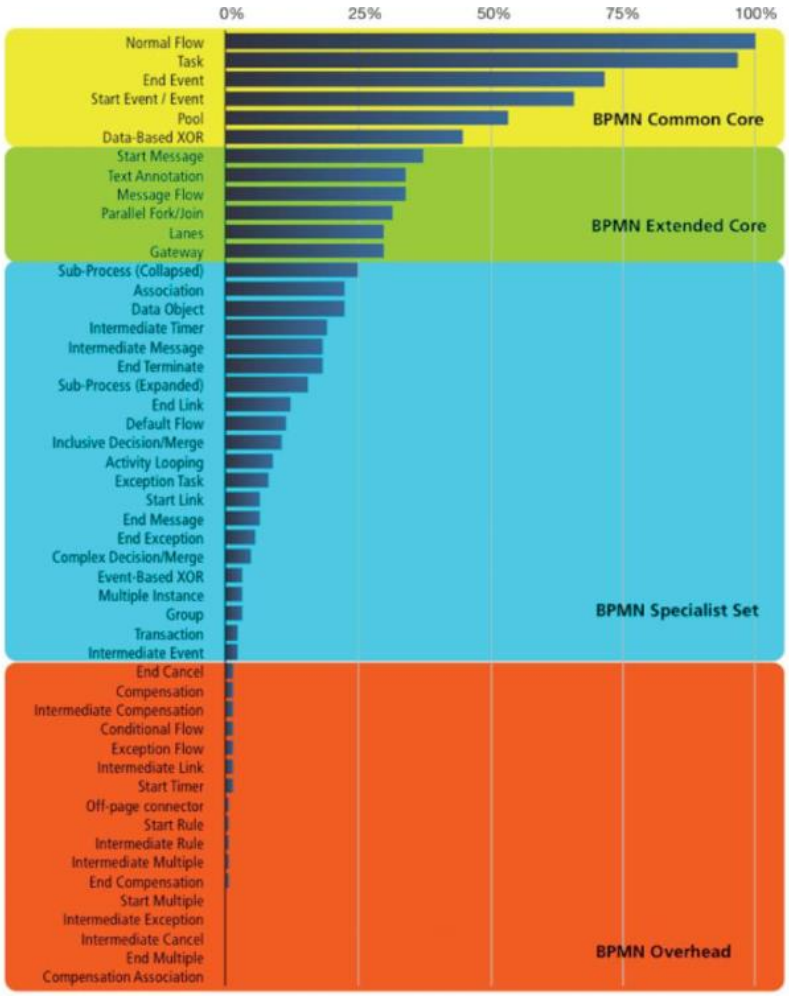
BPMN and its Symbols

- BPMN indeed contains many symbols
- Research shows that only a very small subset of them is sufficient for understanding most of the diagrams
- You can learn it like any spoken language – by focusing on basics first and getting answers for your most important questions

Graphics: Sandy Kemsley http://www.column2.com/

Source: **How Much Language is Enough? Theoretical and Practical Use of the Business Process Modeling Notation,** Michael zur Muehlen, Jan Recker



Example

What do we want to know while driving?

Possible Answers to this Question

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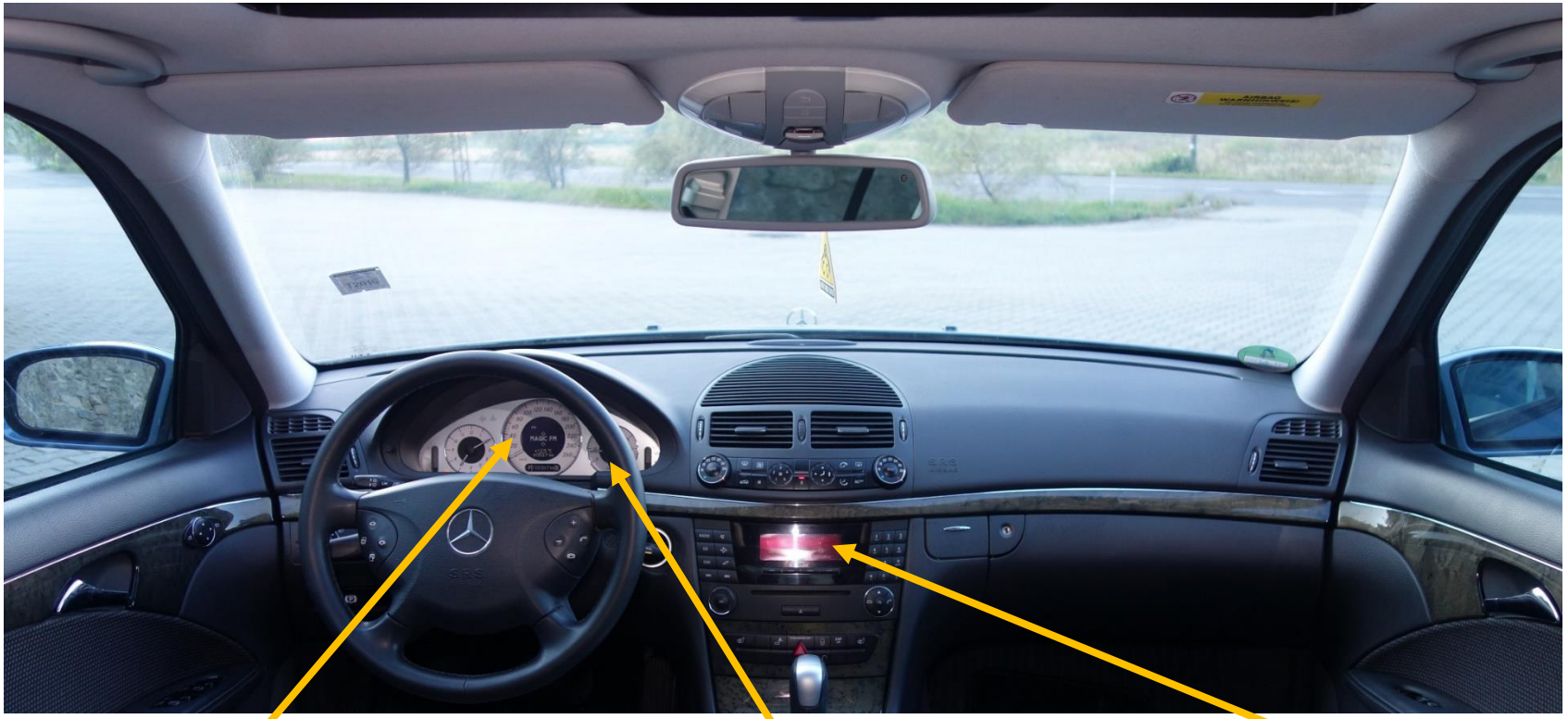


How fast am I driving?

Do I have enough fuel?

Am I late for the meeting?

Knowing what to focus on allows you to avoid distractions

What do we want to Know about a Process?

?	What can start a process?
?	How does my process end?
?	What can happen during the process?
?	What do we do in a process?
?	How does the process flow?
?	Who does what in a process?
?	… and possibly many more.

BPMN can answer many of those questions

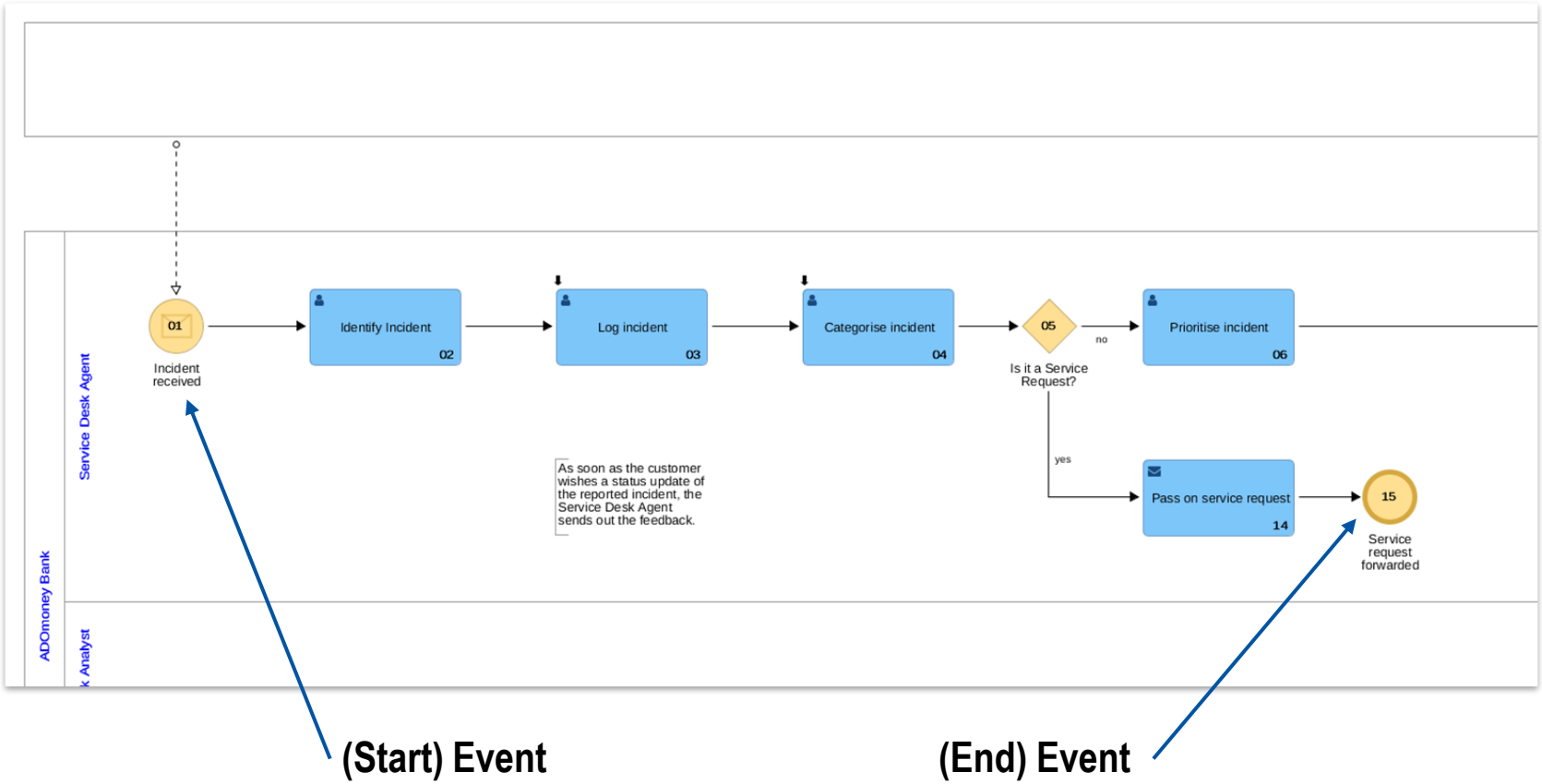
BPMN Elements

?	What can start a proces?	Events
?	How does my process end?	
?	What can happen during the proces?	
?	What do we do in a proces?	Activities
?	How does the process flow?	Gateways
?	Who does what in a process?	Swimlanes
?	… and possibly many more.	

BPMN can answer many of those questions

Events

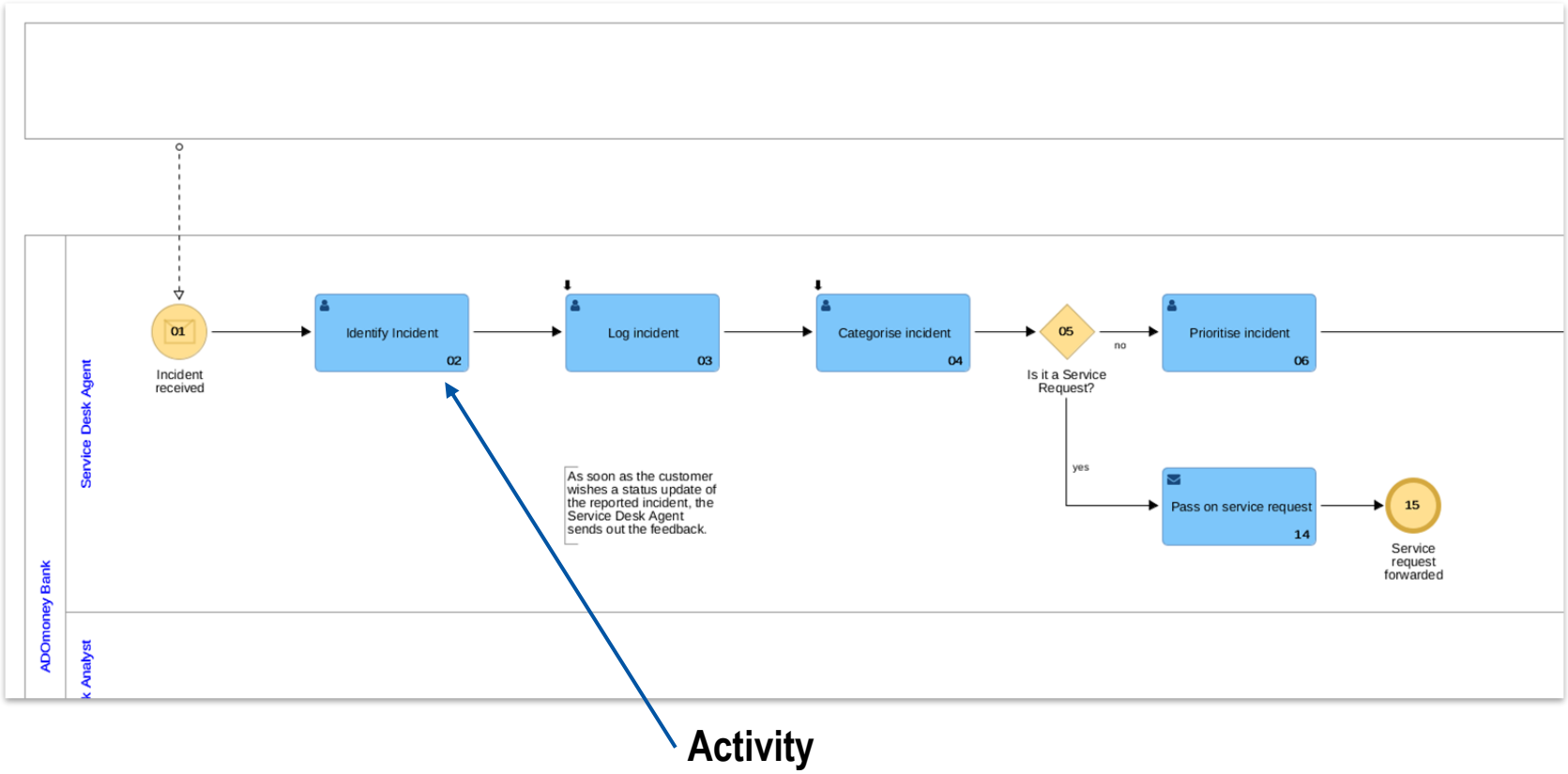
Let's take a look at an example BPMN diagram



- Events are depicted as circles
- They allow you to document important events influencing the process flow (especially start and end)

Activities

Let's take a look at an example BPMN diagram



- Activities (Tasks and Subprocesses) are shown as rounded rectangles
- They allow you to document work performed in a process

Exercise

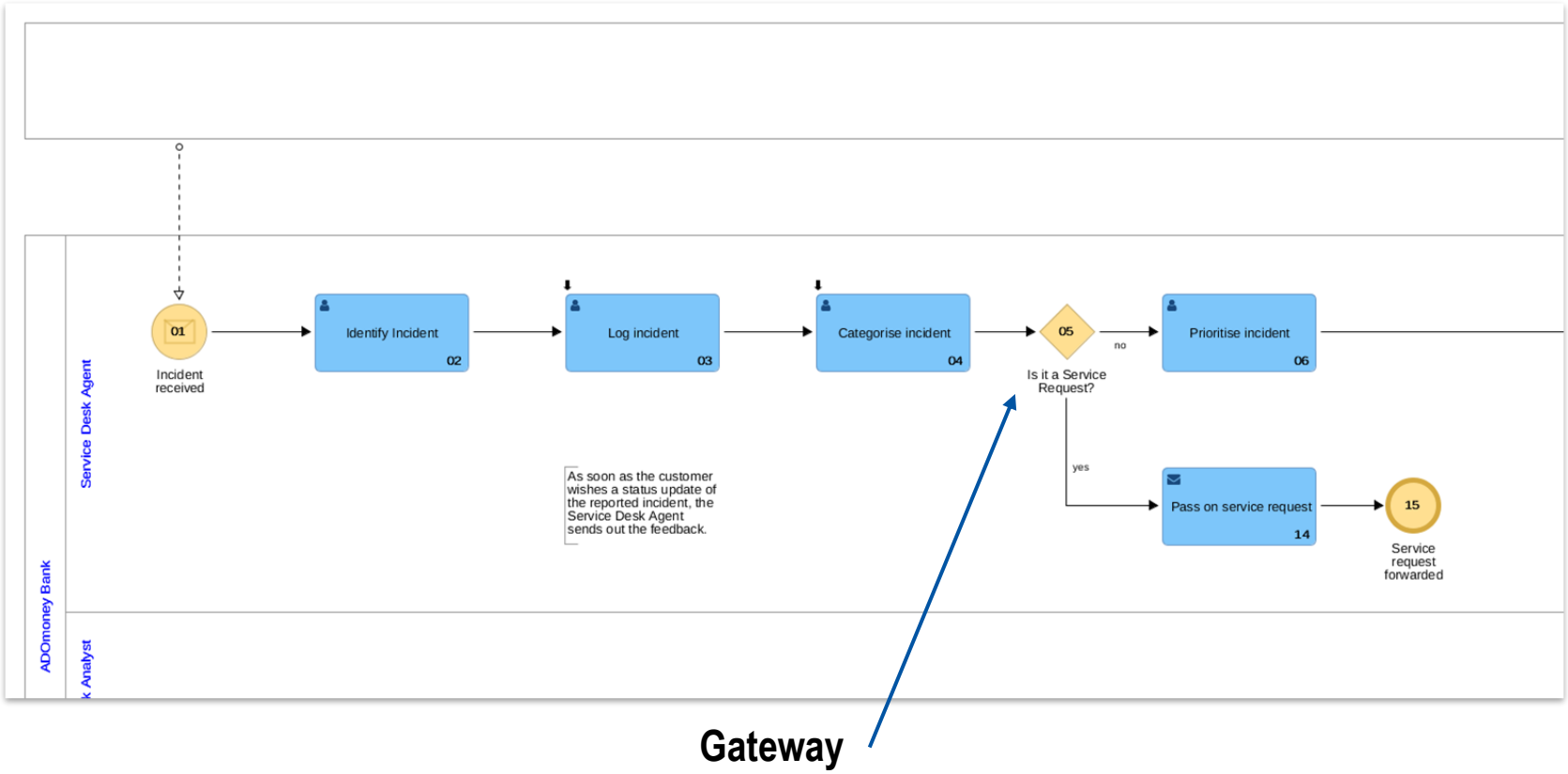
Create a BPMN diagram documenting a happy path of ATM cash withdrawal process.

Insert the start event and end event (Card properly inserted, Cash withdrawn) and add the steps of the process, which are:

- Enter PIN
- Select amount
- Remove card
- Withdraw cash

Gateways

Let's take a look at an example BPMN diagram



- Gateways are depicted as diamonds
- They help you to show where process paths can split and/or merge

Exercise

Extend your diagram knowing that

- Some people enter a wrong PIN. In this case they take the card from the ATM and the process ends.
- It seems that people additionally select the receipt preference (i.e. whether they want the receipt to be printed or not) after selecting the amount of cash. In this case they have an additional step in the process after withdrawing cash: Take a receipt. Afterwards the process ends.

Add tasks and gateways as needed . Please remember to use proper gateways to show that:

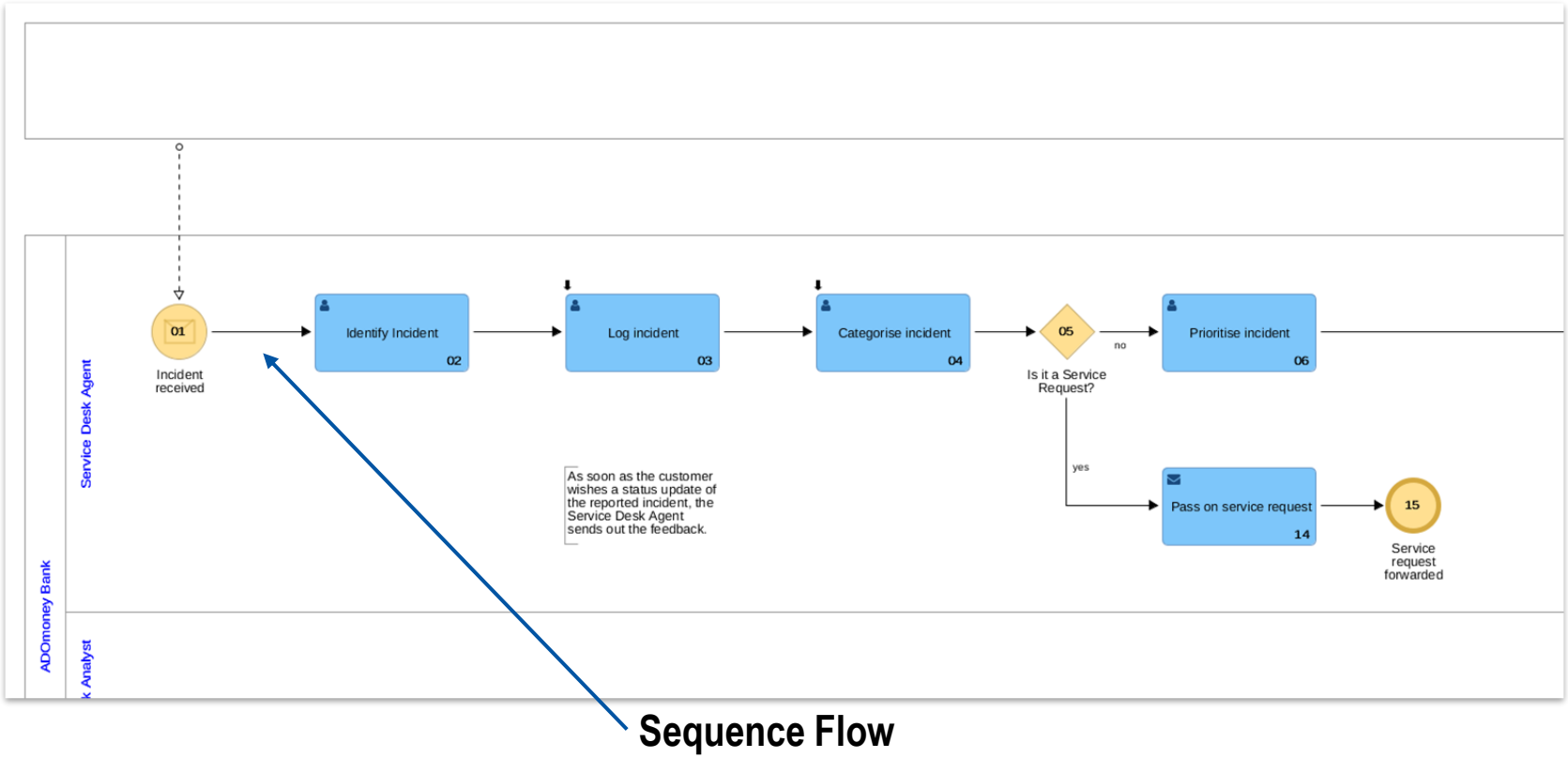
- PIN is either correct or wrong
- Selection of the receipt preference has to take place before the ATM processes the transaction and allows the card to be removed
- The receipt needs to be taken only if the customer selected it earlier in the process

Also make sure to name the end events accordingly to show the alternative results of the process:

- Cash not withdrawn (wrong PIN)
- Receipt of the withdrawal taken

Sequence Flow

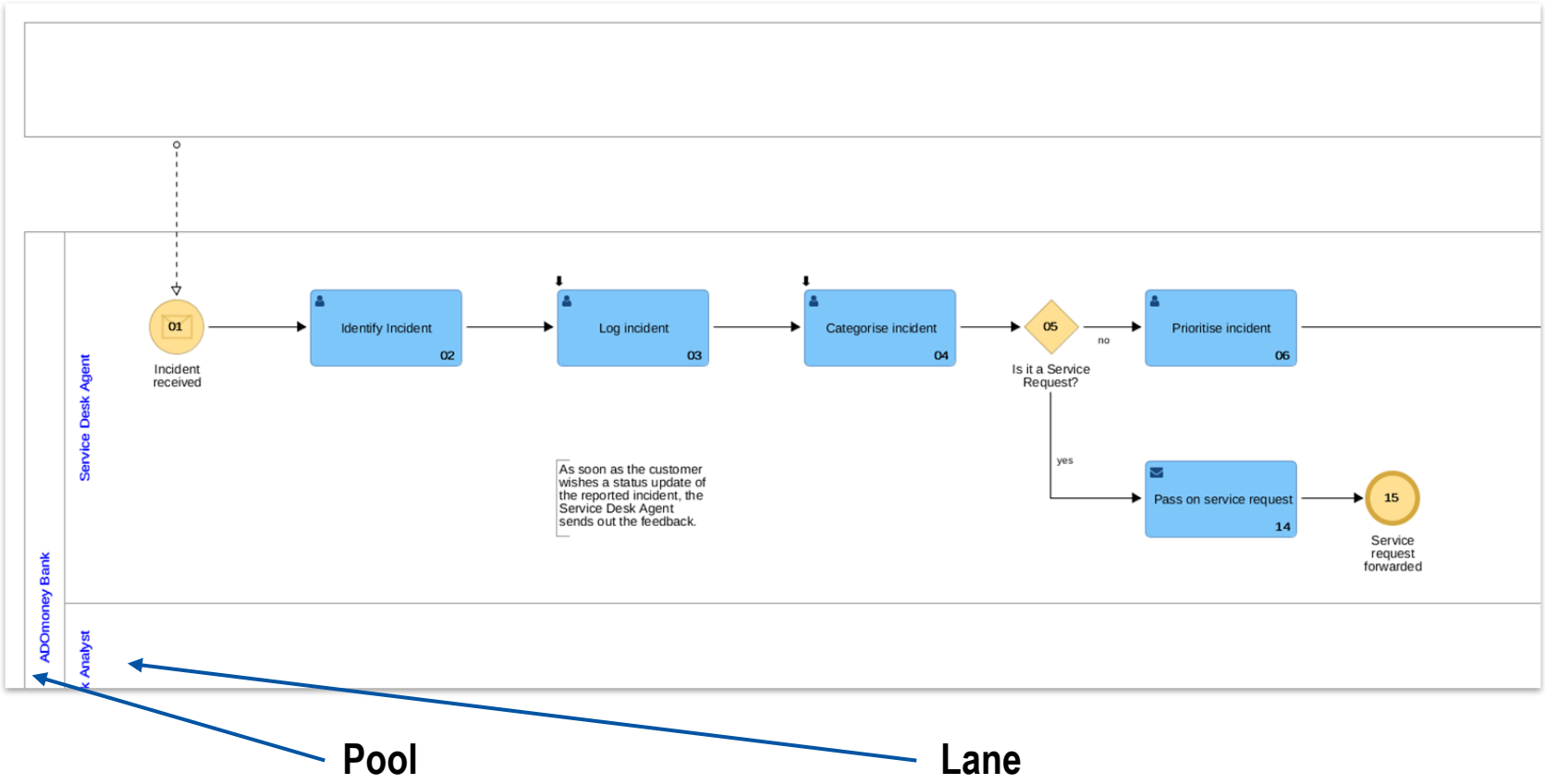
Let's take a look at an example BPMN diagram



- Sequence Flow is shown as an arrow drawn with a solid black line and filled arrowhead
- It shows in which order process steps are performed
- There are even more types of „arrows", which in BPMN are called Connecting Objects

Swimlanes

Let's take a look at an example BPMN diagram



- Swimlanes (Pools and Lanes) are shown as rectangles
- They help you to show who performs which activities and its context (Pools).

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Self Assessment

?	BPMN currently stands for…?	
?	BPMN is maintained by…?	
?	Which of the BPMN elements is used to show how the process starts?	
?	Which of the BPMN elements is used to split process flows?	
?	Which of the BPMN elements is used to connect elements of the process flow?	
?	Tasks and Subprocesses belong to the BPMN category called…?	

Self Assessment – Solutions

?	BPMN currently stands for…?	Business Process Model and Notation
?	BPMN is maintained by…?	Object Management Group (OMG)
?	Which of BPMN elements is used to show how the process starts?	(Start) Event
?	Which of BPMN elements is used to split process flows?	Gateway
?	Which of BPMN elements is used to connect elements of the process flow?	Sequence Flow
?	Tasks and Subprocesses belong to the BPMN category called…?	Activity

The Benefits of BPMN

- Standard notation maintained by OMG – independent entity (no vendor lock-in)
- Common language for various groups: business users, business analysts, technical implementation specialists etc.
- Basic BPMN is similar to flowcharts, so it is easy to learn
- However, it allows also to capture more technical details e.g. via event handling
- BPMN 2.0 contains interchange mechanism (BPMN Diagram Interchange)*
- BPMN 2.0 contains attributes and logic to support process automation

*The BPMN Model Interchange Working Group was established, where BPMN tool vendors work together to improve diagram interchange (http://www.omgwiki.org/bpmn-miwg/).

The Purpose of BPMN

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> „**BPMN really just describes processes in terms of their activity flows.** That alone encompasses quite a lot, but admittedly more information is needed to do BPM."
>
> Bruce Silver
> *In „BPMN Method & Style"*

BPMN is constrained to support only the concepts of modeling that are applicable to **Business Processes**. This means that other types of modeling done by organizations for business purposes is out of scope for **BPMN**. Therefore, the following are aspects that are out of the scope of this specification:

- Definition of organizational models and resources
- Modeling of functional breakdowns
- Data and information models
- Modeling of strategy
- Business rules models

Source: BPMN 2.0 specification, page 22

Out of Scope

What BPMN does not cover

Organizational Structures (Units, Roles, …)

Enterprise Architecture aspects (Applications, Services, …)

Data Models

Strategy Maps (Strategies, Goals, …)

Business Rules

Simulation Data (Times, Costs, Probabilities)

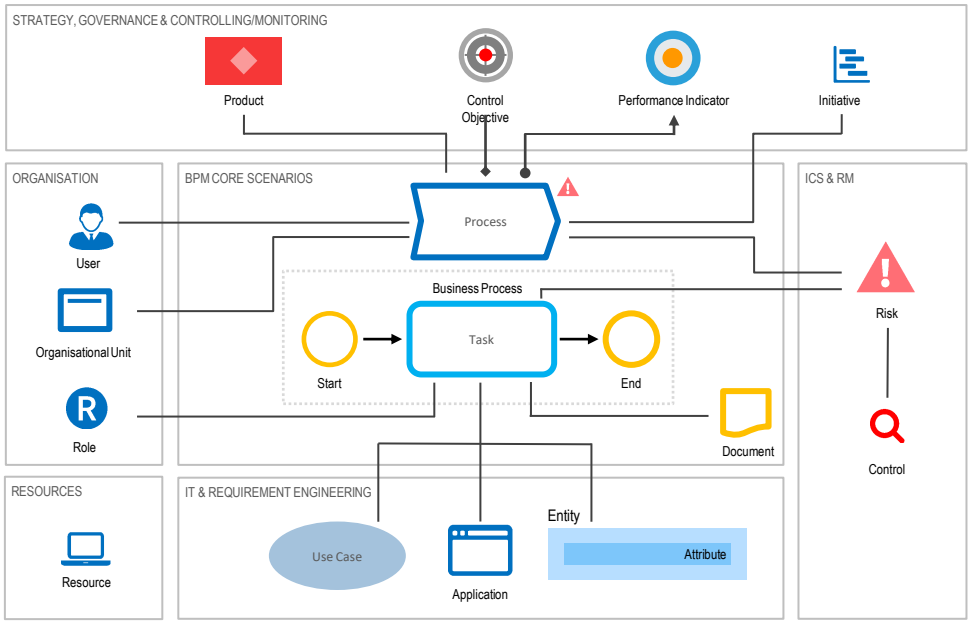
And all non-process oriented organizational modelling aspects (such as internal control systems (no risks, no controls), capability management (no capabilities), etc.)

But BPMN contains mechanisms for extensions, which allow tool vendors to add more information of non BPMN-supported content.

Excursus: BPMN „*fit for business*“ with ADONIS

BOC Group provides BPMN 2.0 in full conformance to Process Modeling and Choreography – as part of the new BPMS application library in the new platform ADONIS NP.

„Taking BPMN one step further“: we expand the BPMN metamodel with further concepts and attributes for the graphic representation of business application scenarios.



„Making BPMN fit for business“: Supporting business evaluation/reporting e.g. for risk and control reports in ICS scenarios or function analysis in organizational scenarios.

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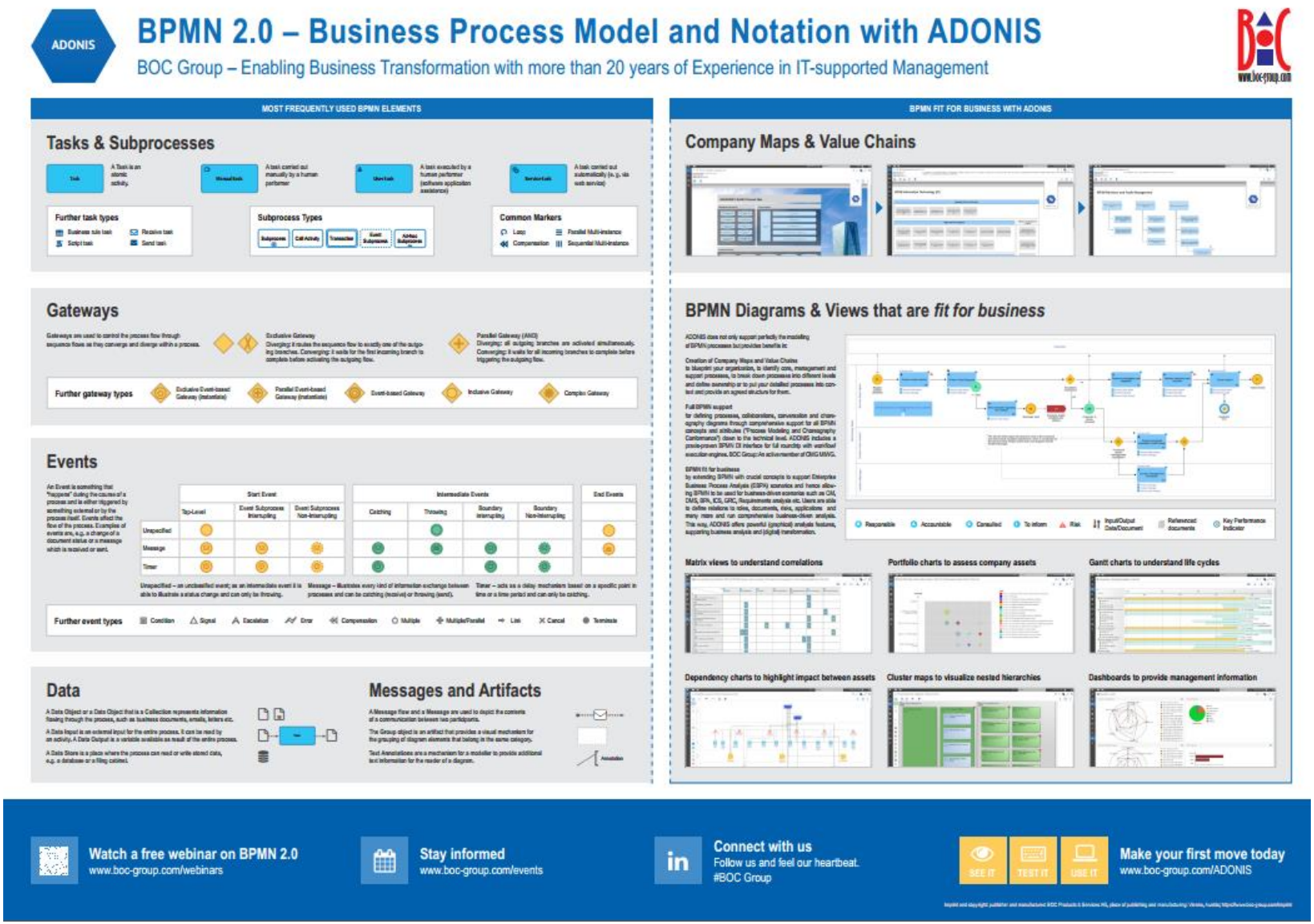
BPMN with ADONIS



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Agenda

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- **Descriptive modelling**
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Categories of BPMN objects – Flow Objects

Overall in BPMN there exist 5 Categories of Objects

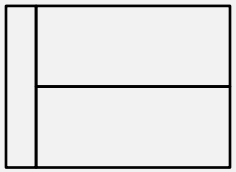
- **Flow Objects**

Activities

Events

Gateways

- **Swimlanes** (Pools and Lanes)



- **Data Objects**

- **Artifacts**

- **Connecting Objects**

Flow Objects – Activities

Overview Activities

- They show work performed in a business process
- Shown as rounded rectangles
- Two sub types: Tasks and Subprocesses

Tasks
Process steps, which we do not decompose any further (atomic)

Subprocesses
Process steps which can be decomposed to show more details

Flow Objects – Activities

Overview Tasks

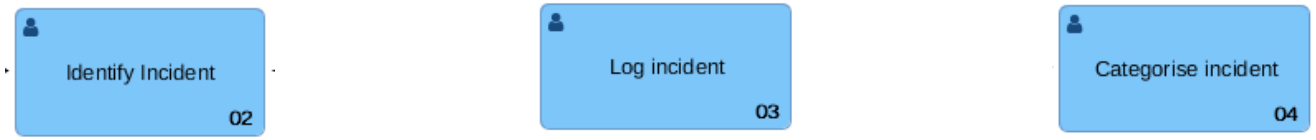
- Tasks can have special markers showing their types
- Most commonly used task types are:

Task		No specified type („None”). We do not document how exactly the task is performed.
User Task		Avatar icon. The task is performed by a user in an IT system.
Service Task		Cogwheels icon. The task is performed automatically by an IT system.
Manual Task		Hand icon. The task is performed by a user with no IT support.

Flow Objects – Activities

How to name Tasks

- Common naming convention for Tasks is „Noun + Verb”

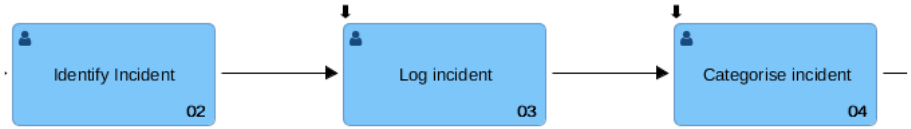


Other examples e.g. „Prepare report”, „Send invoice”

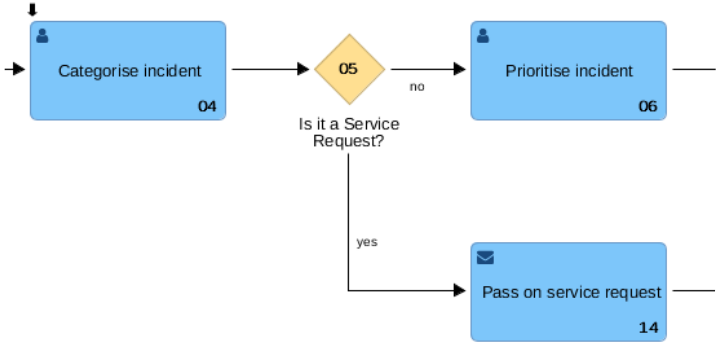
Flow Objects – Activities

How does the process flow?

- In order to see in which sequence Activities are performed we connect them with a Sequence Flow
- Some flows are simple sequences:



- While others have many paths:

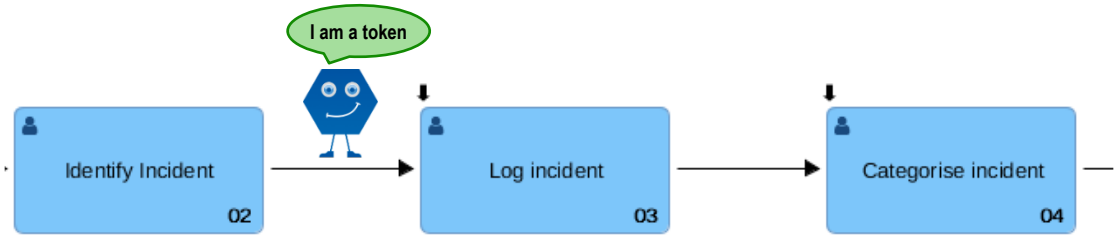


- In order to understand the details of a process flow, BPMN uses the „Token“ concept

Flow Objects – Activities

Tokens

- Tokens are theoretical constructs that help you understand how the process flows. They do not have any given visualization
- It also helps you see what happens in a given process instance (specific process run)

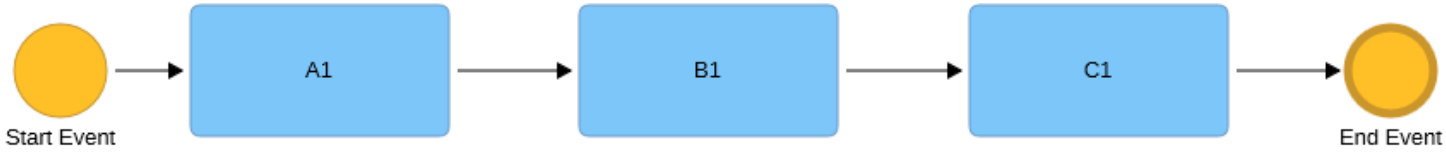


- For example – in the graphic above we can see that after the task „Identify incident", the token moves to „Log incident". When this task is completed, the token moves to „Categorise incident".
- The example above is the most basic process pattern – a sequence.

Flow Objects – Activities

Pattern 1 – Sequence

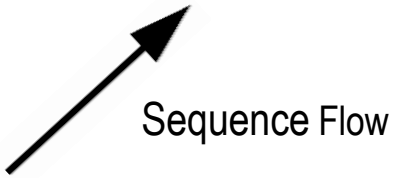
- The sequence is the most basic process pattern.
- The example above shows a valid process diagram. BPMN allows to skip start and end events if this is done consistently (BUT: best practice is: do not skip start and end).
- However, we suggest as a best practice to use Start Events and End Events because it allows you to clearly show the process scope



- In this case we read the pattern as follows: when the Start Event is triggered, the token is born and starts going via a Sequence Flow through the process steps. When the token reaches the End Event it is consumed and the process instance life (token) finishes.
- Patterns presented here are based on the concept of Workflow Patterns proposed by Professors Wil van der Aalst and Arthur ter Hofstede. You can learn more about Workflow Patterns on: http://www.workflowpatterns.com

Flow Objects – Activities

Sequence Flow



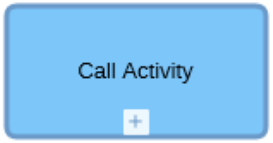
- Always drawn as solid line with a black arrowhead.
- It is used to show the order in which activities will be performed in a process.
- Tokens pass along sequence flows from flow object to flow object.
- Each Sequence Flow has only one source and only one target.
- Start events cannot have an incoming sequence flow. (Exception: Parallel start events; Instantiating Exclusive event-based Gateway).
- End events cannot have an outgoing sequence flow.

Flow Objects – Activities

Subprocesses

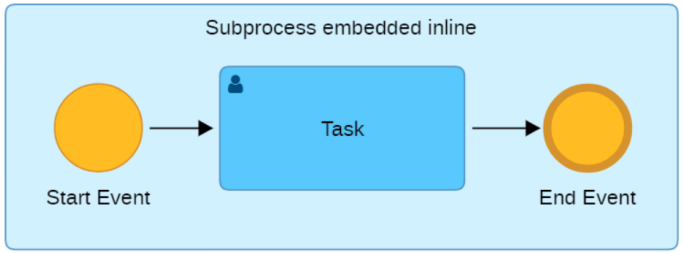
- Shown as rounded rectangle with a „+“ marker

Embedded Subprocess:
Allows you to hide the complexity of a model by grouping some related activities in a lower level model



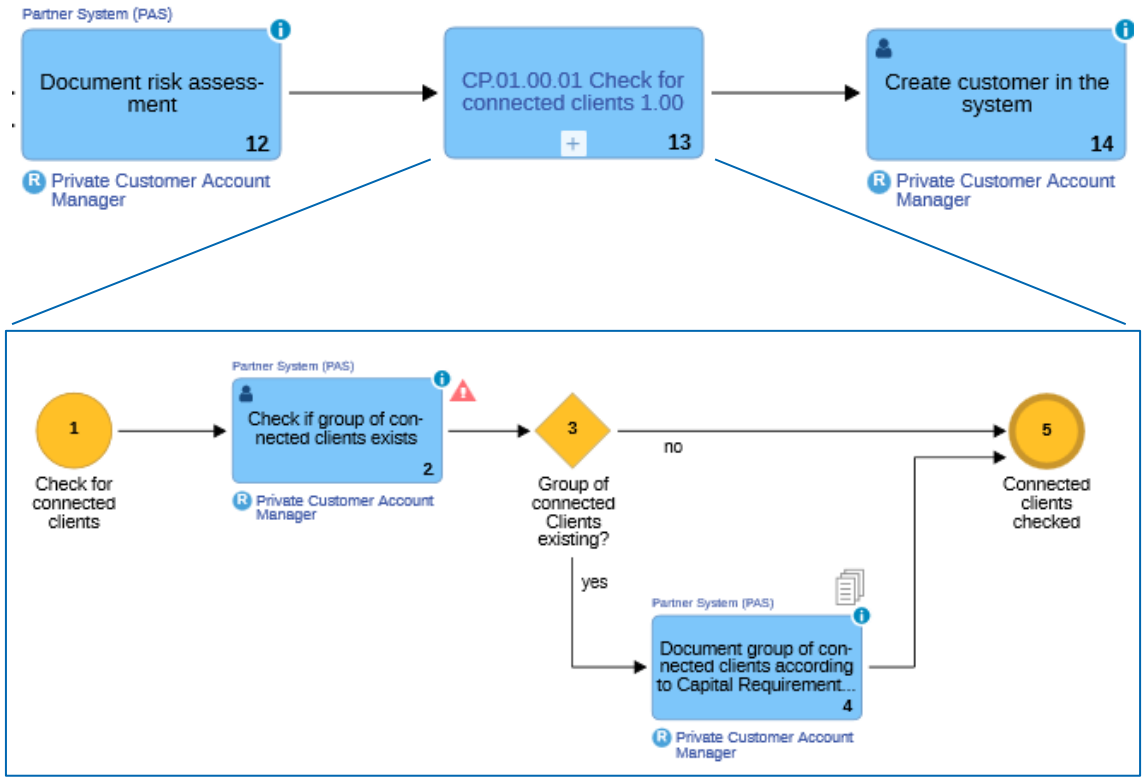
Call Activity:
Can be used to show that a standard process is used i.e. one diagram called by many others

- Sometimes you will also see Subprocesses with their content visible. This is called inline modelling.
- Inline modelling is commonly seen in documents which will be printed, but in modelling tools hierarchical modelling is more convenient



Flow Objects – Activities

Subprocesses allow to hide Complexity

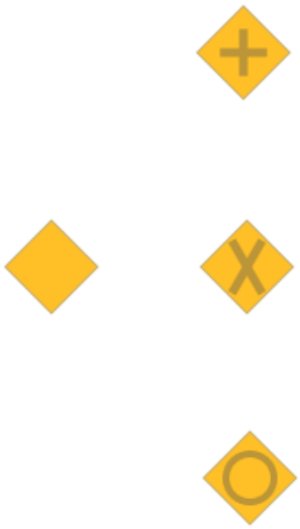


- If you just need a quick overview you can see that after documenting risk assessment you need to check for connected clients and after it is done you can create a customer in the system.
- If you need more information, details are available in a lower level model.

Flow Objects – Gateways

Overview Gateways

- Shown as diamonds.
- Allow you to show how various process paths split and merge.
- Most popular types are:



Parallel Gateway

All of the outgoing paths are taken.

Exclusive Gateway

Only one of the outgoing paths can be taken.
Two possible visualizations.

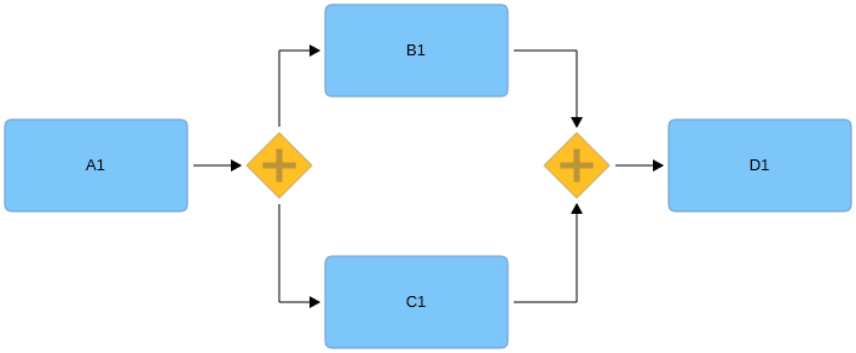
Inclusive Gateway

One or more outgoing paths are taken.
At least one path must be taken.

Flow Objects – Gateways

Parallel Gateway

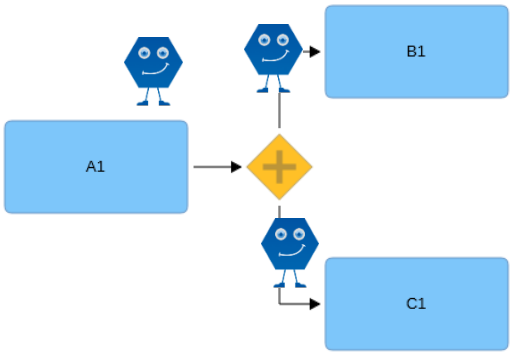
- Also known as AND gateway.
- Shows that after the split several paths have to complete before the process can continue.
- Does not necessarily mean that things are happening at the same time.
- Creates more tokens.
- Paths need to be merged unless we want to have many tokens flowing further.



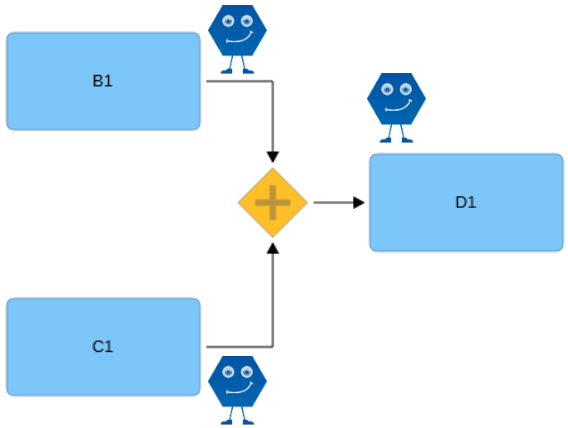
Flow Objects – Gateways

How does Parallel Gateway work?

- Parallel Split (every outgoing Sequence Flow gets a copy of token)



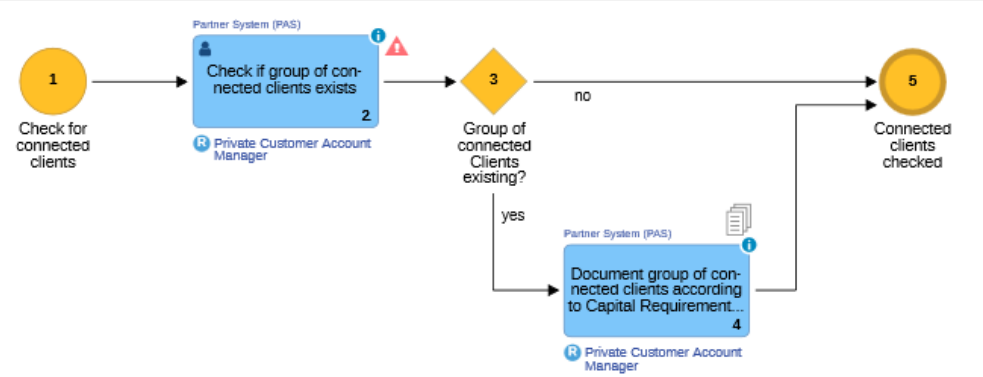
- Parallel Merge (all tokens have to be merged before the process can continue)



Flow Objects – Gateways

Exclusive Gateway

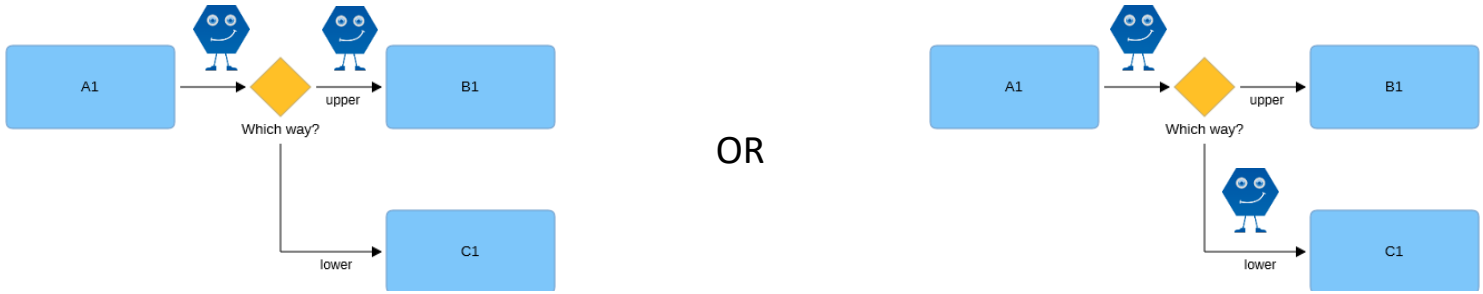
- Also known as XOR gateway.
- Only one path can be taken.
- The Gateway is not the place where the decision is actually made. The actual “task(s)” of getting all data to determine the decision has to be executed before.
- The Gateway is called decision-based Gateway, so BPMN requires we already have enough data and the Gateway only handles the routing.
- Best practice: name the Exclusive Gateway with a question and provide answers on outgoing Sequence Flows



Flow Objects – Gateways

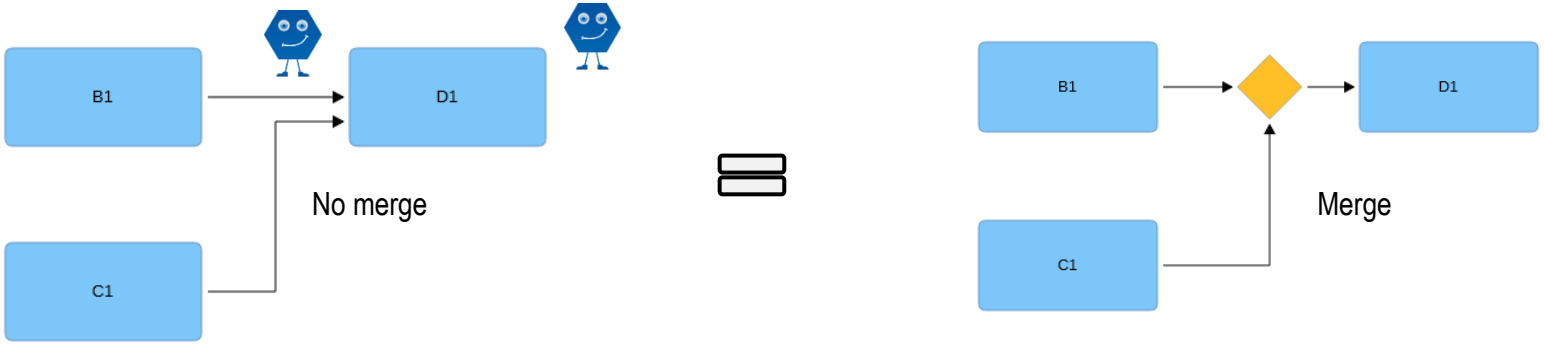
How does the Exclusive Gateway work?

- Pattern: Exclusive Choice



- With Exclusive Gateways the token is not multiplied. It follows only one Sequence Flow – depending on the condition which is true.

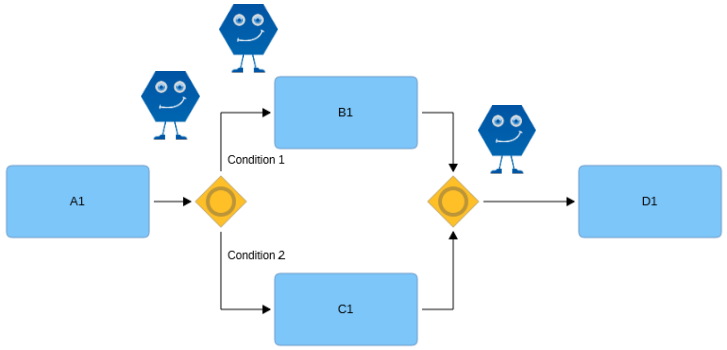
- Because of this, the resulting paths may, but do not need to be merged. (Best practice: no merge)



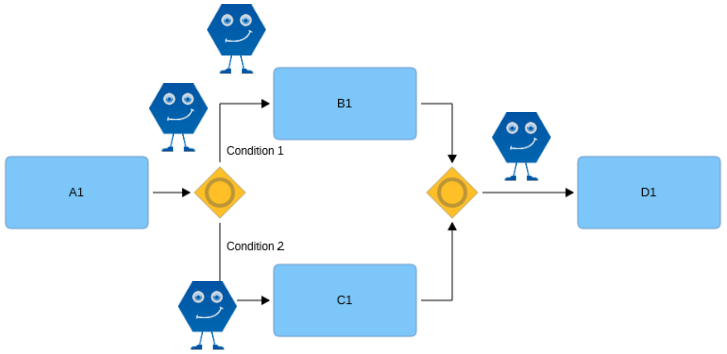
Flow Objects – Gateways

Inclusive Gateway

- Also known as OR gateway.
- At least one outgoing path has to be selected, but possibly more. This depends on the conditions defined for each path. Each condition that is true will be followed.
- Token may be multiplied.
- Best practice – use this Gateway when conditions are clear. Do not try to save space by replacing AND and XOR gateways with a smaller amount of OR gateways.



If conditions are exclusive it behaves as XOR



If all conditions are true it behaves like AND

Mix of those 2 behaviours is also possible

Flow Objects – Gateways

Can we avoid using Gateways?

BPMN allows an alternative to using (many) gateways

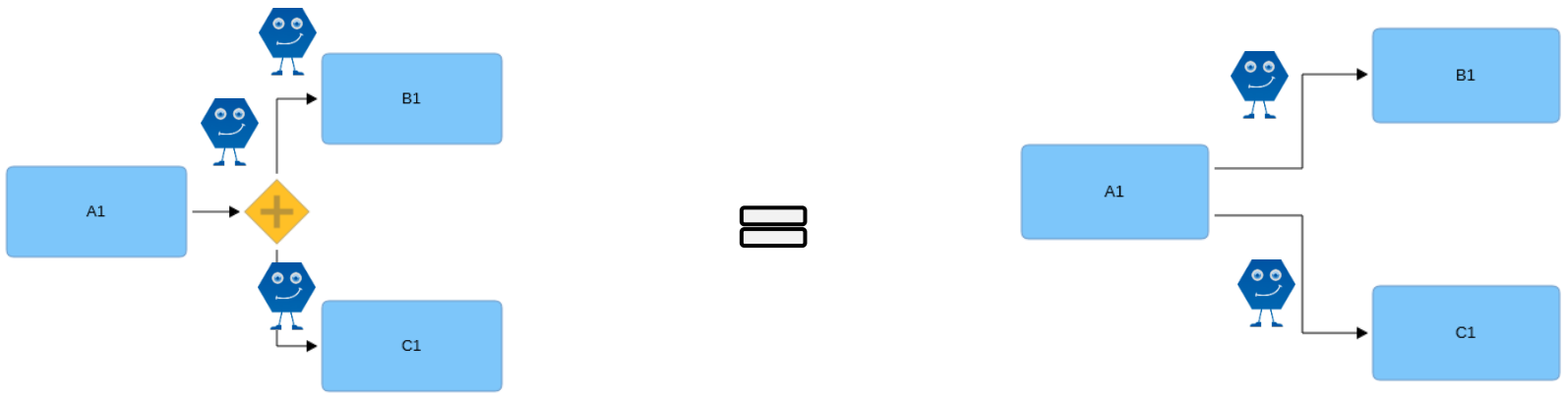
For this purpose you can use special constructions of the Sequence Flows (see next slides)

Good practice however is to use gateways since they give you better visibility

Flow Objects – Gateways

Parallel Split

- If you use many outgoing Sequence Flows it will multiply the token (one token for each Sequence Flow)

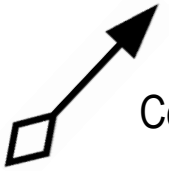


Best modelling practice

- Use this pattern if you want to show that after one Activity completed, two or more can be started

Flow Objects – Gateways

Conditional Sequence Flow

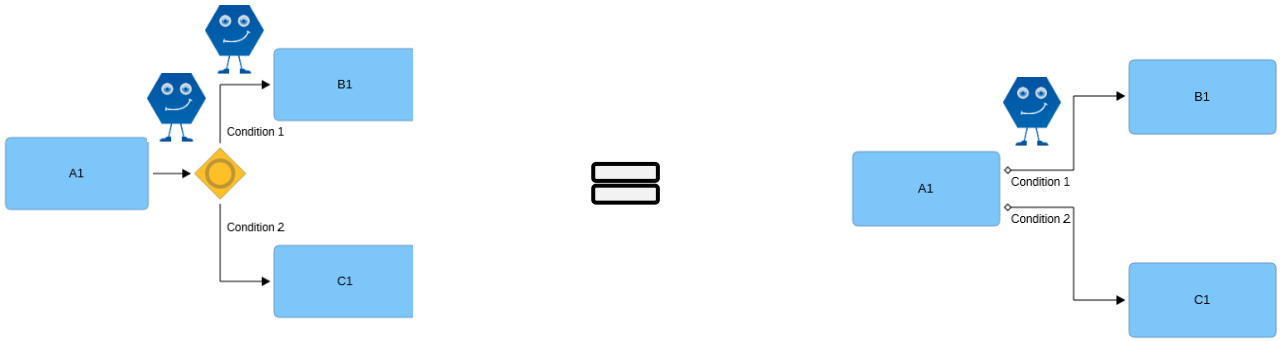


Conditional Sequence Flow

- Shown with a diamond marker at the start (please note: only valid when it is not attached to a gateway or an event).
- It results directly from an activity and has a condition.
- A sequence flow can optionally define a condition expression, indicating that the token will be passed to the next object in the sequence flow after the activity has been completed, but only if the expression evaluates to true.
- Every sequence flow whose condition is met receives a token, so it can behave as XOR or OR gateway.

Flow Objects – Gateways

Parallel Split



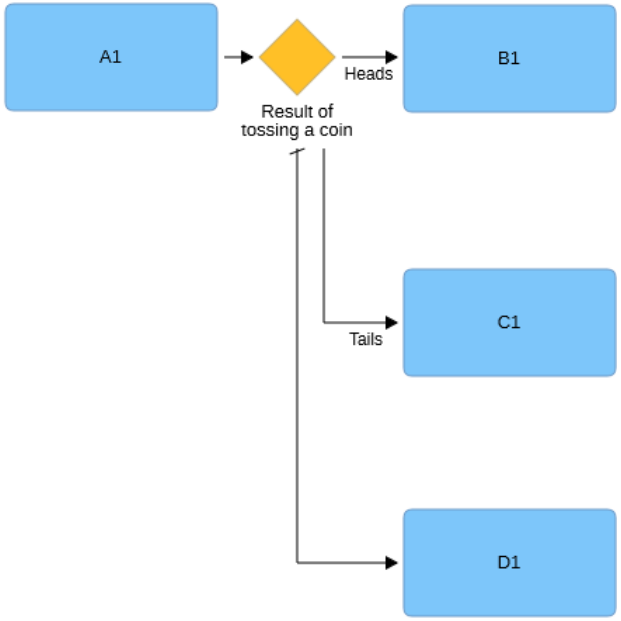
Best modelling practice

- Use this pattern to show that after the first Activity completes, one or several process paths can become active.
- If we use an inclusive Gateway with three outgoing paths, depending on the conditions 1, 2 or all 3 of them can receive a token.
- Best practice is to use the multi choice pattern only when necessary (i.e. when Parallel and Exclusive Gateways are not sufficient).

Flow Objects – Gateways

Default Sequence Flow

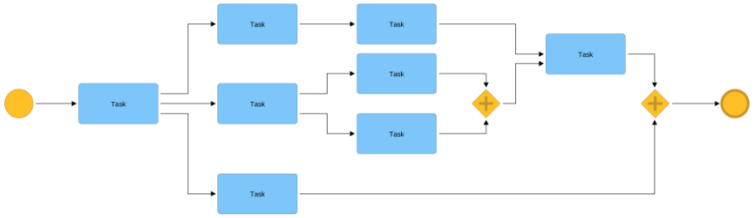
- Marked with a slash.
- Default sequence flow receives a token whenever no condition of the other outgoing sequence flows is met.
- It shows what should happen when none of the (other) conditions on the sequence flows are true; NOT to be confused with happy path (i.e. perfect process flow).
- It can originate from an exclusive, inclusive, or complex gateway or an activity.
- Best practice for default sequence flows: Cover the entire value range to avoid flows that can't continue.



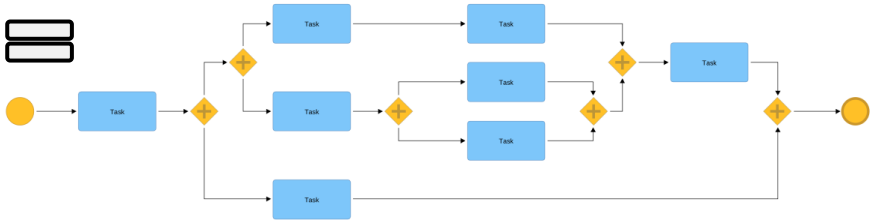
Flow Objects – Gateways

Can we avoid using Gateways? Continued.

- You can split paths without gateways, but if you want to merge paths from parallel or inclusive gateways you have to use a proper gateway.
- Otherwise many tokens will follow the Sequence Flows and most likely activate process steps many times.
- Avoiding gateways allows you to have more compact models, but you need to spend more time watching the conditions to understand the logic.



Less elements but you have to notice and understand the logic.



More elements, but logic is immediately clear.

- Good practice: use gateways!

Flow Objects – Events

Overview Events

- Shown as circles.
- In a typical process flow, the most commonly used types are:

Start Event

Circle with single thin line. Shows what needs to happen, so that a process can begin.

Intermediate Event

Circle with double thin line. Shows what can happen during the process.

End Event

Circle with single thick line. Shows the result of the process.

Flow Objects – Events

Start Event

- It behaves in a passive way, waiting (listening/catching) for something to happen that will trigger a process (i.e. start a new instance).
- Most popular types of triggers are:

The process starts when we get some message (email, phone, etc) from an external participant directed to us.

E.g. Order received.

The process starts at a given moment in time.

E.g. 2 days before quarter ends.

The process starts when some condition is met.

E.g. Stock level minimum reached.

The process starts when we receive information that was broadcasted to all interested parties.

E.g. Major customer insolvency communicated.

Flow Objects – Events

End Event

- It behaves in an active way throwing something at the end of the process.
- Most popular types are:

Our process ends by sending some message to an external participant.

E.g. Invoice sent.

Our process ends by broadcasting some information to multiple interested parties that may want to react accordingly.

E.g. Books for the last reporting period closed.

When this end event is reached, the life of the process instance ends and all remaining tokens are consumed

Exercise

Create a new BPMN diagram for a holiday application proces and model it accordingly knowing that the process behaves as follows:

- The process starts when the HR clerk receives an e-mail from the employee with a holiday application.
- The HR Clerk needs to Check the application and if some details are missing (i.e. dates are not clear) needs to Clarify the details with the employee (this is done by phone call).
- Afterwards the clerk needs to Check the remaining days and if there are still enough days Document the accepted application in the HR system.
- If there are not enough days the clerk performs the step Inform the employee about rejection (this is done outside the IT system, via e-mail) and the process ends (Application rejected).
- If the application was accepted and the clerk documented it in the HR system, the next task is to Inform the employee about acceptance (also via e-mail) and the process ends (Application accepted).

Exercise

Set the object types to:

Element	Type
Holiday application received (Start Event)	Trigger: Message
Check the application	None
Clarify the details	Manual
Check remaining days	None
Document the accepted application	User
Inform the employee about rejection	Manual
Inform the employee about acceptance	Manual

Agenda

- Process modeling – overview of methods and purposes of diagrams
- Basics and history of BPMN
- Descriptive modelling
- **Analytic modelling**
- Advanced BPMN and automation based on BPMN diagrams

Flow Objects – Events

Intermediate Event

- Intermediate events can be catching (like start events) or throwing (like end events).
- The former have light markers, the latter have dark markers.
- They allow you to show how to handle things that happen during the process.
- When a token reaches a throwing event, it is triggered by the token and the token continues.
- When a token reaches a catching event, it may not pass until this event is triggered from outside.

- Example: In this case, the token can continue only after we received the order

Flow Objects – Events

Intermediate Event – Message

- Catching or Throwing

- Always showing information exchange with the outside of the process (e.g. customers, business partners).
- Directed communication.
- You can also substitute them with proper task types.

Flow Objects – Events

Intermediate Event – Signal

- Catching or Throwing

- Can be used inside the process or across processes.
- Broadcast type of communication.

Flow Objects – Events

Intermediate Event – Timer

- Only Catching (since you can only wait for some time to pass)

- Makes your process wait (token is blocked).

Flow Objects – Events

Intermediate Event – Condition

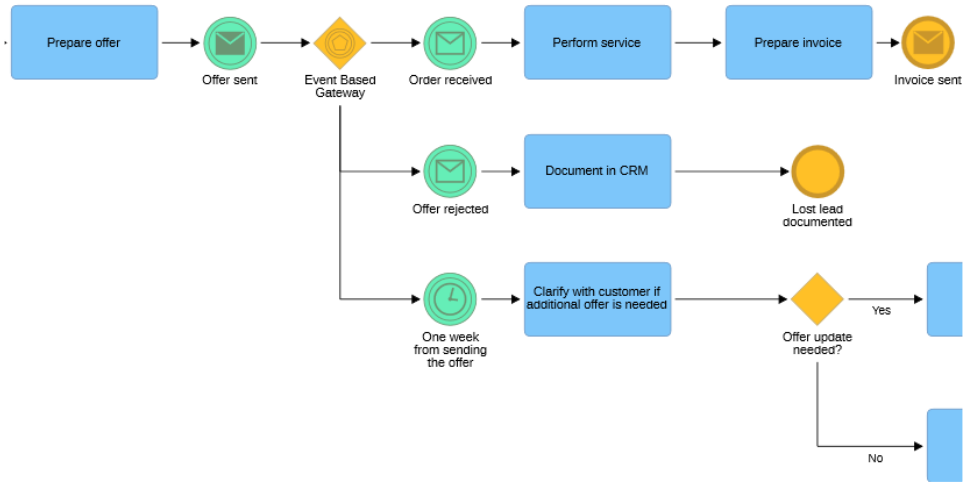
- Only Catching (since you can only wait for some condition to be met)

- Condition is always external.
- Makes your process wait (token is blocked).

Flow Objects – Events

Event-based Gateways

- Sometimes we cannot use Data-based Gateways as we do not have an *a priori* knowledge about which path should be taken.
- In these cases Event-based Gateways can be used, followed by catching events.
- The Token waits for a first event to be triggered and follows this path.
- Commonly used to show e.g. handling of communication with external participants.



This is an example of the pattern “Deferred Choice”.

Categories of BPMN objects – Swimlanes

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Overall in BPMN there are 5 Categories of Objects

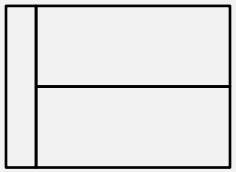
- **Flow Objects**


Activities


Events


Gateways

- **Swimlanes** (Pools and Lanes)



- **Data Objects**

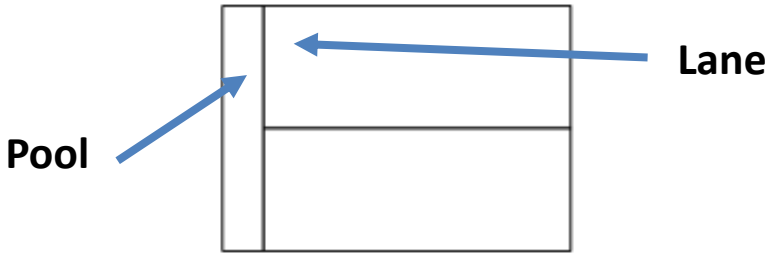
- **Artifacts**

- **Connecting Objects**

Swimlanes

Overview Swimlanes

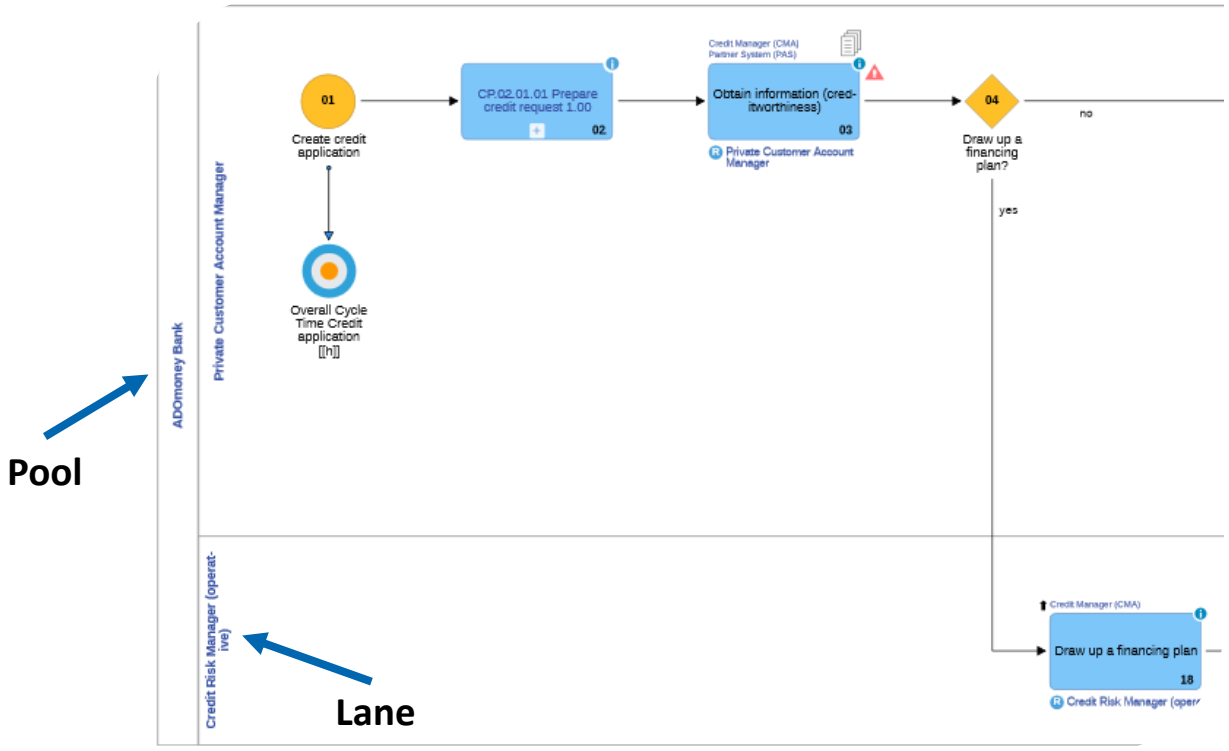
- BPMN allows you to define process participants using pools and lanes (categorized as swimlanes).



- Pools represent participants and show process boundaries.
- Empty pools with no content („black box") are also allowed.
- Lanes are used for task assignment / representation of responsibilities.
- Horizontal and vertical arrangement is allowed.
- Flow objects (tasks, events and gateways) must always be clearly assigned to a Lane.

Swimlanes

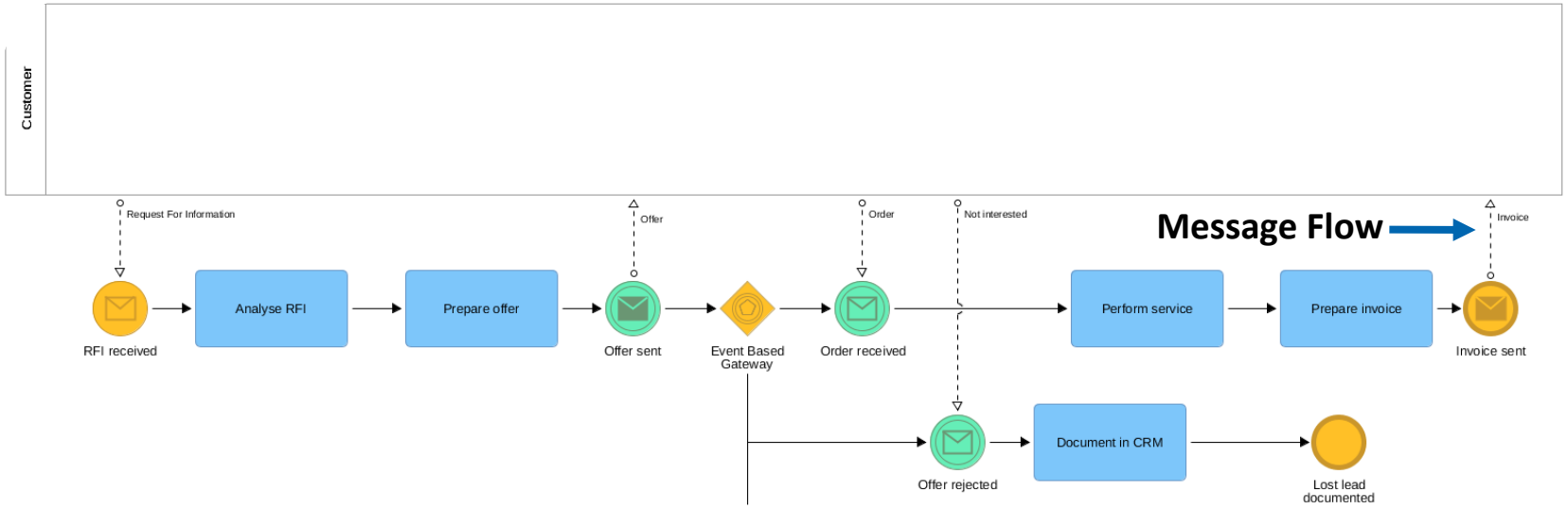
Pools and Lanes



- Lanes are always inside the pools.
- Both are shown as rectangles, but pools have dividing lines (at the beginning), while lanes do not.

Swimlanes

Collaboration Diagrams and Message Flows



- BPMN allows you to show how multiple participants work together – such models are called Collaboration Diagrams. An example above shows how a company interacts with a customer.
- The process of the company is in the implicit invisible pool (only one such pool is allowed in a diagram).
- Processes exchange information via Message Flows.

Exercise

- Extend your model, so that it shows the collaboration between the HR process you already modelled and the other participants: employee and manager.

- Insert the additional pools (**Employee**, **Manager, HR**) and add the message flows to show information interchanges. Inside the **HR** pool add a lane **HR Clerk.**

- Extend the process with an additional task and insert an event based gateway and three intermediate events (**Application accepted, Application rejected, 3 days**) to document acceptance details documented below:
- After the step **Check remaining days** shows that there are still available days (i.e. after the Exclusive Gateway “Yes” path) the clerk needs to **Ask the employee manager for acceptance** (via e-mail).
- The manager (whose process we do not need to document in detail) can either answer with approval or reject the application (e.g. because there are too many people from the team already on the holidays). If the manager accepts, the process continues to **Document the accepted application.** In case of rejection we go to **Inform the employee about rejection.**
- It is also possible that there will be no response from the manager. In this case after 3 days we assume the application was accepted and proceed accordingly.

- Connect the diagram elements with message flows as needed.

Categories of BPMN objects – Data Objects

Overall in BPMN there are 5 Categories of Objects

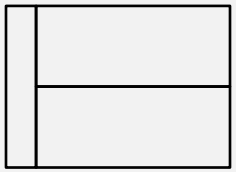
- **Flow Objects**

Activities

Events

Gateways

- **Swimlanes** (Pools and Lanes)



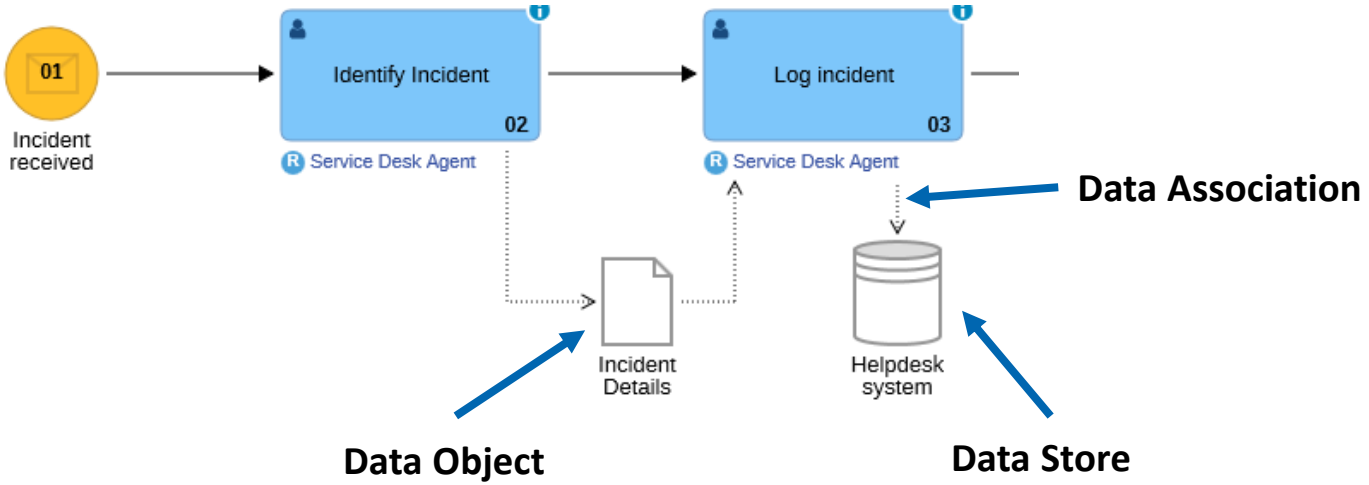
- **Data Objects**

- **Artifacts**

- **Connecting Objects**

Data Objects

Overview Data Objects



- BPMN allows you to show how data and documents flow through the process using Data Objects.
- Data Objects are connected to Flow Elements using Data Associations.
- If you need to store data in a permanent way (i.e. outside the “life” of a process instance) a Data Store should be used. Data Stores sometimes represent IT systems.

Exercise

- Add the following data objects and link them with the flow objects by using Data Associations:
- **Holiday application [submitted]** starts with **Check the application** and goes to **Clarify the details**
- **Holiday application [clarified]** starts with **Clarify the details** and goes to **Check remaining days**
- Add the Data Store called **HR system** and link it with the task **Document the accepted application**

Categories of BPMN objects – Artifacts

Overall in BPMN there are 5 Categories of Objects

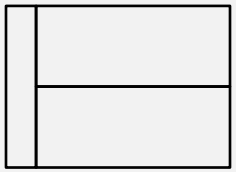
- **Flow Objects**

Activities

Events

Gateways

- **Swimlanes** (Pools and Lanes)



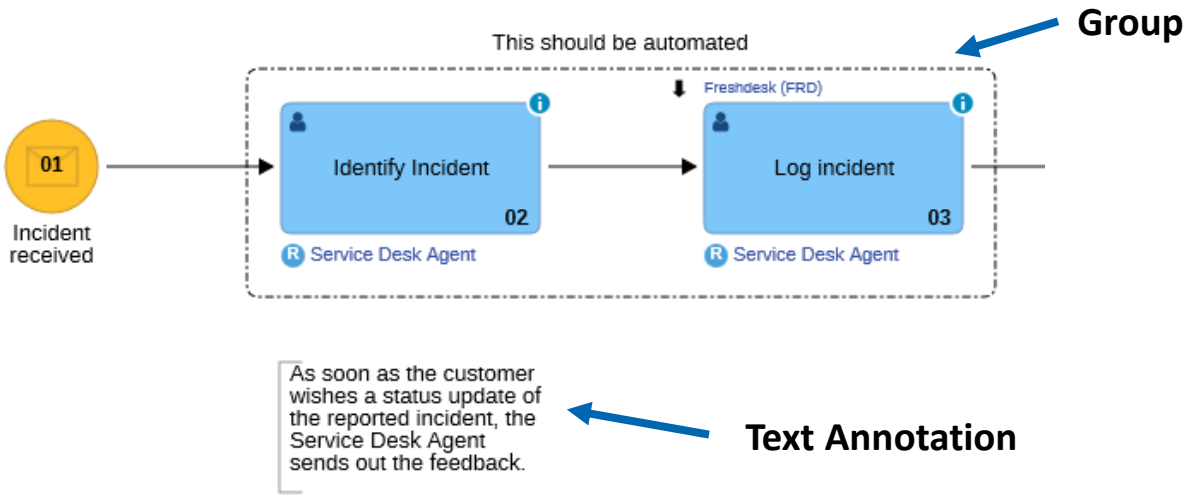
- **Data Objects**

- **Artifacts**

- **Connecting Objects**

Artifacts

Overview Artifacts



- Artifacts allow you to add more information to a diagram.
- Annotations act like Post-Its.
- Groups show a categorization.
- They do not influence the process flow.

Exercise

- Add the Group called Non-value adding to categorise proper tasks.
- Add the Text Annotation to the process with comment about the team calendar which could be useful improvement for the process.

Categories of BPMN objects – Connection Objects

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Overall in BPMN there are 5 Categories of Objects

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Activities

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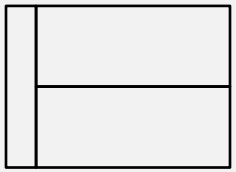
Gateways

- **Swimlanes** (Pools and Lanes)



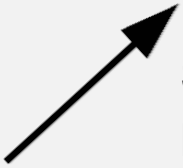
- **Data Objects**

- **Artifacts**

- **Connecting Objects**

Connecting Objects

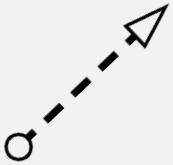
Summary



Sequence Flow: defines the process flow

Standard Flow: is executed when other conditions do not apply

Conditional Flow: contains conditions that must apply, before the path is executed



Message Flow: represents the message exchange between participants

Association: is used to connect Artifacts

Data association: directed attachment of the data objects (visualization of the write / read direction)

Self Assessment I

?	Which object types are categorized as Flow Objects?	
?	Which type of a Task should be used for a proces step where a user logs into a system and performs some actions there?	
?	Which type of a Subprocess is appropriate for showing that in a process we reuse standard procedures of sending correspondences?	
?	If our process starts every Tuesday, which Start Event type should be used?	
?	Which BPMN element represents process participants?	

Self Assessment I

?	Which object types are categorized as Flow Objects?	Activities, Events, and Gateways
?	Which type of a Task should be used for a proces step where a user logs into a system and performs some actions there?	User Task
?	Which type of a Subprocess is appropriate for showing that in a process we reuse standard procedures of sending correspondences?	Call Activity
?	If our process starts every Tuesday, which Start Event type should be used?	Timer
?	Which BPMN element represents process participants?	Pool

Self Assessment II

?	Which BPMN element can be used to categorize diagram elements without influencing the process flow?	
?	Which Gateway should be used if only one outgoing path can be selected?	
?	Which BPMN element allows you to mark the path which should be taken when none of the conditions you documented is valid?	
?	Which BPMN element is used to connect Data Objects to Flow Elements?	

Self Assessment II – Solutions

?	Which BPMN element can be used to categorize diagram elements without influencing the process flow?	Group
?	Which Gateway should be used if only one outgoing path can be selected?	Exclusive (XOR)
?	Which BPMN element allows you to mark the path which should be taken when none of the conditions you documented is valid?	Default Sequence Flow
?	Which BPMN element is used to connect Data Objects to Flow Elements?	Data Association

Agenda

- Process modeling – overview of methods and purposes of diagrams
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- Descriptive modelling
- Analytic modelling
- **Advanced BPMN and automation based on BPMN diagrams**

More events :)

		None	Message	Timer	Con-ditional	Signal	Escalation	Error	Com-pensation	Multiple	Parallel Multiple	Link	Cancel	Terminate
Start Events	Top-Level	○	✉	◷	≡	△				⬠	✚			
	Event Sub-Process Interrupting		✉	◷	≡	△	⩓	↯	◀◀	⬠	✚			
	Event Sub-Process Non-Interrupting		✉	◷	≡	△	⩓			⬠	✚			
Inter-mediate Events	Catching		✉	◷	≡	△				⬠	✚	⇨		
	Throwing	○	✉			▲	⩓		◀◀	⬟		➡		
	Boundary Interrupting		✉	◷	≡	△	⩓	↯	◀◀	⬠	✚		✕	
	Boundary Non-Interrupting		✉	◷	≡	△	⩓			⬠	✚			
End Events		●	✉			▲	⩓	↯	◀◀	⬟			✕	●

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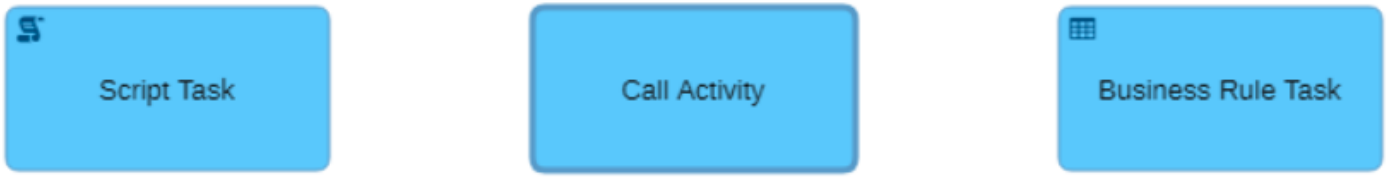
Additional Activity types

- Tasks

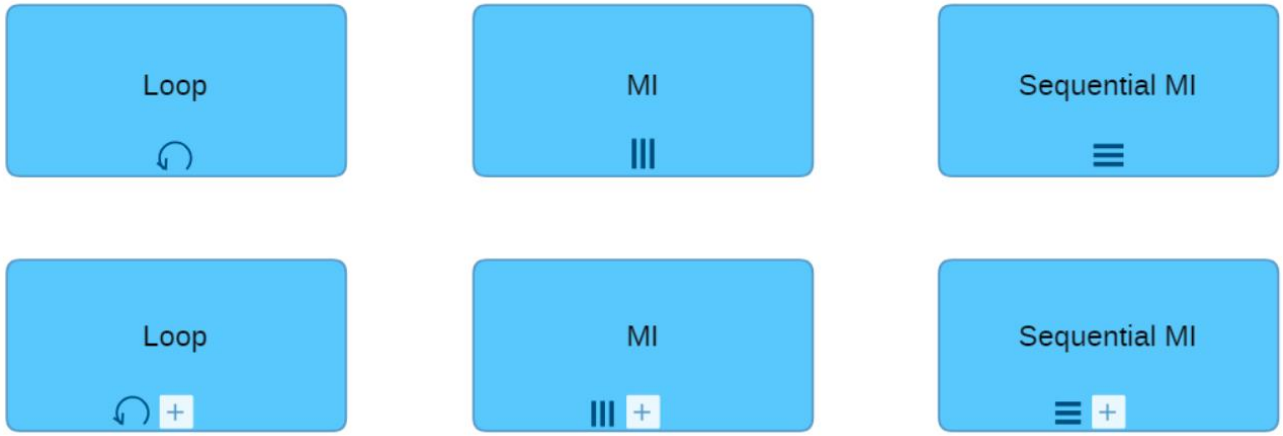


Additional Activity types

- Sub-Processes

Additional Activity markers

- Loop and MI
- Both for Tasks and Sub-Processes



Loop: Repeating until a defined condition is fulfilled, or alternatively as a return e.g. modeled by Gateways

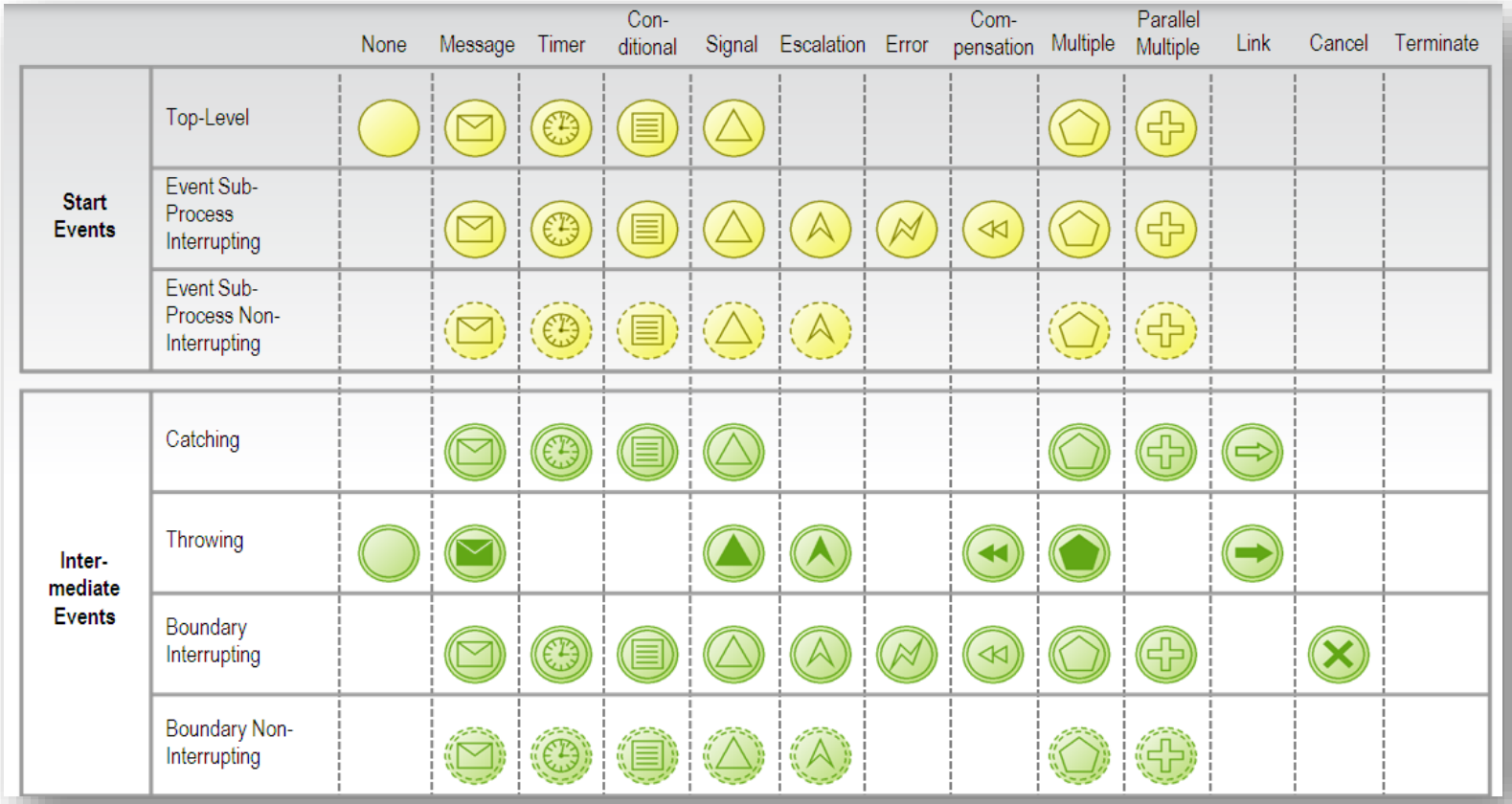
Multi Instance: Iterations are **parallel** and their number is already known at the beginning

Multi Instance: Like the parallel tasks but performed **sequentially**

Exception handling

Boundary Events

- Always catching
- Interrupting vs non-interrupting



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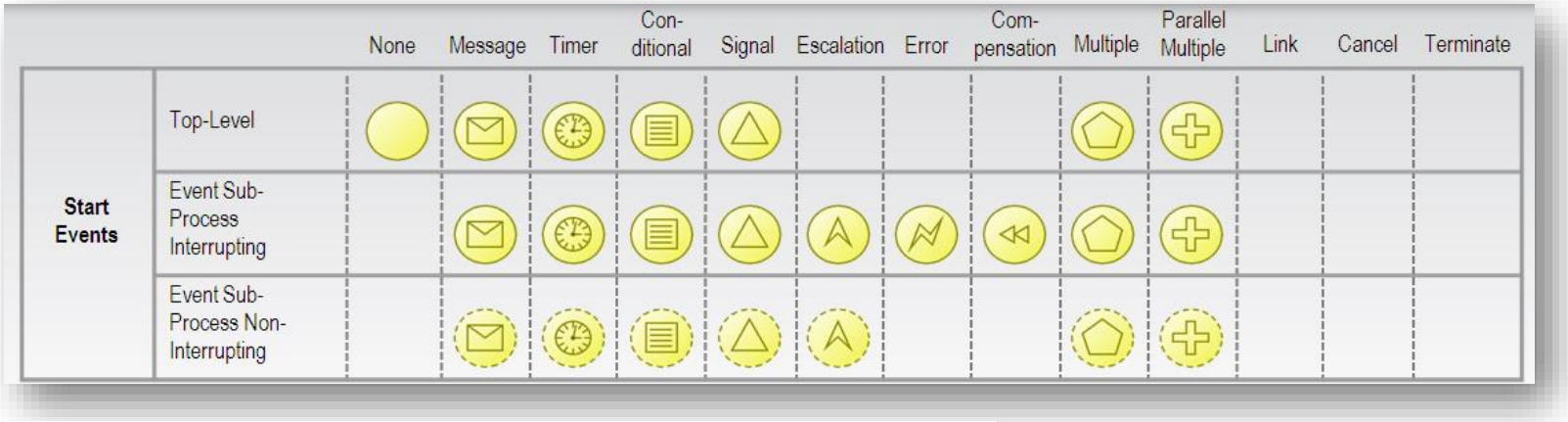
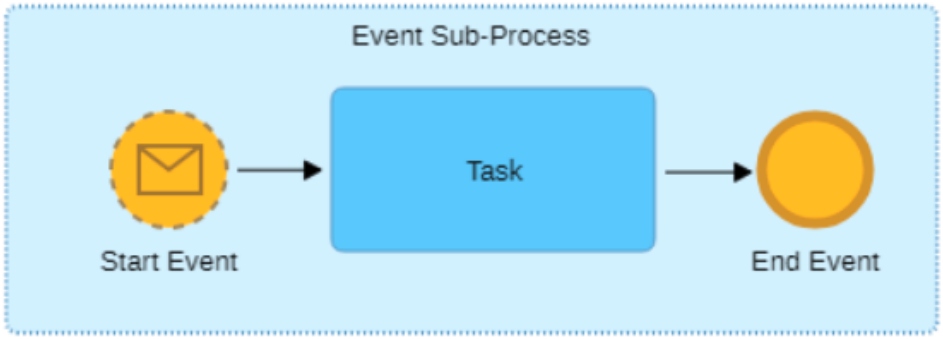
Exception handling

Event Sub-Processes

- „Boundary events on steroids" ;)





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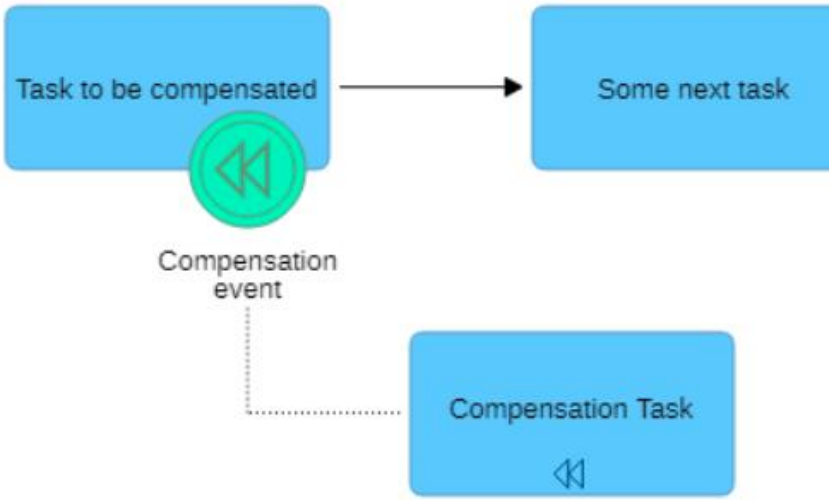
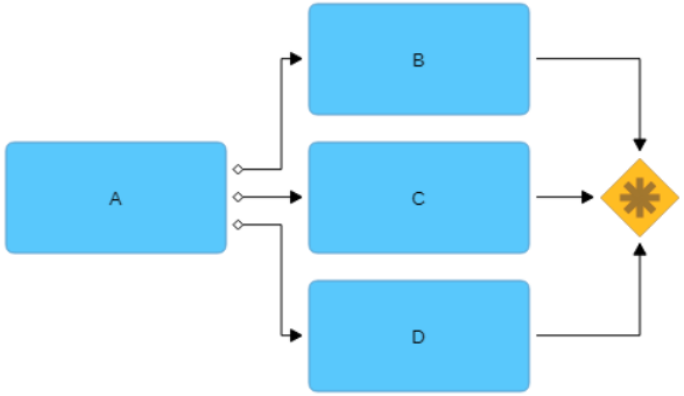
Additional Activity markers

- Compensation allows us to undo things that already took place



More gateways

- Complex



More gateways

- Instantiating

Digital Transformation

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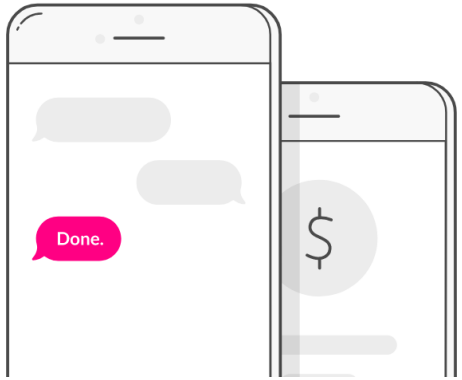
New world

Instant Everything

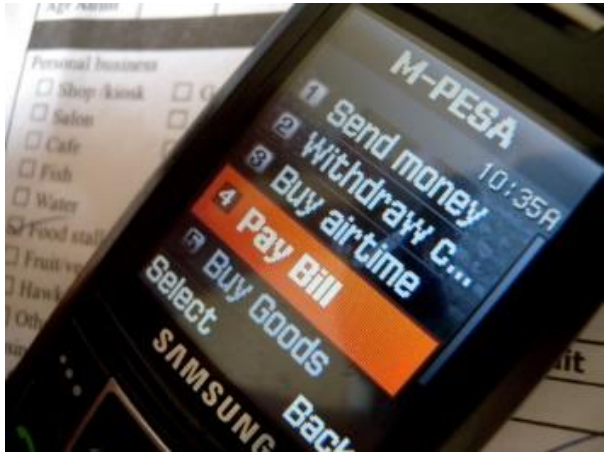
Maya, our charming artificial intelligence bot will craft the perfect insurance for you.
It couldn't be easier, or faster.

See the Lemonade App in action

90 Seconds
To get insured



3 Minutes
To get paid



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How to automate

- Specific apps
- Workflow > BPMS > iBPMS
- Robotic Process Automation (RPA) > Cognitive/AI
- Low code/Citizen developers

Current state of many organizations

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DIGITAL DESIGN SKILLS FOR FACTORIES OF THE FUTURE

Does it sound familiar?

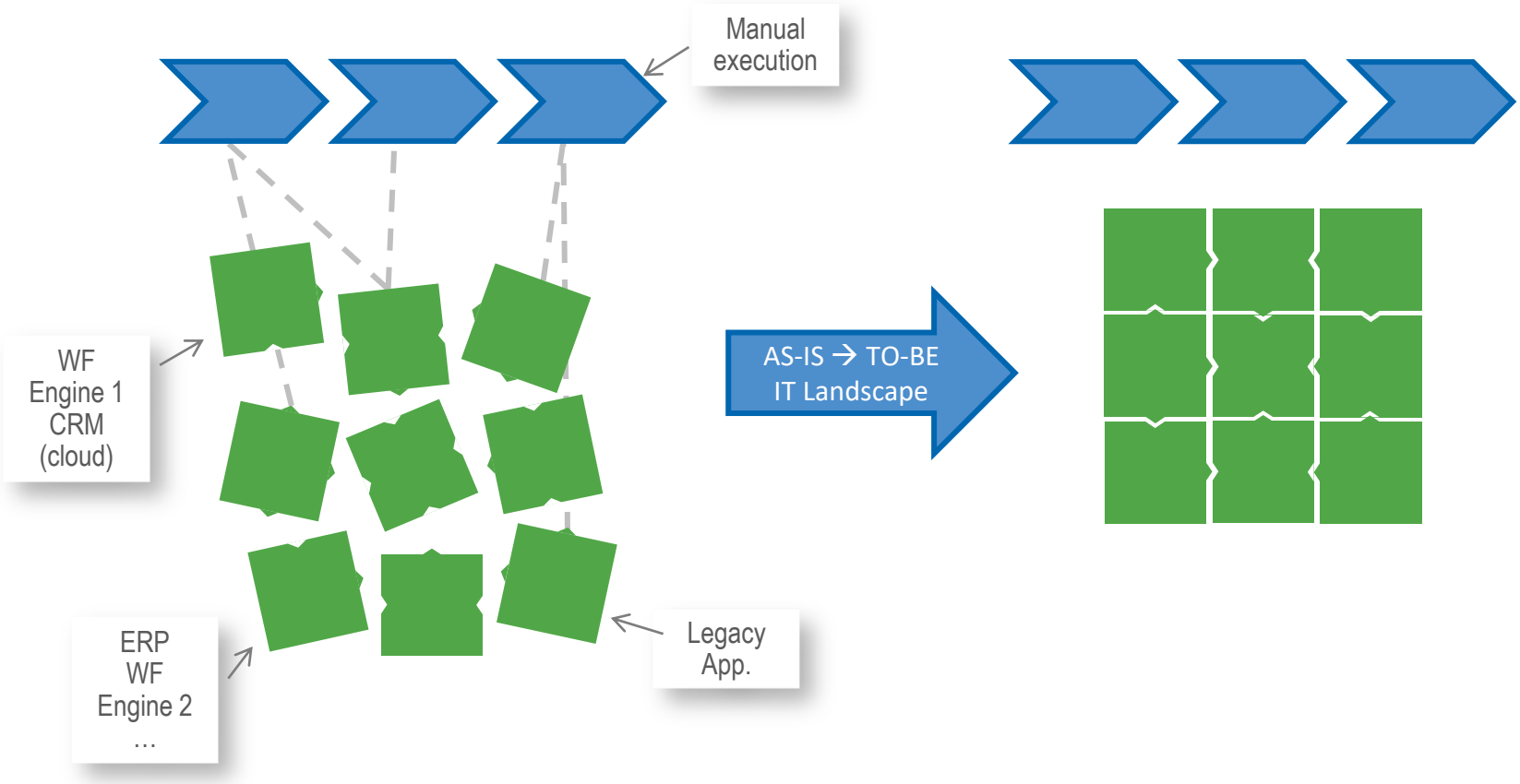
- Hundreds of applications used by employees
- Not all of them bought or created by IT

- One or more workflow engine or BPM Suite
- But on average **less than one third of processes automated**

- ERP does not always provide expected level of user experience nor sufficient flexibility
- New applications needed for supporting important business scenarios and flexibility (rule management, Robotic Process Automation, …)

- Rising expectations
- Digital Transformation
- Migration to cloud
- Citizen developers

What you are trying to achieve?



- Consistent IT architecture providing support for your processes
- Identified interconnections and dependencies

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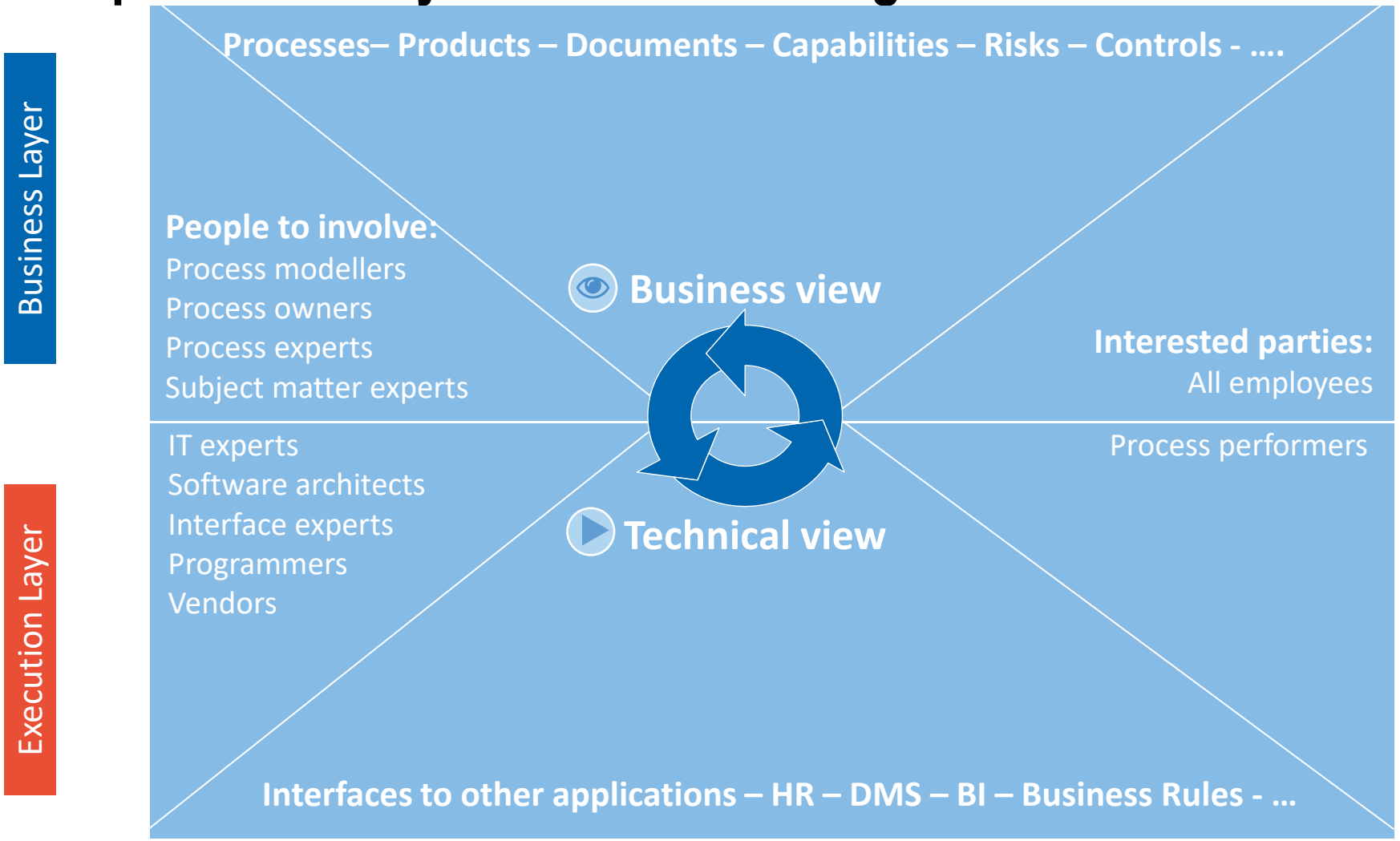
Can you provide proper support for all your processes with a single automation tool?

> **„I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail"**
>
> Abraham Maslow

- Usually there is no single source of truth (application that automates all processes and integrates with everything)
- IT landscape constantly evolves, so you need to be flexible

- You need to stay independent and be able to change automation tools if your business requirements evolve

You also need to take into account many additional aspects before you start automating



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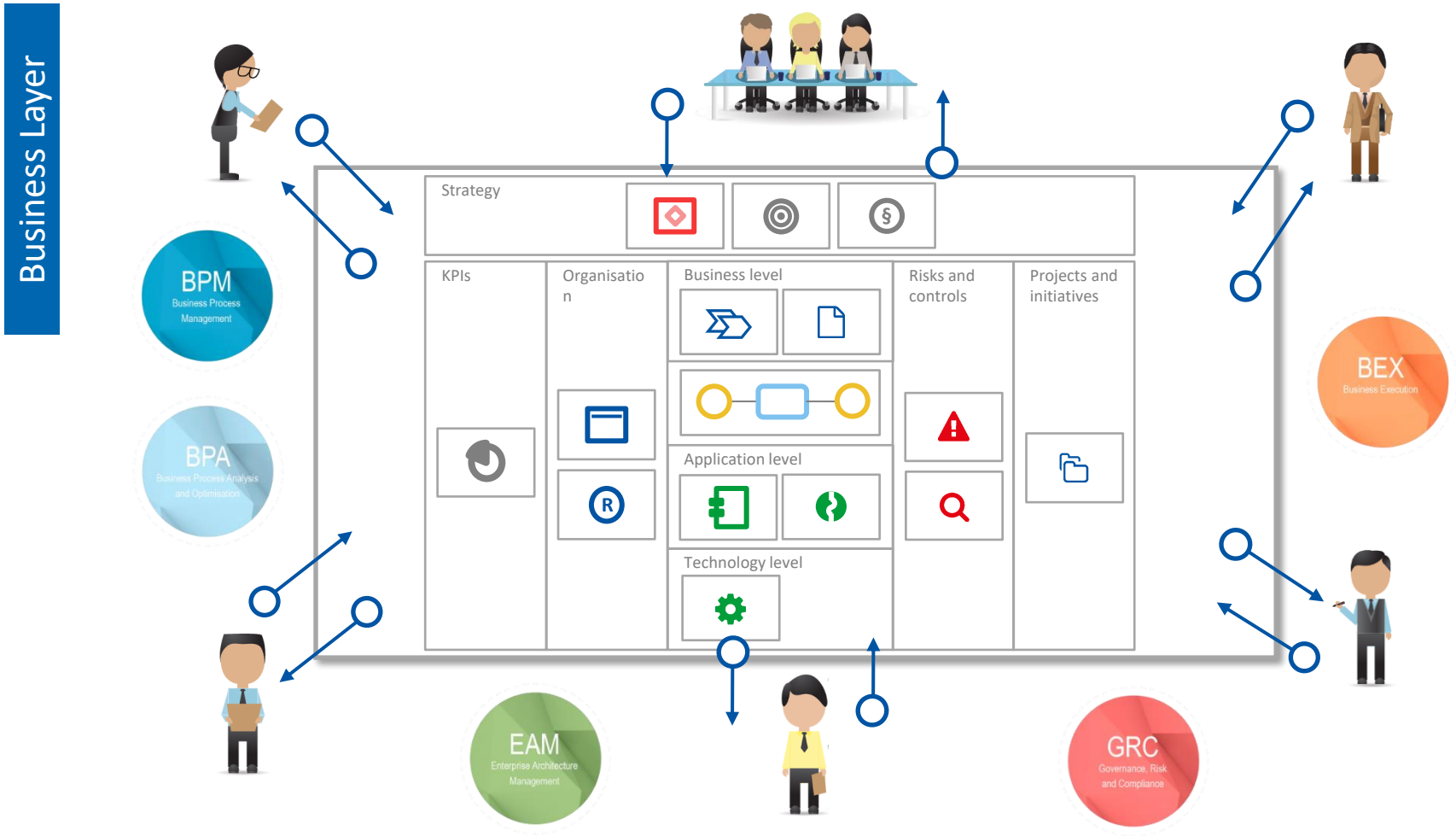
You also need to adjust what is presented to which roles

Strategy, Business Architecture, Process Architecture, Enterprise Architecture, …



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Model Driven Architecture (MDA) – approach of Object Management Group provides you tool independence

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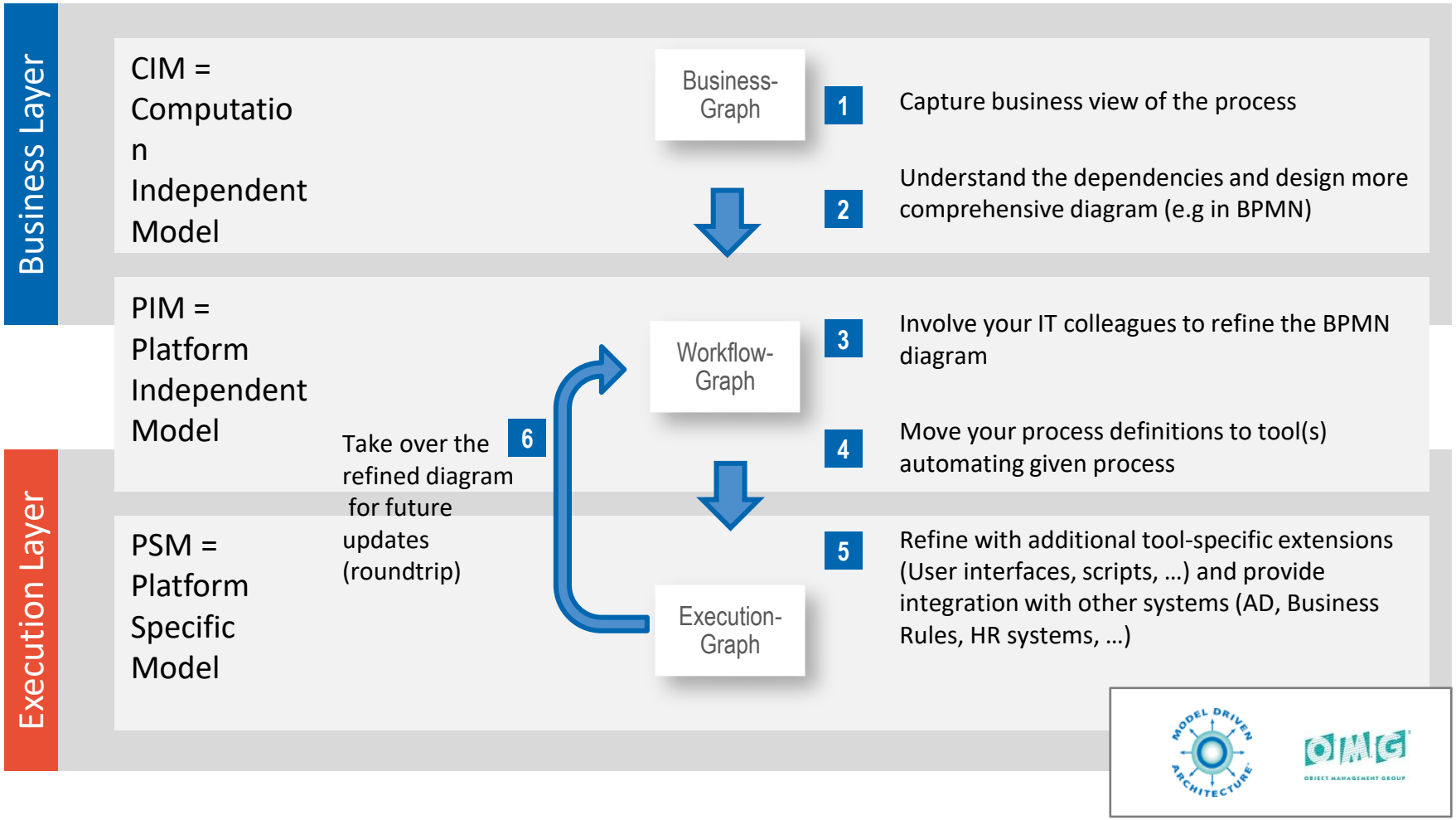
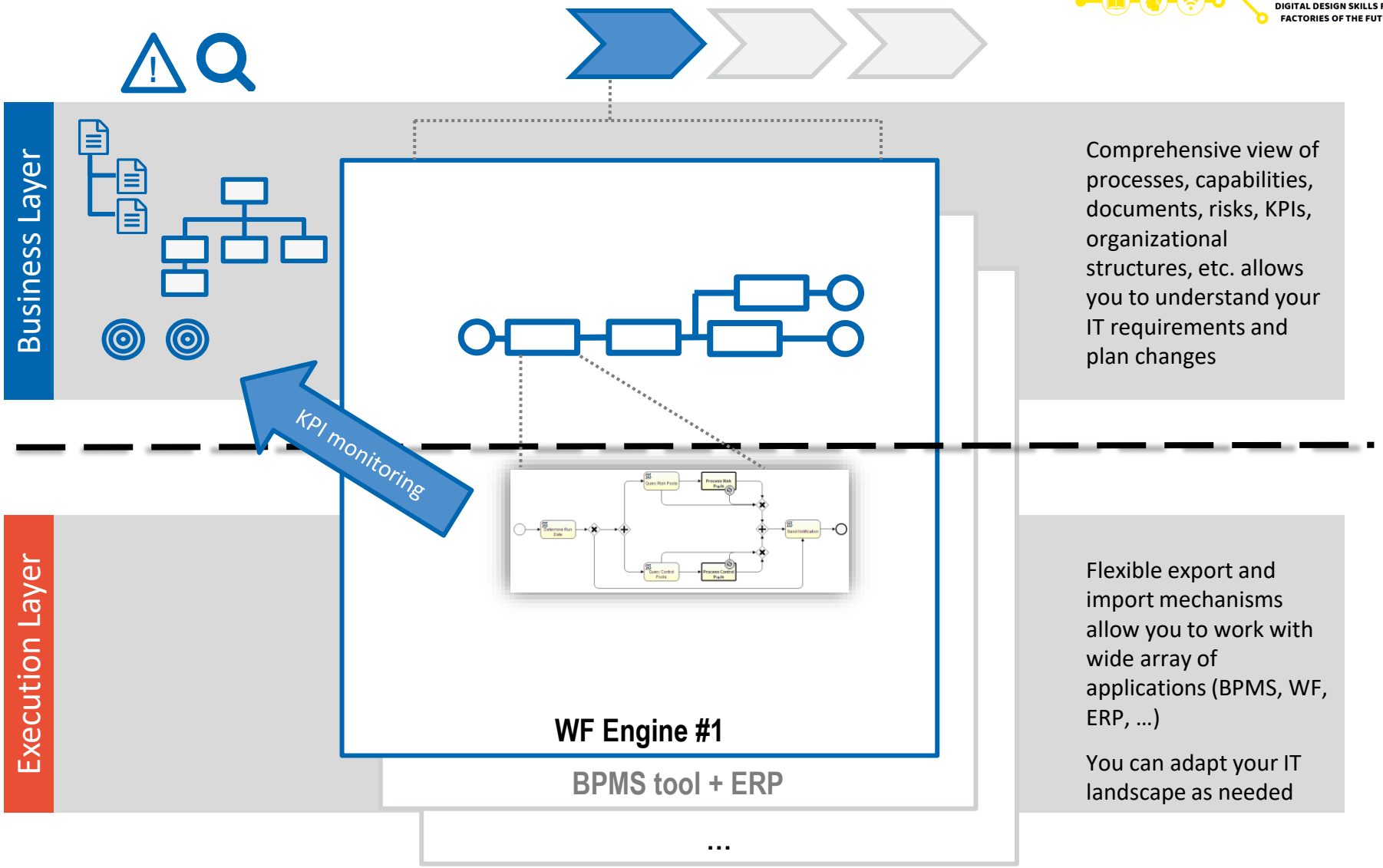


Automating processes with ADONIS



Comprehensive view of processes, capabilities, documents, risks, KPIs, organizational structures, etc. allows you to understand your IT requirements and plan changes

Flexible export and import mechanisms allow you to work with wide array of applications (BPMS, WF, ERP, …)

You can adapt your IT landscape as needed

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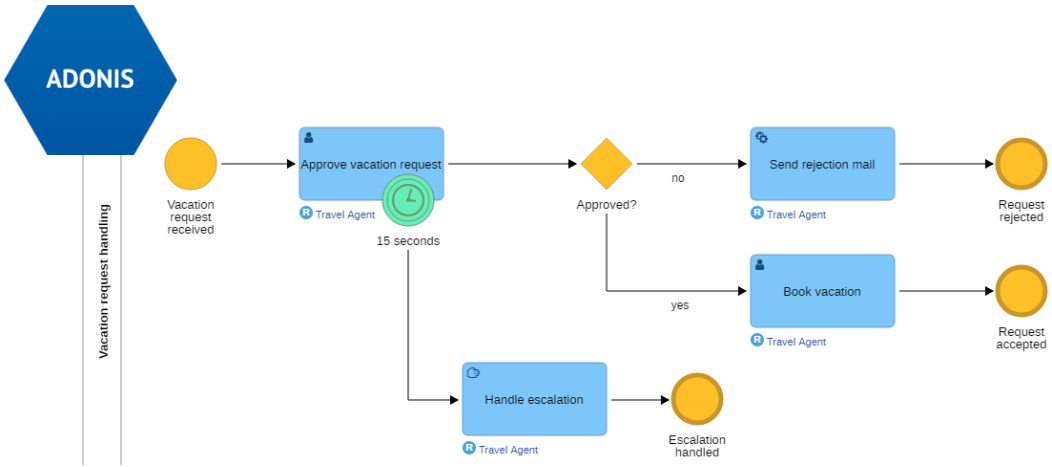
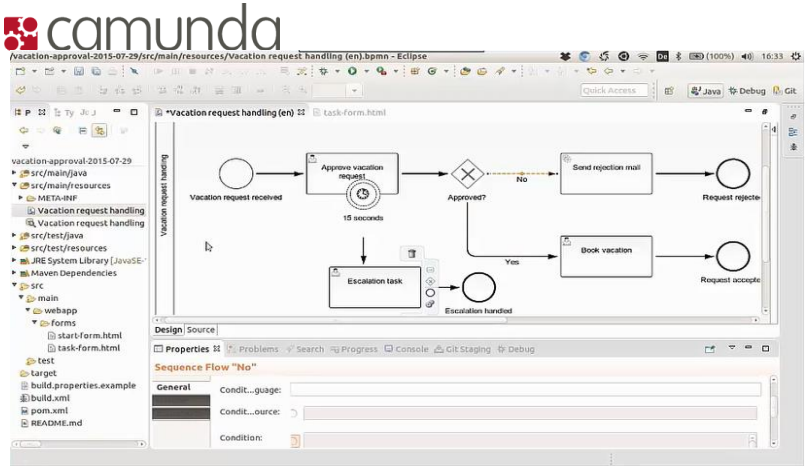
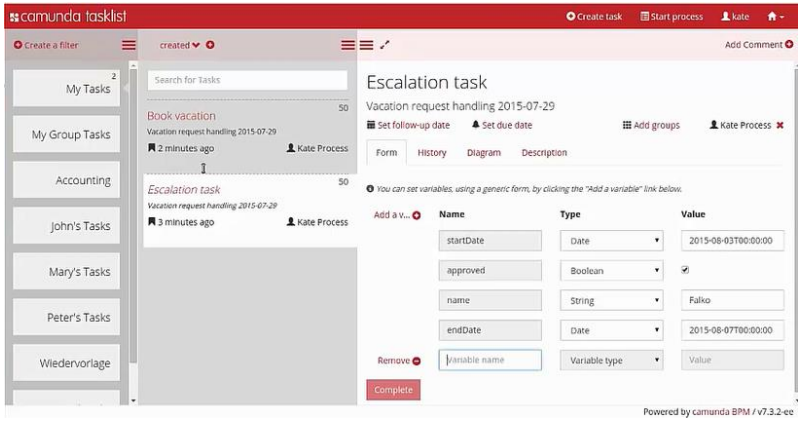
Real life example – ADONIS and Camunda



- Vacation request process created in ADONIS
- Moved to Camunda and extended with data and forms before execution

Transfer via BPMN™





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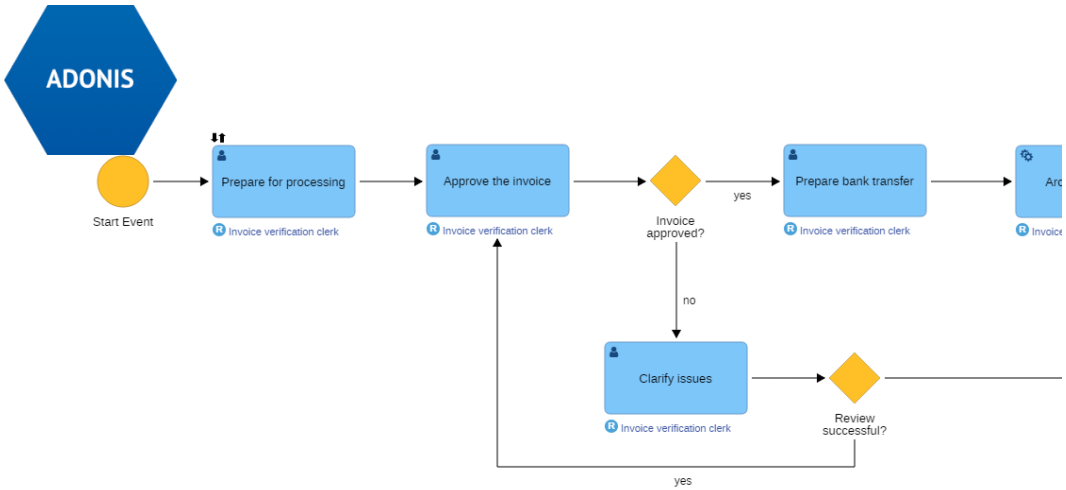
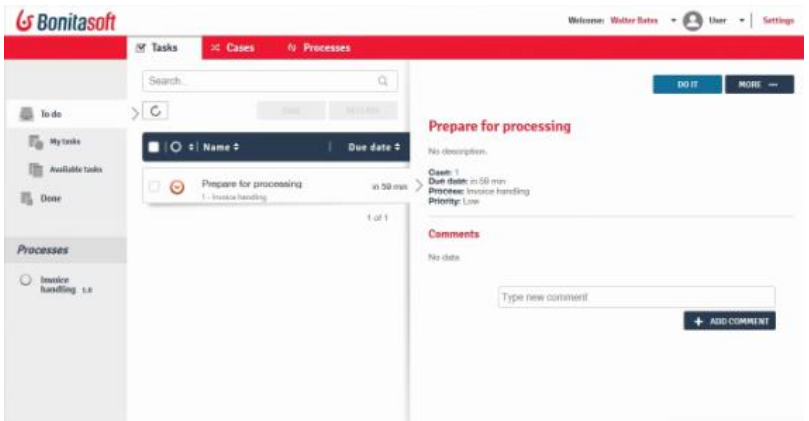
Real life example – ADONIS and Bonita



- Invoice approval process created in ADONIS
- Moved to Bonita and extended with data and forms before execution

Transfer via BPMN™



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Easy interchange with other tools thanks to the support for standards

- BOC actively participates in BPMN, DMN and CMMN Task Forces
- Active member of the BPMN Model Interchange Working Group
  - You can learn more about BPMN MIWG from article on BPTrends.com we co-authored: http://www.bptrends.com/making-bpmn-a-true-lingua-franca/
- Support for all test cases by BPMN MIWG (30+ tools tested)

Active member of OMG Model Interchange Working Group

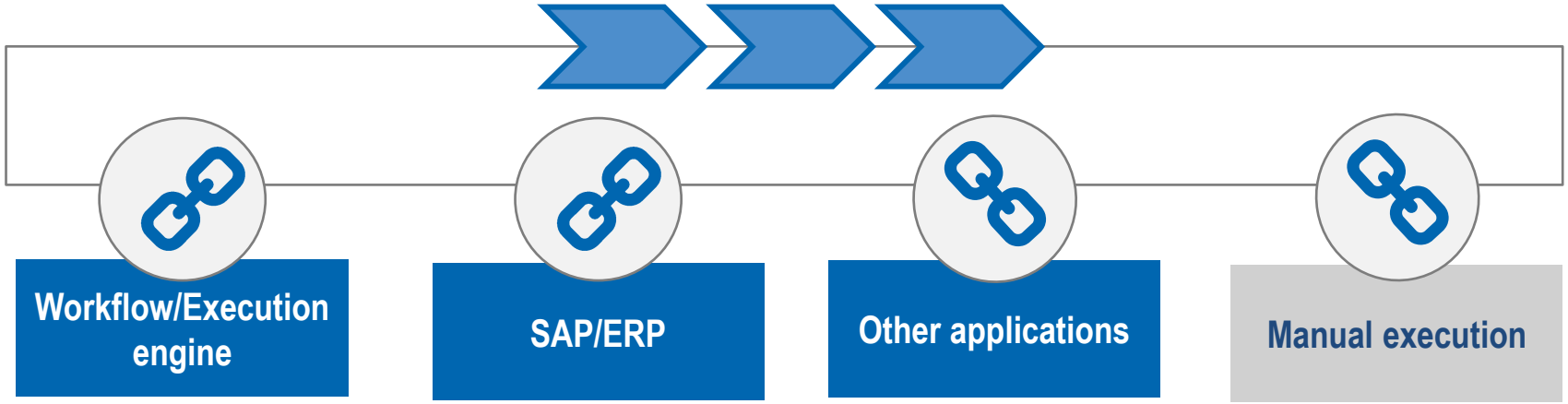
- ADONIS participated in **all interchange demonstrations by BPMN MIWG** (including full roundtrip of hidden technical attributes introduced by execution engines)
- You can find the videos showing how to move from a documented process to running application on: http://www.omgwiki.org/bpmn-miwg/doku.php

Full list of tools tested by BPMN MIWG can be found on: http://bpmn-miwg.github.io/bpmn-miwg-tools/

How ADONIS supports process execution

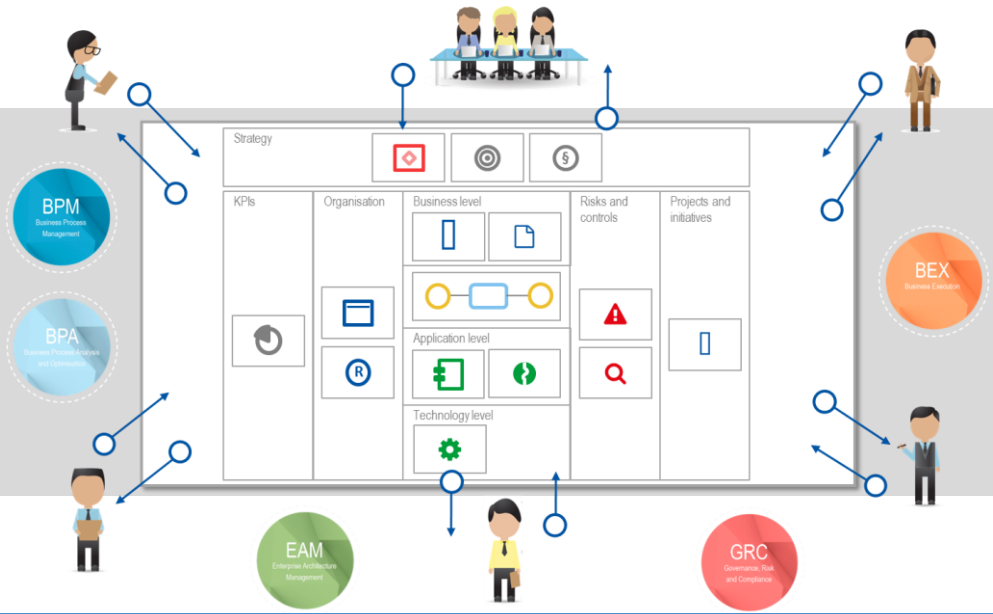
Comprehensive capabilities of integration with BPM/Workflow and further tools

- URL calls
- BPMN Diagram Interchange (XML)
- REST API
- SAP Solution Manager
- Custom integrations



Flexibility and independence

Business Layer



Execution Layer

Interfaces

WF Engine | **ERP** | **HRM** | **DMS** | **CMDB** | **CRM** | **...**

With ADONIS you are independent and you can change IT tools if your business requirements evolve

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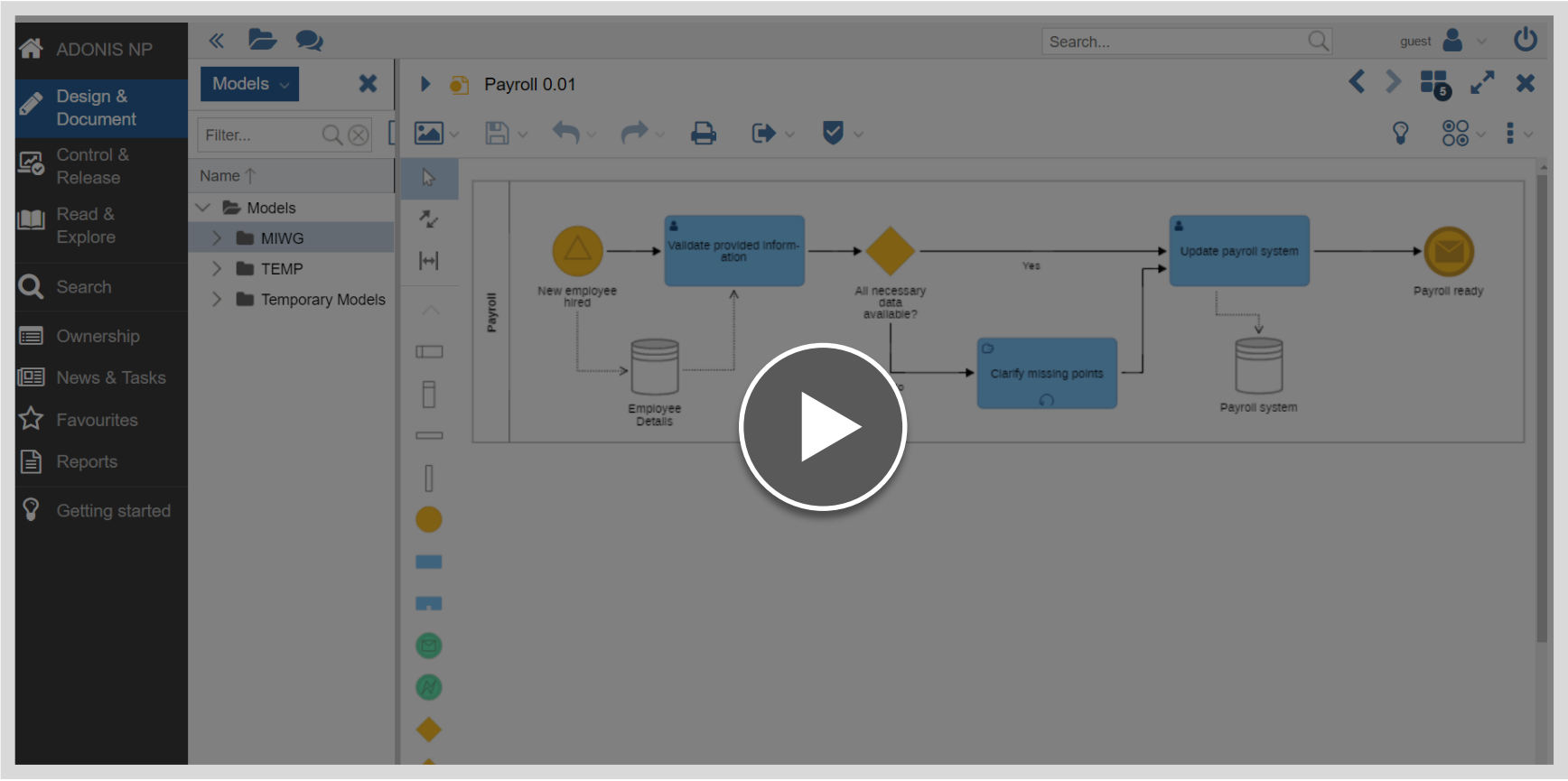
Live-Demo

How to move from a process diagram to an application?



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