Modeling Business Processes Using BPMN and ARIS

Applies to:
Enterprise architects, BPXers, business analysts. Cross industry and not product specific.

Summary
The “how” of the business domain centers around modeling business processes. Although the most common modeling methodology in the SAP world is EPC (Event-driven Process Chains), in this article I will focus on the technique for modeling business processes using BPMN. For those more interested in the granular level of process modeling, my next article will deal with a five-layer model for setting the granularity or different levels of detail when modeling processes.

Author: Natty Gur
Company: SAP
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Author Bio
Natan Gur has 13 years of experience in the IT field. Recently, he has been working for SAP on the SAP enterprise architecture (EA) framework. Natan has eight years of experience running EA in companies and governmental bodies. Natan also serves as the technical director of the International Association of Software Architects (IASA) and is a member of the IASA board of directors. He has been elected by Microsoft as an MVP for the last four years.
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Introduction

The “how” of the business domain centers around modeling business processes. Although the most common modeling methodology in the SAP world is EPC (Event-driven Process Chains), in this article I will focus on the technique for modeling business processes using BPMN. For those more interested in the granular level of process modeling, my next article will deal with a five-layer model for setting the granularity or different levels of detail when modeling processes.

There are various potential business process modeling artifacts in existence today. You can use Data Flow Diagrams (DFD), Integrated Computer-Aided Manufacturing Definition (IDEF0), Unified Modeling Language (UML) 2.0, value stream mapping, Event Driven Process Chains (EPC) and Business Process Modeling Notation (BPMN). These are described in more detail here:

- DFD is a diagram that shows the movement of data between a process, entities and data stores. DFD is more useful for logical and physical modeling.
- IDEF0 shows the process and the flow between processes by using inputs, outputs and syntactic rules. IDEF0 is good for detailed logical processes and workflows. IDEF0 is used mainly by the United States army.
- UML is all about diagrams that show activities and processes and the control flow between them. UML can be used to model high-level processes or to explore how people interact with your organization.
• Value stream mapping lists the steps or activities of a business process across the top as a series of boxes. Below the steps, there is a simple timing diagram that depicts the work time that each step takes and the wait time between and within process steps.

• EPC diagrams use graphical symbols to show the control flow structure of a business process as a chain of events and functions.

• The primary goal of BPMN is to provide a notation that is readily understandable by all business users, from the business analysts who create the initial drafts of the processes, to the technical developers responsible for implementing the technology that will perform those processes, and finally, to the business people who will manage and monitor those processes. Thus, BPMN creates a standardized bridge for the gap between business process design and process implementation.

Currently, there are scores of process modeling tools and methodologies. BPMN advances the capabilities of traditional business process notations by inherently handling business-to-business (B2B) business process concepts, such as public and private processes and choreographies, as well as advanced modeling concepts, such as exception handling and transaction compensation (see http://en.wikipedia.org/wiki/BPMN for a more detailed description of BPMN).

In this article, I will focus on BPMN, for two reasons: 1) I strongly believe that this notation (which is a standard) will be widely adopted by the industry, and 2) while BPMN is a rich notation, it is not a complex one. I will begin with an explanation of the notation as well as the notation rules, and I will end with a real-life example of a process modeled with BMPN in ARIS.

ARIS Support for BPMN

BPMN is composed of five main notations: events, tasks, gateways, flows and artifacts. Each of these main notations is split into subtypes that help us better reflect the process that we are modeling. Although ARIS does not fully support BPMN, it has support for most of the notations that I will cover. ARIS support for BPMN can be found in a dedicated model type called "business process diagram (BPMN)".

Events:

There are three main events: Start, Intermediate and End. Start and End are used to indicate the start and the end of a process. Intermediate events occur between start and end events, and they affect the business flow. All of these event types support type dimension such as message, timer, error, cancel, compensation, rule, link multiple and terminate. Most of the type dimensions belong to intermediate events (all of them except terminate), while the other event types might be used with part of those type dimensions.

ARIS has predefined definitions for “Start event”, “End event” and “Intermediate event”. ARIS supports all of the aforementioned type dimensions by using the attribute "event type" under the BPMN attributes group. ARIS allows you to assign any one of the type dimensions to any event and therefore isn’t in compliance with the BPMN standard.

Tasks:

Tasks represent atomic activity that is included in a process. BPMN has notations to express tasks, subprocess tasks, activity looping and multiple instances. You can express tasks in ARIS by using the “Function” definition. ARIS enables you to express task types using the “subprocess type” and “loop type” attributes under the BPMN attributes group, but there are no visual representations as required by the standard.

Gateways:

A gateway is used to control the divergence and convergence of multiple sequence flows. Thus, it determines branching, forking, merging, and joining of paths. As is the case with events, there is a visual representation for expressing different types of gateways. BPMN supports “XOR” both for data and event based, “OR”, “Complex” and “AND”. ARIS has a predefined “Gateway” definition that you can use. To express different gateway types, you can use the “Gateway type” attribute under the BPMN attributes group.
Flows:
BPMN lets you use seven different flow types: normal, uncontrolled, conditional, default, exception, message flow and compensation association. Using the “Connection” definition and the “Condition” attribute (under the BPMN attributes group), ARIS lets you define normal, uncontrolled, conditional, default and message flows. If you want to express messages in ARIS, you also need to use the predefined message symbol. ARIS does not support exception flow or compensation association.

Artifacts:
BPMN also supports notations to express transactions, groups (for analyzing and documentation purpose), off-page connectors, associations, text annotations, pools (which represent a participant in the process), lanes (sub-partitions within a pool to organize and categorize activities within the pool) and data. Pools, lanes, data and association are supported by predefined ARIS types. Transaction, group, off-page and text annotations are not supported by ARIS.

BPMN Rules:
BPMN is quite flexible in terms of rules. In addition to having to follow the notations, there are other a few other rules that you need to keep in mind. 1) Connecting two tasks over two different pools may only be done using a message. 2) You cannot use messages to connect two tasks in the same lane. 3) Sequence flows cannot be placed between other notations then start event and start event. 4) Sequence flows cannot be placed between end events and other notations. 5) Message flows cannot be placed between start events and other notations. 6) Message flows cannot be placed between intermediate events and other notations.

Modeling BPMN
Now that we’ve gone over the support for BPMN in ARIS, let’s roll up our sleeves and see how we can use ARIS to model a process using the business process diagram view. The process that we are going to model is a typical recruiting process in human resources (HR).

The Modeled Process
The process starts when a request for a new vacancy is received by one of the corporate recruiters. The recruiter creates a job opening and submits the new opening to the corporate site and to HR agencies. As a result of the opening, submission applicants start to apply for the job. The recruiter collects all the applicant data on a daily basis, reviews the applicant data and links each applicant to a relevant job opening.

Next, the recruiter sends a schedule for the panel members to interview the applicant. The panel conducts interviews and sends the recruiter the recommended applicants. The recruiter sends polite messages to the applicants who did not pass the panel interviews and starts the assessment process for those who passed them. The assessment institute conducts an exam. If they have any doubt regarding the candidate, they also conduct a psychological evaluation. In any case, they contact the applicant’s references. The institute returns evaluations to the corporate recruiter. The recruiter again sends polite rejection messages to all of the applicants except one, to whom she sends an offer. The candidate decides if he accepts the offer, in which case a hiring process starts, or if he rejects the offer, which terminates the process.

Pools, Lanes, and Roles
Now let’s take a look at how to model this process in ARIS. The first task is to decide what pools and lanes we want to use. In this case, there is an interaction between our corporate entity and several externals, so we will work with two pools (one for the corporate entity and one for the externals). The corporate pool contains two lanes: one for the recruiter and one for the panel member. The externals pool contains 4 pools: applicant, assessment institute, psychologist and candidate reference.

The next step is to open ARIS, create a new “Business process diagram” model, add the needed pools and lanes and create relations between them. To better reflect the fact that each lane represents a certain role, we also want to add organization units. Adding organization units will help us navigate between building blocks. The result should look like this:
It’s always a good idea to use prefixes while modeling. Using prefixes helps distinguish between two symbols derive from the same Type while navigating the models and running queries and reports.

**Recruiter and Applicants**

Now let’s go through the process description and try to identify events, tasks, gateways and data. I usually follow the old and proven method of using verbs and nouns to identify the right notations. The process starts with the starting event of “job vacancy arises,” followed by two tasks done by the recruiter (create and submit job). Once the recruiter submits the job, an event that represents the new job post is triggered. This event causes the applicant to see the job posting and start to apply for it. Then the recruiter, on a daily basis, checks the data posted by applicants. To reflect the daily basis, we use the Timer event, which reflects the fact that the recruiter checks for applicant data once a day. Applying for an opening uses the applicant data
as input for the task. Therefore we use the data artifact to show that this data is output for one task but input for other tasks, such as the recruiter view of applicant data.

So far, the model should look like this:

![Diagram of business process model](image)

**Panel Members**

The next steps in the process are to link the applicant to the opening and schedule interviews with the applicant and the panel members. Here we use a message event to indicate that both applicant and panel member are notified with a message.

The schedule message triggers a session of interviews held by the panel. If we could show a loop visually we would do that, but with ARIS we can only set the interview task attributes to a loop task. At the end of the interview process, the panel returns a list of successful candidates. Here we have some business logic represented by a gateway. If the candidate is chosen by the panel, the recruiter continues to the assessment task. If not, a message should be sent that cancels the process for a given candidate. We use the cancel event to reflect the termination of a process with one candidate.
Assessment Process

Starting the assessment actually triggers a process that has been outsourced to an external vendor. One of the BPMN rules requests message flow when tasks need to communicate across pool boundaries, so we use messages to communicate between the pools (recruiter to assessment institute and back). The default process from the assessment perspective is an exam, followed by a conversation with the candidate’s references. If there are any issues arising from the exam, they also conduct an evaluation with a psychologist. To reflect that logic, we use the default flow from the exam to the conversation task and conditional flow from the exam to the evaluation task. After all the assessment flows take place, the institute writes evaluations and sends them back (via message flow) to the recruiter.

The flow should look like this:
Based on the returned evaluation, the recruiter notifies with a “process termination” all of the applicants except for one, who gets an offer. The offer is represented as a message event at the applicant end.

Then the applicant has a gateway that represents his decision to accept or reject the offer. This is followed by termination of the process if he get the offer and a new hire process start if he rejects the offer. Again, if we could show this visually, we would display the hire applicant task as a subprocess.

The rest of the process should look like this:
Summary
The process in its entirety is difficult to show in an MS Word document, as the text in the graphic is unreadable. I have nevertheless embedded a graphic of the entire process here, to provide an overview.

This was a fairly easy example of process modeling. In reality, most processes are much more complicated and harder to model. Just keep one rule in mind: There’s no right or wrong in process modeling. As long as your enterprise approves the model and sees it as the right way to depict reality or the future, you are on the right track.

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