A Practical Framework for Business Process Modeling

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The Definition of Business Process Modeling

According to the Association of Business Process Management Professionals' BPM Common Body of Knowledge (BPM CBOK)

> *"Business Process Modeling is the set of activities involved in creating representations of an existing or proposed business process. It can provide an end-to-end perspective or a portion of an organization's primary, supporting, or management processes."*

When it comes to the subject of representations it's common for people to think of a flowchart as an adequate example of a business process model. Yet, depending on an organization's reasons and purposes for process modeling, a typical process flowchart may not fulfill process modeling requirements of thoroughness, completeness, accuracy and precision.

The modeling notation used and the level of detail in a process flowchart are two considerations. The scope and content of additional supporting documents are equally important considerations. In this article I'll explain the level of detail needed and the other types of supporting documents that collectively provide a multi-dimensional model of a business process.

Process Levels vs. Process Specification Details

When planning a business process documentation effort, the question of process "levels" always comes up. I'm often asked, "To what level do you define processes?" It's a difficult question to answer for a variety of reasons. Because of this, I prefer to answer the question by shifting the conversation away from a discussion about "levels" and instead, toward a discussion about:

- The entire portfolio of documentation
- Which portfolio documents to include or exclude from the model (process specification)
- Which details to include or exclude from each document

When people think about process modeling, they often only think in terms of process flowcharts. The concept of "levels" likely originates from this flowchart-only perspective. People see a flowchart and want to know what "level of process" the flowchart represents. This assumes that there is some kind of commonly understood process modeling standard that clearly differentiates one process model level from another.

Yet there is no standard. Various consultants and organizations have attempted to define and explain process modeling levels, yet they differ greatly. And nearly all confuse process classification with process decomposition. And in nearly every case, it's impossible to look at an isolated flowchart and be able to quickly and easily identify its "level." Therefore, a direct answer to the "How low do you go?" question isn't possible without first setting some parameters and expectations.

A Flowchart Isn't a Complete Model

Rarely do people consider a process model as a full set or portfolio of documentation that collectively specifies process details from a variety of perspectives. To be fair, an easy-to-read, understandable flowchart can convey a lot of useful information. But if thoroughness, completeness, accuracy and precision are quality attributes required from the modeling effort, more than just a few mid-level flowcharts would be needed.

At the "highest" level of documentation, a flowchart shows a handful of named processes, each of which can easily be identified, or further classified into a set of named, related sub-processes. The set of named sub-processes of a super-process is considered a "lower" level of process. Therefore, a "Level 2" process is the named set of sub-processes that make up "Level 1" processes. Then, "Level 3" processes would be the named sub-processes of "Level 2" processes. And so on, until the organization can't think of any more sub-processes.

In this typical taxonomy it's impossible to look at any single flowchart and be able to identify what "level" of detail the flowchart represents. While it's easier to see the difference between the highest and lowest levels of detail, the levels in-between aren't distinctly different enough to identify without a label.

When someone asks, "How low do you go?" what they're really trying to ask is, "To what extent and depth do you model business processes?"

The answer depends on the purpose of the modeling effort. Generally, most business process modeling projects I get involved with fall into one of the following categories:

- Business Process Improvement Projects
- IT Service Management Improvement Projects
- Business Systems and Software Requirements
- Compliance Documentation Projects
- Training and Education Documentation Projects

The level of detail required for each of these initiatives is usually driven by the intended use of the documentation. Regardless of the drivers behind the modeling effort, what clients usually need is more than just a set of flowcharts.

It's rare to find an organization with any extent of knowledge, skill, or experience in the principles, practices, quality controls and metrics involved in business process modeling. Process improvement project managers don't know what a thorough, complete, accurate and precise business process model looks like. For these reasons, when a client engages me to lead a process modeling project, I start by introducing the concept of a *Business Process Blueprint* – which represents a portfolio of business process document

The Business Process Blueprint Documentation Portfolio

The purpose of a collection of documents in the Portfolio is to provide a multi-dimensional view of process details from different perspectives.

While I try to stay away from debating about "levels" of process models, I can say that "levels" are more about inclusion or exclusion of documents (and details within those documents) in the portfolio. Rather than talking about flowchart levels, I discuss the overall extent of documentation. It becomes a discussion focusing on the set of documents that adequately specify the scope and depth of details about a process.

The Process Documentation Portfolio that I typically propose consists of the following documents:

A. The Enterprise Business Process Catalog

B. BPMN Business Process Flowcharts

C. Data Flow Diagrams

D. Process Definition Documents

E. Business Events and Triggers List

F. The Logical Business Data Dictionary

G. DMN Decision Diagrams and Matrices

H. The Business Rules Matrix

I. Roles and Responsibilities Matrix

J. Process Language Glossary

K. Process Documentation Repository

With the exception of process/procedure flowcharts, the rest of the documentation rarely involves selective inclusion or exclusion of details within each document. What drives the exclusion/inclusion of documents and relative details is the organization's reasons for modeling in the first place. The more thoroughness and completeness that the organization requires, the more extensive the documentation.

A. The Enterprise Business Process Catalog

The Enterprise Business Process Catalog (EBPC) and accompanying Enterprise Process Classification Framework (EPCF) is a process inventory and classification system. The EBPC is the list of the organization's processes. The EPCF is the framework the EBPC uses for classifying (categorizing) those processes.

Starting out, the arrangement or organization of the EBCP usually follows APQC's Process Classification Framework (PCF). The PCF is "organized into 12 distinct categories, including five categories of operating areas and seven categories of support areas. Each category contains groups of processes and activities that, when considered as a whole, represent the operations of an organization.[1] The PCF's five categories of operating areas and seven support areas closely match other process operating/support constructs such as Porter's Value Chain[2], or the Value Chain Group's more detailed Value Reference Model[3].

From some perspectives, this categorized inventory of processes, might represent what people in the organization consider to be the "highest" level of processes. This "high level" model is simply the highest level of a classification hierarchy of named processes.

B. BPMN Business Process Flowcharts

The first specification involves naming the flowchart modeling notation to be used. Given the scarcity of structured process modeling notation standards, this is an easy specification. I nearly always specify the Business Process Model and Notation (BPMN). Then, within the notational standards, I'll include or exclude some of the following:

Specific Syntax Used in Activity/Task Descriptions

Activity and Task descriptions strictly follow the Role-Action-Object syntax. If the activity/task is performed by a person, the task description starts with the specific, formal job role name - and never the name of a function or department. If the task is performed by a machine/computer/software, its name is used instead of a job role. Next, an action verb is used to describe the action the Role performs. And finally, the object of that action is specified.

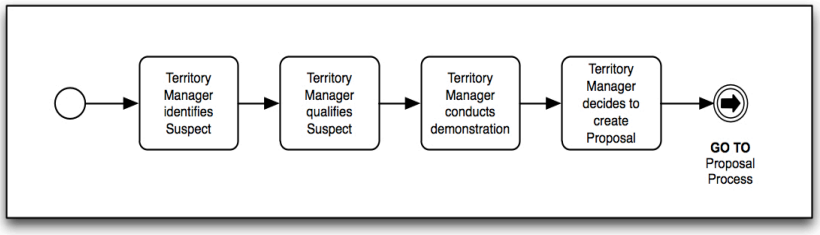
These tasks are the most discrete, individual, sequentially focused activities that can be identified.

[1] From: http://www.apqc.org/process-classification-framework

[2] http://en.wikipedia.org/wiki/Value_chain

[3] http://www.value-chain.org/framework/value-reference-model

Fig. 1: Syntax Example: Role – Action Verb

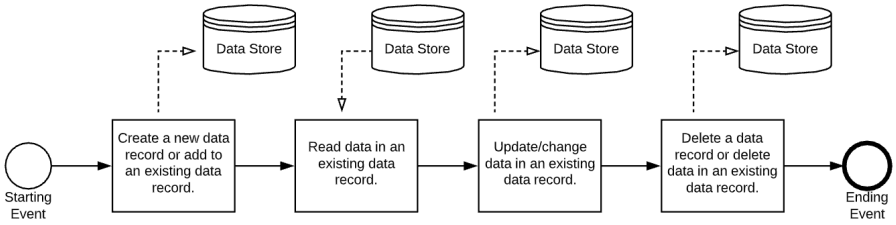


Data Store Objects

One of the artifacts in the Business Process Modeling Notation (BPMN) is the "Data Object" artifact. This artifact is used to represent information flowing through a step ("Task" in BPMN) within a process. When using this artifact, I usually specify the direction of flow – based the CRUD model - with one of the following labels:

- Create Record
- Read Record
- Update Record
- And sometimes, Delete Record

Fig. 2: CRUD Data Store Notation



Annotations

Annotations are used to provide additional information about a process. They can appear anywhere in a BPMN flowchart. I typically use Annotations as placeholders to ask a question or emphasize the need for more information or clarity. Other than using Annotations for containers for my Data Object Element Tables, by the time the final validated flowchart is complete, most of my Annotations have been removed.

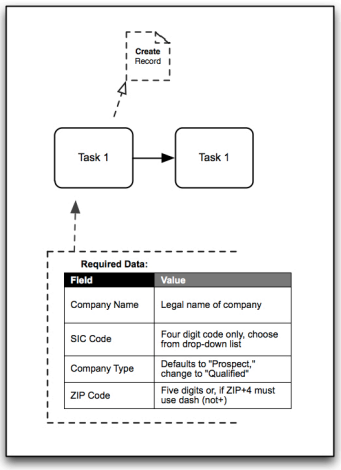
Special Annotation: Data Object Element Tables

Data Object Element Tables are not within the BPMN specification. But I often include them with BPMN flowcharts, especially if the flowcharts will be used for things like:

- Specification or clarification of data entry rules
- To support training and support functions and activities such as the development of training classes, and user manuals
- For customer support and instructional/on-boarding materials

Whenever a task involves a performer/user in creating or updating data, I'll usually include Element Tables as shown in Figure 3, below. While my Data Object Element Tables aren't exactly specified within the BPMN standard, I consider them a derivative of an Annotation artifact.

Fig. 3: Data Object Element Table



Intermediate Events

In BPMN there are three types of Events: Start, Intermediate, and End. While I almost always include Start and End events in my BPMN flowcharts, the inclusion or exclusion of Intermediate Events is often a consideration when defining the level of detail to be included in the process model.

Intermediate Events represent things that can occur during the course of process execution. Things like time limits, messages (i.e. E-mail and middleware messaging), exceptions or variations, error handling, and compensatory responses can be represented with Intermediate Event artifacts. Most Intermediate Events are significant within a process. The intra-process responses to these Intermediate Events are often the most risky parts of a process. It's usually where a process involves waste or failure.

Other Artifacts and Output

Regardless of whether a flowchart was produced using a standard notation (like the BPMN or an individual flowcharter's informal notation), the use of Pools and Swimlanes are common. Pools and Swimlanes are best used to show the containment or division of process tasks and responsibilities within a business entity, organizational function, or role. While understanding functional containment is important, I believe Swimlanes alone don't thoroughly explain role responsibilities. The division of roles and their process responsibilities can be more precisely detailed in other documents in the Portfolio – namely the Roles and Responsibilities Matrix. Regardless, the inclusion or exclusion of Pools and Swimlanes is another consideration when defining the extent of process documentation/modeling details.

Levels = Inclusion/Exclusion of Modeling Notation Artifacts

As you can see, the inclusion/exclusion approach to flowchart modeling detail doesn't deal with identifying and naming a distinct hierarchy or a level (as in height) perspective. It doesn't mix classification with decomposition. The only consideration is which artifacts to include or exclude.

C. Data Flow Diagrams

The purpose of the Data Flow Diagram (DFD) is to help focus the specification on the flow of data between participating objects in a process. A DFD illustrates some of the same information that a flowchart does but isn't focused on the procedure or sequence of process tasks. In other words, a flowchart better describes the "how" where the DFD better describes the "what." Like many things we deal with in life, it's difficult, and often somewhat inaccurate to define something from a single perspective - such as looking at an object only from the front, and not from all sides. Since most "business" processes involve the flow and manipulation of data, it's prudent to orient much of the modeling/documentation on the movement and manipulation of that data/information.

D. Process Definition Documents

The Process Definition Document (PDD) includes specific sections such as:

- Definition and Purpose of the Process
- Process Goal and Objectives
- Inputs and Outputs
- Resources (Capital, Equipment, and Human)
- Process Roles and Responsibilities
- Imitating Business Events (Process "Triggers")
- Process Sequence (Process Narrative)
- Process Rules (Business Rules)
- Process Measurements
- Process Controls
- High-Level Process Diagram
- Validation (Process Owner and Stakeholder Acknowledgement and Agreement)
- Process Issues and Risks
- Outstanding Questions and Issues (with detailed Action Items and Statuses)

Most of the time, this is an "all or nothing" document. The extent of detail in this document covers a lot of significant information about both the design and the management and control of a process. On projects requiring only a minimum amount of documentation, the PDD and a procedural-level BPMN flowchart might be the only two types of documentation we deliver.

E. Business Events and Triggers List:

Processes are an organization's response to business events. Therefore, it is prudent to identify all the business events an organization responds to, and match those events with the processes they would possibly trigger or initiate. This cross-referencing exercise is done to further ensure that all processes within the scope of the modeling effort have been identified.

F. The Logical Business Data Dictionary

The Logical Business Data Dictionary (LBDD) is a multi-tab spreadsheet workbook consisting of all of the data objects and associated elements found in a process flow. There can be one LBDD for an individual process and one LBDD for the entire organization. All of the individual LBDD's roll up to the enterprise-level LBDD. The LBDD is often referenced by software designers and developers when process modeling/documentation projects are sub-projects of larger, software development and implementation projects.

G. DMN Decision Diagrams and Matrices

A large percentage of processes involve decision tasks. And in many situations those decisions can be as complex as they are complicated. Although it's possible to model decisions using BPMN, the Decision Model and Notation (DMN) is often more effective in illustrating the decision. Two key elements of the standard are *Decision Requirements Diagrams* and *Decision Tables*.

Those elements provide clear, complete, concise, and consistent of decision inputs, factors, and outputs.

H. The Business Rules Matrix

The Business Rules Matrix is a spreadsheet that is used to define relationships between objects participating in processes. It simply helps answer the question of, "For each, individual Object A, how many Object B's can there be?" Defining these relationships is another way of defining the rules for how the objects participate in a process. The BRM is the detailed support of the process rules section of the Process Definition Document. The none-one-many (0, 1, M) notation used in each cell of the BRM directly translates to the more conversational syntax of the business rules statements in the PDD.

I. Roles and Responsibilities Matrix

Even though process performers are identified in flowcharts, Data Flow Diagrams, the Logical Data Model, and the Process Language Glossary, the Roles and Responsibilities Matrix consolidates and summarizes performer and responsibilities data into a single document. People can have one role and responsibilities in one process, and another role and responsibilities in another process. This causes issues with availability and capacity utilization, conflicting priorities, and individual performer's performance appraisals. It's not unusual for one person to "report to" two or more managers, each with separate agendas and priorities. The Roles and Responsibilities Matrix helps expose and resolve these kinds of resource leveling issues.

J. Process Language Glossary

People often communicate using real or made-up acronyms, slang, generalizations, and misnomers. This causes plenty of confusion. The Process Language Glossary is intended to serve as THE definitive source of process language, terms, and acronyms. If nothing else, it's used to clarify and confirm all process stakeholders' understanding of the organization's "language of process."

K. Process Documentation Repository

Much of the documentation produced during a process modeling/documentation effort is subject to frequent updates and revisions. These living documents usually need to be accessed by a wide range of process stakeholders during the effort. And, of course, the final documents would be frequently accessed, and updated, by all the different process stakeholders throughout the lifecycle of those processes. All of this drives the need for a well-organized, easily accessible, secure repository of documents. If an organization doesn't already have a content or document management system in place, the modeling/documentation team takes responsibility for developing, implementing, and managing the repository.

Summary

This article addresses the question of "How much detail do you include when modeling a process?" There are a few important concepts to understand when answering the question. First, it's critical to clearly understand the specific reasons for modeling the processes. In general, this should give you an idea about the potential scope and extent of detail needed. Second, there is a distinct difference between classification levels and decomposition extent. Third, it's unlikely that a flowchart alone can't provide or expose enough information to completely define a process. And since a useful process model typically involves more documents than just a flowchart, and those documents will be frequently accessed by a wide range or process and project stakeholders, a document management system should be setup and managed to ensure ease and simplicity of access, while providing controls and security to ensure documentation integrity.

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