



Process Modelling & Mapping: The Basics

Kelly Halseth
Regional Coordinator,
Forms Management & Production
David Thompson Health Region
Session 64

Opportunity is missed by most
people because it is dressed in
overalls and looks like work.

- Thomas A. Edison.

Introduction

One of the most powerful weapons in the Forms Management arsenal is the process map. As forms professionals, we are tasked with creating efficient and useful tools for our organizations, often with little understanding of the underlying business process. Often we are collaborating with customers who don't understand their own business processes, much less the upstream and downstream processes. A process map can go a long way to building that understanding while highlighting problems, miscommunications, gaps, redundancies, workarounds, rework loops and waste. In short, process maps show us "what" we do, "how" we do and "where" we do it. And above every process map should hang a huge sign that reads: "Why?"

Understanding how to create and analyze business processes is a skill that can benefit anyone, in any role, in any industry.

Business Process Defined

"Processes are how people within an organization collaborate in order to accomplish a goal. Essentially everything we do in an organization involves or contributes to some type of process."ⁱⁱ

A business process has typical characteristics:

- it exists to meet a specific business need
- collaboration between multiple people or groups
- takes place over a period of time
- often has more than one iteration
- is repeatable

Good ideas are not adopted automatically. They must be driven into practice with courageous patience.
-Admiral Rickover

So what is a process map?

Process mapping consists of a collection of tools and methods used to understand an organization and its processes. Those tools allow us to document, analyze, improve, streamline and redesign business processes to realize organizational efficiencies. A process map is a visual aid for picturing work processes and shows how inputs and tasks are linked and highlights the steps required to consistently produce a desired output. A process map encourages new thinking about how work is done, where it is done, who performs it, what problems frequently occur and how best to solve them. A common analogy relates to road maps: you can't plot a route to get to where you want to go...unless you know where you are.

Process models and maps can also be used to identify appropriate

quality improvement team members, identify who provides inputs or resources to whom, establish important areas for monitoring (critical control points) or data collection and to identify areas for improvement. Flowcharts can help us understand the flow of a wide variety of things: information, documentation, forms, patients, products, supplies, customers or employees.

Benefits of using Process Maps

Benefits of process maps:

- enables everyone to visualize (see) the process in the same way
- acts as a training and educational tool for new and existing staff and help reduce procedural errors
- focuses stakeholders on the process itself
- builds understanding between cross functional work areas
- provides a “current state” upon which to base future improvements
- identifies objective measurements and metrics for ongoing evaluation and future improvement activities
- identifies existing workarounds, rework loops and information gaps
- illustrates opportunities for improvement
- improves compliance with, or provide documentation for, quality and regulatory standards (SOX, C-SOX, CCHSA, JCAHO, OH&S, etc)

The most dangerous kind of waste is the waste we do not recognize.
- Shigeo Shingo

Business Process Modelling Tools

Process Modelling levels

Level one: this very high level map outlines the operational levels of an organization and are rarely, if ever, actually drawn. Examples include: customer processes, administrative processes.

Level two: shows end-to-end processes across the above operational areas. For example a level two process for purchasing capital equipment would cross several operational areas: the requesting department, purchasing, accounts payable, asset management, receiving and biomedical/maintenance. Also called top down or high-level process maps. They are quick and easy to draw, but may not provide the detail necessary to build understanding or realize improvements.

Level three: shows the roles, inputs, outputs and steps required to complete a specific process within an operational area. For example, the purchasing

process (request, sourcing, cut PO) might be depicted as a process map. Also called cross-functional or deployment diagrams. Usually contain enough information for improvement efforts, but often miss inefficient details and don't function well for training or as operational documentation.

Level four: is the documentation of systems, instructions and procedures required to complete steps in the level three processes and shows inputs, outputs, associated steps and decision points. For example, specific steps necessary to cut a PO in the enterprise application would require a level four process map. The procedures and system instructions can be represented as text, an algorithm or detailed process map. Because of the level of detail, they can be resource-intensive to create, but offer the greatest improvement potential. Since they illustrate decisions and subsequent actions, they are excellent training and reference materials. But if your organization is new to process mapping, use these sparingly. The time and effort may turn stakeholders off before they've had a chance to experience the benefits of the work.

Process Maps

Choose the type of process map appropriate for your specific goal. What follows is a description of different types of process maps, when to use each, and a brief outline of how to create them. What is common to all of them is the "process-oriented approach". This approach:

- Defines the process first
- Specifies the customers of the process
- Defines and refines the requirements for all process customers
- Specifies the steps involved in getting something accomplished
- Indicates the sequence of steps

Top-Down Process Maps

Top-Down or High-level process maps (Parking Lot diagrams to some) are good for illustrating the major clusters of activity in a process; those key steps essential to the process while limiting the amount of detail documented. The top-down flowchart starts with the major steps drawn horizontally. The detail is provided in numbered subtasks under each major task. The top-down flowchart does not show decision points or rework loops and does not show the same detail as a cross functional chart or detailed flowchart.

How to Draw Top-Down Diagrams (Level 2)

1. List the most basic steps in the process. Limit yourself to no more than 5 or 6 basic steps and place them in order horizontally across a whiteboard, flipchart or large piece of paper.
2. Under each step, list the sub-steps that make up that element, list them in the order they occur and again, limit yourself to 5 or 6 sub-steps.

Cross Functional or Deployment Diagrams

Use cross-functional flowcharts to show the relationship between a business process and the functional units (such as departments) responsible for that process. Bands represent the functional units. Shapes representing steps in the process are placed in bands that correspond to the functional units responsible for those steps. You can represent a process either vertically or horizontally. A vertical layout, where bands representing the functional units run vertically from the top to the bottom of the page, places slightly more emphasis on the functional units. In a horizontal layout bands representing functional units run horizontally across the drawing page, highlighting the process.

These charts emphasize where the people or groups fit into the process sequence, and how they relate to one another throughout the process. Cross-functional or deployment charts are excellent tools for illustrating how a process flows across organizational boundaries. They can be very effective at identifying delays, redundancy, excessive inspection, rework and potential points of process failure.

How to Draw a Cross Functional Diagram (Level 3)

1. Gather together a team representing the different functional areas.
2. Place a large piece of paper on a wall or flat surface.
3. Identify your process stakeholders/players (people or functional areas).
4. Down the left hand side of the paper starting with the process customer at the top, list the process players in order based on the closeness of their relationship to the process customer.
5. Draw horizontal lines between each process stakeholders, using a double

line if they are external to your organization (customer, supplier, regulatory body). These are referred to as *swim lanes* and may also be used to represent different roles in a process or a key piece of software. The bottom axis is time and moves from left to right.

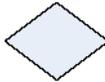
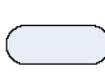
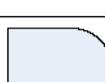
6. Write out the process steps in order and on the line of the person/functional area that performs that task, moving from left to right as time elapses.

7. As you draw boxes, connect them with lines and arrowheads showing the direction of input. Concurrent activities should be aligned vertically and shared activities (between people or functional areas) should be drawn on the on the swim lane (when possible).

Alternatively you can also write the process steps on 'sticky' notes and place them on the map. You can then move them around until the team members are satisfied that the steps are properly identified and in the correct order. Finish by adding labels, decisions, and arrows (showing direction of input) to the map.

Detailed Flowcharts

Flowcharts are maps or graphical representations of a process. Steps in a process are typically described within a specific set of symbols, which communicate 'what' or 'where' something is happening. There are literally hundreds of different symbols to choose from, but most experienced process analysts will recommend that you choose a handful of basic symbols and stick with them. Accurate flowcharts can be created using very few symbols (e.g. oval, rectangle, diamond, delay) and the International Standards Organizations standard 9004.4 recommends just four. A chart of commonly used symbols is shown on the right.

Symbol	Represents	Example
	Activity	Data is entered Purchase approved Cut PO ISO 9004.4
	Decision Point	Yes/No Agree/Disagree Pass/Fail ISO 9004.4
	Document	Purchase Requisition IV Record Expense Claim
	Start/Stop Input/Output	From (other map) To (other map) A need is identified ISO 9004.4
	On-page Connector	Go to another part of the flowchart
	Arrow	Shows the direction of flow taken by the process, through all the other symbols. ISO 9004.4
	Delay	Waiting for a service Report sitting on a desk

In quality improvement work, flowcharts are particularly useful for establishing a common understanding of a process, or allowing people to “see” the process in the same way. Displaying the “current state” of a process helps identify illogical flows, potential miscommunications, redundancy, rework, delays, dead ends, and missing critical control points that might otherwise go unnoticed.

Another methodology, from the Ben Graham Group (www.worksimp.com) is a very effective method of collecting data and drawing detailed process charts.

Important things to Remember

- ensure that you are working with the people actually doing the work. Managers will often want to be involved in process work, and their support is critical. But unless they do the tasks on a day-to-day basis, they can often be more of a hindrance than help.
- ensure team members feel safe in sharing and understand that this isn't a fault finding mission. Their description of the process *as it is*, is critical, good, bad or otherwise.
- decision symbols are appropriate when those working in the process make a decision that will affect how the process will proceed. For example, when the outcome of the decision or question is YES, the person would follow one set of steps, and if the outcome is NO, the person would do another set of steps. Be sure the text in the decision symbol would generate a YES or NO response, so that the flow of the diagram is logical.
- in deciding how much detail to put in the flowchart (i.e., how much to break down each general step), remember the purpose of the flowchart. For example, a flowchart to better understand the problem of long waiting times would need to break down in detail only those steps that could have an effect on waiting times. Steps that do not affect waiting times can be left without much detail.

How to draw a detailed process flow chart (Level 4)

- 1, Describe the process to be charted and define the process boundaries. (scope)
2. Always start with the process trigger (business need that drives the process) You may want to start by determining major and minor inputs into the process with a cause & effect (Ishikawa) diagram or using the six sigma SIPOC tool.

3. Complete the big picture before filling in the details, often by sketching a cross-functional diagram first
4. Keep the descriptions concise. If necessary, cross reference other maps or documentation.
5. If you are the facilitator, make generous use of the Socratic dialogue. Ask lots of questions. Ask lots of 'why' questions. It is best not to facilitate mapping your own process. If the participants are able to describe the process in a way that makes sense to someone who knows nothing about it...then you are probably capturing enough detail.
6. Note down each successive action taken. Actions should be clearly described in as few words as possible.
7. Pay attention to the questions. These are often critical control points: places in the process where multiple alternative flows appear, based on questions, inspections etc. When you are charting a branch, always follow the most important alternative to flow chart first. Then go back and complete the remaining flows.
8. Validate the process chart with others involved in the process.
9. Identify responsibility for each step.

Man's mind, once stretched by a new idea, never regains its normal dimensions
- Oliver Wendell Holmes

Process Analysis

Processes are rarely designed intentionally and they all evolve over time. Throughout this evolution, inefficiency, redundancy and waste creep in. It is critical to avoid finding fault with a specific process: recognize that people and departments make changes in an effort to get the job done, often without knowledge of how those changes might impact upstream and downstream processes.

The performance of individuals is only as good as the process will allow it to be. Processes, especially cross-functional business practices, are usually not documented, not standardized, not measured, not systematically and continually improved and not managed by the micro-process doer or owner.

Analyzing Process Maps

Processes evolve (or devolve) over time as staff or business conditions change and in response to other changes in the organization. This evolution often results in growing process complexity. The trouble spots in a process usually begin to appear as a team constructs a detailed flowchart.

- Begin by challenging the necessity of each process step. Is this step redundant? Does it add value to the product or service? Is it problematic? Could errors be prevented in this activity? How? Does this process step physically change the product? Is it done right the first time? Is it another inspection, control point or approval? Is it required to meet a regulation or legislation? If you stopped doing this step, would your customer even notice? Asking these questions will help determine if the process step adds value for your customer or your organization. Combine, simplify or eliminate activities that do not contribute value.

Watch for over inspection or multiple approvals in your process as they may suggest a lack of confidence in the process. Eliminate control steps that are not critical for quality outcomes.

- Identify time-lags or delays in the process. Look for ways to eliminate those delays.
- Watch for multiple handoffs and specialized work areas. Who is involved? What could go wrong? Is the output of one area meeting the input needs of the next? Could 30 seconds of effort at point A save 3 minutes of effort at point B or service meeting the needs of the next person in the process? Each time a process crosses organizational boundaries, there is increased potential for delay or miscommunication. Consider opportunities to increase the scope of functional areas to allow for more work to be done in a specific area. Some efficiency proponents argue that reducing specialization of tasks can lead to decreased turnaround times, fewer errors and more efficient processes of work tasks. Cellular work areas are taking the place of assembly line processes, both in operational and administrative work environments. Communication is improved, silos are taken down and the workforce is better trained and more flexible to upcoming changes.
- Examine decision points. Does it evaluate an activity to see if everything is going well? Is it effective? Is it redundant? Is it designed to catch an error that could be prevented (or caught) earlier in the process?

- Look carefully at rework loops and quality control points. Does this rework loop prevent the problem from recurring? How is feedback from this loop returned to the area of origin? Could the problem be prevented or caught earlier in the process? Are repairs being made long after the step where the errors originally occurred? Are their methods for preventing the problem that could be employed?
- Look hard at each document symbol and ask if this document or data entry is necessary? Where does the form or data go afterward? Is it up to date? Is it redundant? Is there another way of capturing this data? Is there a single source for the information? Could this information be used for monitoring and improving the process?
- Evaluate each Delay symbol. Is the delay necessary? For what? Some delays are valid, i.e. “delay while resin cures,” or “wait for Lab results” but many are not. Ask, “How long is the wait”? Can it be eliminated or reduced?
- Examine the overall process: Is the flow logical? Are the steps in the right order? Could some work be done in parallel to reduce overall processing time? Are there places where the process leads off to nowhere? Is there repetition?

If everyone is thinking alike, then somebody isn't thinking. -George S. Patton

Other Questions for Analyzing Process Maps

Challenge your map and process by asking the following questions:ⁱⁱ

- Is this map comprehensive?
- Are there other key outputs? What activities lead to this output?
- What are the major inputs into these activities? (Think of inputs as both physical entities and information.)
- How is information tracked? Written specs or paper invoices? What percentage of this information is automated?
- What technology or application is used to convert a particular input into an output? What equipment or job aids are used?
- What are the major decisions made with the process? Where and when are these decisions made? By whom? Are approval signatures required? When?
- How long does this step take? Why does it take this long? Is there a range? Why is there a range?
- What is the cost of performing these activities? Can you give me an estimate?
- What are the problems you encounter in performing this step? What causes

these problems?

- What are the roadblocks in this process?
- What are the strengths of this process?
- How do we know when this process is successful?
- Is this process successful as it currently exists? How do we know?

Conclusion

There are many benefits of using process maps, and many different ways to draw them. Because people have limited understanding of an organizations processes and usually visualize them differently, a process map can build understanding and often create the 'aha' moment necessary to drive action, improvement or change. From a hastily sketched top-down diagram on a flipchart to a complex detailed computer drawn deployment chart, visual representations of "how" we do things helps to crate understanding of "where we are" and sometimes "how we got here". But you can't set a new course or plan a new route if you don't know where you are to begin with.

Endnotes

ⁱ BABOK® (*The Guide to the Business Analysis Body of Knowledge*), International Institute of Business Analysis, Version 2.0, 2008.

ⁱⁱ Adapted from *Designing Cross-Functional Business Processes* by Bernard Johann