Process Mapping and Redesign

'A picture is worth a thousand words'. Thus, when one needs to understanding a process and all its intricacies clearly, e.g. in order to improve or redesign it, drawing a diagram or map of it is very powerful.

Typically, two versions are drawn: the current state of the process or 'as is' version; the required state or 'to be' version. If the current process is performing reasonably well, then it is appropriate to document it in sufficient detail that the documentation can be used to train new staff and inform continuous improvement activities. If the process is in need of radical overhaul ('re-engineering') then it is normally only useful to document it to a sufficient level of detail to identify the trouble spots and opportunities for improvement.

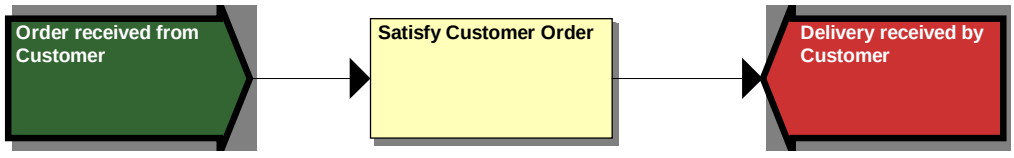
Initially, a high level picture of the current process can help identify areas for improvement. This need not conform to any specific rules – it just needs to make the point.

Formal process mapping

Formal process maps should be able to show:

- The internal or external trigger(s) that start the process or restart it after a break.
- Breaks or wait states in the process
- The final or intermediate results of the process, both internal and external.
- The steps within a process
- The sequence of the steps, including any parallel processing
- Iterations of one or more steps
- Alternative paths between steps, including mutually exclusive and non-exclusive alternatives
- The role performing each step

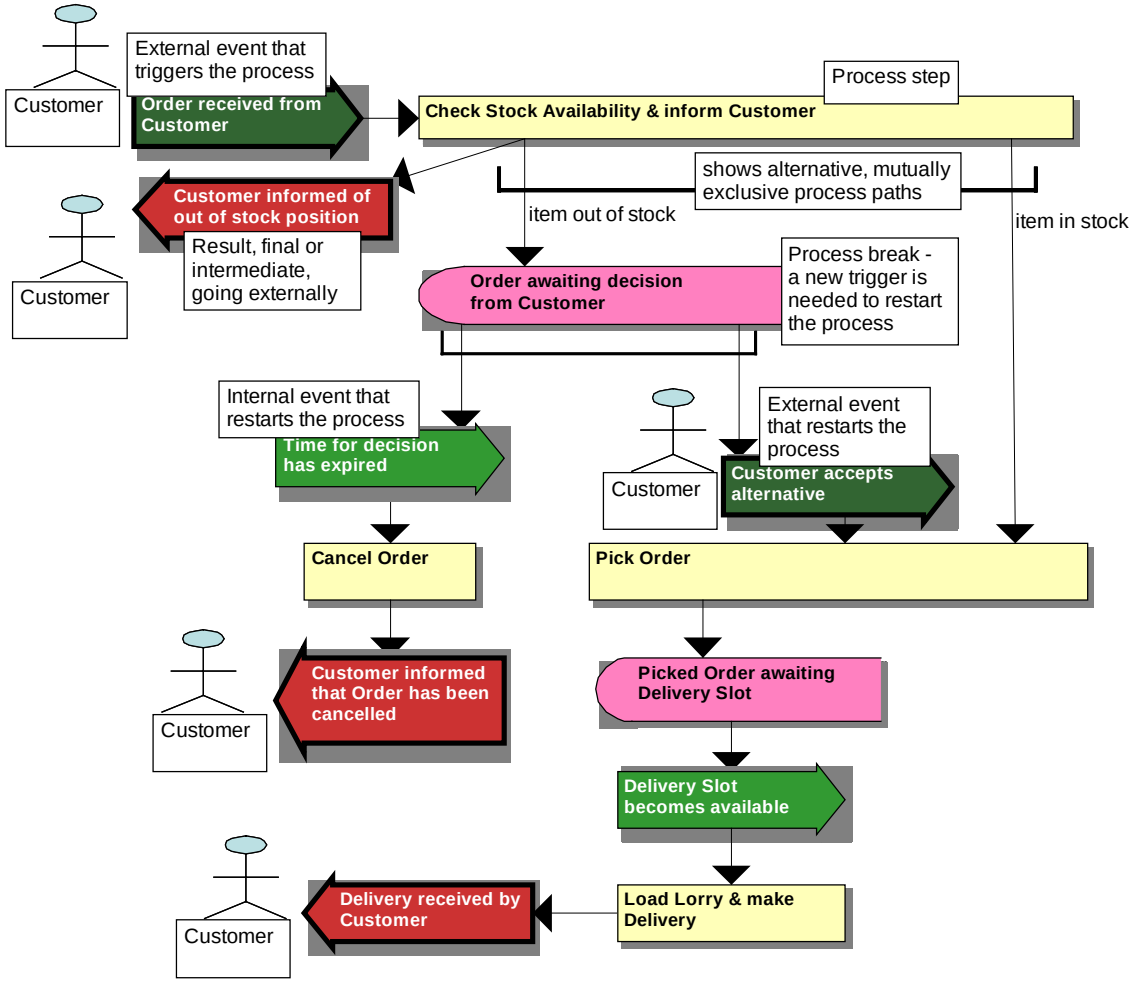
Each end-to-end process must have at least one event that triggers it (e.g. 'Order received from Customer' triggers the 'Satisfy Customer Order' process) and must produce at least one result in response to that trigger (e.g. 'Delivery received by Customer').



An end-to-end process may also include one or more breaks in the process, where the process has to wait for new input, such as a decision (e.g. maybe the original item the customer ordered is out of stock and the process is waiting for the customer to select an alternative or to cancel). These 'process breaks' should be scrutinised closely, as they are often prime causes of delay and, in many cases, can be removed by appropriate redesign. If they do stay, then it is imperative that there are one or more triggers to restart the process from the break – or the process stays incomplete for ever. (E.g. one trigger might be 'Decision received from Customer'. Another might be 'Time for Customer decision has expired' – now we need to decide whether to chase the customer or cancel the order ourselves. We may have a policy that all orders are cancelled on expiry or a policy that customers meeting criterion for 'good' are always chased up and only orders for the rest are cancelled.)

It is very common for there to be parallel paths through a process and for alternative paths through a process, where the selection of a path is dependent on the outcome of the process step just completed. These paths should be labelled clearly. There may be more than one route 'out' of a process step. If any of these are mutually exclusive, this must be shown clearly.

The following diagram shows an example of one commonly used diagramming style, with the various different types of object labelled accordingly. (N.B. Various styles exist, each with its own strengths and weaknesses.)



The process is triggered off by the receipt of an Order from a Customer. The first step is to check whether or not there is sufficient stock to satisfy the order. There are two, mutually exclusive possibilities – there is enough stock or there isn't. If there isn't enough stock, the customer is informed and the process stops until either the Customer accepts an alternative or doesn't respond at all within the pre-set time limit. In the latter case, the Order is cancelled (in line with Company policy, one presumes!) If the Customer accepts the alternative or the item as in stock on the first place, the Order is picked ready for delivery. The process stops again here, awaiting a suitable Delivery Slot. When the latter becomes available, the Lorry is loaded, the delivery is made and the process ends with the result that the Delivery is received by the Customer. A number of business questions are prompted by this diagram:

- What if the Customer has obviously made a mistake, and ordered an item that does not exist (either at all or just in our organisation)?

- What if the Customer refuses the alternative and cancels the Order?
- Is it clear that informing the Customer that there is no stock also includes suggesting an alternative that is in stock?
- Are we recording Orders and Order statuses and, if so, at what step or steps in the process?
- There is a time delay while waiting for the Customer's reply. In that time, the alternative could go out of stock and/or the originally ordered item could be back in stock. What do we do in these cases?
- 'Load Lorry & make Delivery' cannot all be done at the same place and time, so should it be split down further? (See the later definition of an Elementary Business Process or EBP.)
- Could we eliminate one or both of the breaks in the process? For example, for regular Customers, we might have a record of their preferred alternatives, if any. Then, we would know immediately, without asking the Customer, what to do if an item is out of stock.

Process performance criteria

The 'to be' version should be drafted to meet pre-determined performance criteria, comprising one or more of: time; cost; quality; risk / safety; customer experience. For the current example, the current and required performance figures might be:

	Time	Cost	Quality	Customer experience / touch points[1]
Current performance	At least 5 days	£5	10% error rate	Customer hates finding out bad news re out of stock situation well after placing the Order
Required performance	Max. 1 day	£1	0% error rate	Customer knows stock situation and alternatives immediately

Risk and Safety are sometimes additional performance criteria.

Process improvement v process-re-engineering

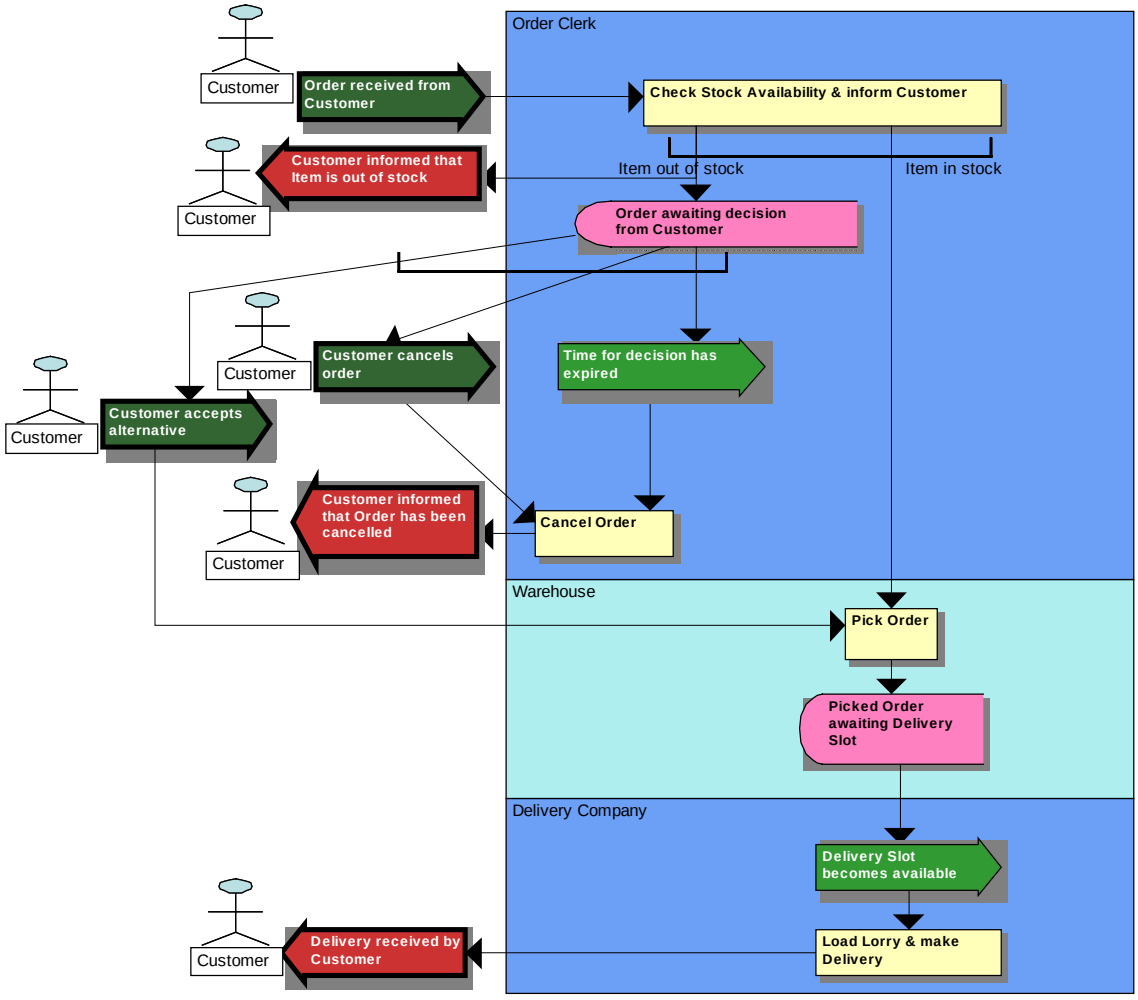
Are we just improving performance or re-engineering the process? The bigger the gap in performance between the current and required state, the bigger the changes needed to effect this. Usually, improvements of less than 30% can be met by improving the current process. Improvements greater than 30% usually require radical change - 're-engineering'. Arguably, it is better to aim high, say, for a 95% improvement and get an 80% one than to aim for a 30% one and get 25%.

Ideally, a process owner, accountable for the performance of the process (the 'A' in 'RACI'), is continually monitoring and seeking to improve its performance. Typically, process re-engineering is a much rarer initiative, as it involves big change and big change is, by its nature, disruptive and is not easy to effect successfully.

[1] See *Want to Perfect Your Company's Service? Use Behavioural Science,* Richard B. Cox and Sriram Dasu, Harvard Business Review OnPoint, June 2001

Clear responsibilities

It is often useful to show on the diagram what role or organisation unit is responsible for performing each step. (This is the 'R' of RACI - see the section on RACI.) For example, each role or organisational unit can be shown as a horizontal (or vertical) 'swim lane', with the process step(s) it is responsible for placed within the swim lane. This informs discussions about whether the assignment of responsibilities is appropriate, including whether it involves too many hand-offs from one role or organisational unit to another.



Here, three organisational roles are shown – Order Clerk, Warehouse and Delivery Company. Note that we have added the trigger that a Customer might cancel the Order.

A good question prompted by this diagram concerns the role of the Customer and the boundary of the 'system'. The diagram does not have a 'swimlane' for the Customer. In fact, it depicts the Customer as an external actor in the process. The first role to be

involved in the process is the Order Clerk, who takes the trigger and performs the first step. However, in today's, increasingly on-line world, the Customer could be part of the solution and enter its own Order and record acceptance of the Delivery. The advantages would include:

- No need to validate the order for wrong items, as we would only offer up items we stock.
- We could show the in/out of stock position and offer alternatives on-line.
- The first process break would either disappear completely ('instant' Customer decision) or be reduced, as the Customer has the information to make a decision in front of him/her.
- Elimination (or, at least, drastic reduction) in any arguments with Customers over the timing and state of deliveries.

We could go even further. Instead of the Customer entering an Order, an Order could be raised automatically when a pre-set (by the Customer) stock level trigger point is reached.

Level of detail - the Elementary Business Process

A particularly important topic when drafting the maps is what level of detail to show. Show too little and opportunities for improvement may be missed. Show too much and no-one will understand the diagram. For example, a diagram may contain a process step 'Package an Order for Despatch to the Customer'. Should this be broken down to show all of the constituent steps; 'Take a sheet of paper big enough to wrap the order'; 'Put ordered items on the paper' …. etc., etc.?

There is one level of process step that is particularly powerful – an 'elementary business process' or EBP. This is where the process step is done by one role, at one place, at one time. Therefore, by definition, it cannot contain any process breaks. When finished, an EBP leaves the process and the data it has used in a state that can be picked up later and/or by a different role. Conversely, if an EBP is incomplete, it must be restarted from the beginning. Thus, seeking appropriate EBPs provokes discussions about what roles should perform what steps, whether steps should be combined or split or even repeated, and where the steps should be performed. It also aids discussions of what computer applications may be appropriate to support what steps. Thus, an EBP has significance for the design ('architecture') of processes, organisations, locations, data, applications and technology.

In the above example, 'Load Lorry & make Delivery', as stated earlier, cannot all be performed at the same place and time. Therefore, it cannot be a single EBP. At least, it breaks down into

'Load Lorry' and 'Make Delivery'. Arguably, the latter breaks down into 'Transport delivery to Customer' and 'Handover Delivery to Customer'. This provokes discussion of further opportunities – to track the movement of the Delivery from warehouse to Customer, and allow the Customer to see this directly on-line.

Cross-functional working, the elimination of functional silos and process naming standards

Two common causes of problems, in process redesign and in building systems to support processes, are functional (or 'silo') thinking and ambiguity in the language used to name and describe things. To help eliminate these, processes and process steps must be named clearly and unambiguously and avoid functional connotations. A particularly helpful convention is the 'verb-noun' style. The verb used should describe the process (step) as clearly as possible and each noun should have a clear, unambiguous definition. Thus, above, the process was called 'Satisfy Customer Order' and not 'Order Processing'. For even greater precision, we could have used 'Pick, pack & deliver to the Customer all of the Items on the Customer's Order, and obtain a Receipt from the Customer for the Delivery'. If this is too long to be used on the diagram, it certainly should form part of the accompanying full description of the process!

Process Re-engineering

Process re-engineering might involve:

- New or changed roles or assignments of roles to process steps. Role assignments might involve roles outside the organisation, i.e. customers and suppliers and, these days, regulators.
- Splitting or combining process steps (see Elementary Business Processes.)
- Elimination of some alternative pathways (ask whether they are cost effective and really add vale that the Customer appreciates (a related Six Sigma concept is 'Critical to Quality' or CTQ).
- Addition of some alternative pathways.
- Parallel processing.
- Elimination of process breaks.
- Ensuring any process breaks that do remain are minimised in duration, handled effectively and efficiently, and always have at least a 'time up' trigger to 'empty' them.
- Radical changes to the Customer experience / touch points
- New/revised applications and / or technology.

- New / changed locations for process steps (e.g. performing some on the Customer's own premises).
- Better data for manual or automatic decision making.

Uses For Process Maps

Process maps (and the associated detailed descriptions, metrics etc.) have a number of uses:

- To gain consensus across an organisation for a cross functional process design
- To simulate the process (either manually and/or by using specialised software) – for this, appropriate metrics must be collected
- For training new staff
- For satisfying the needs of ISO 9000
- To identify opportunities for improvement and inform ongoing continuous improvement activities
- As input to system design and application development or selection
- To generate scripts for users to test systems (after all, the systems are meant to support the organisation's processes ... aren't they?)
- For generating on line help text for the systems that support the process

Because of the importance of properly documented processes, it is vital that an organisation records them, maintains them and communicates them. Typically, this requires the support of a computer system. Various commercial computer packages are available for this.