

# Lean Poster Series #10

## Spaghetti Diagram

by Jonas Hulstaert

### What is a Spaghetti Diagram?

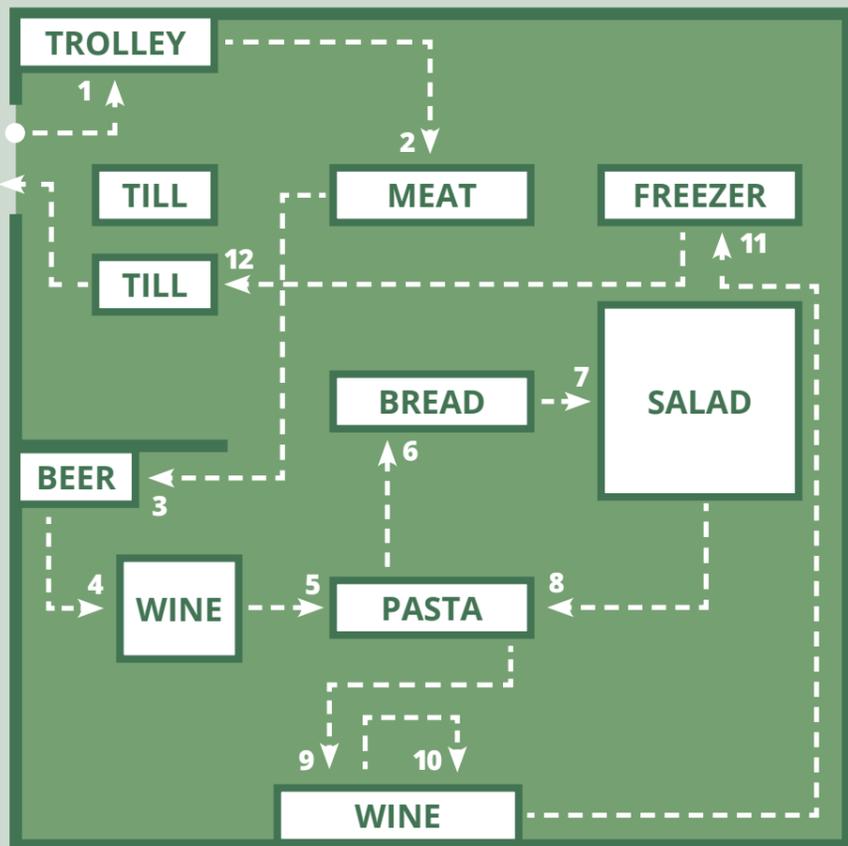
The Spaghetti Diagram, or String Diagram, is a very visual way to depict the flow of material, people and information through a process in a diagrammatic form. It is called a Spaghetti Diagram because that is what it often looks like in its current or as-is form.

### Why Create a Spaghetti Diagram?

- It can be used to identify waste that is often not even recognized as such, e.g. walking to and from a printer that is located too far from the people using it.
- It helps us to see processes and procedures in a different and very visual way.
- It helps us determine the physical flow and distance that information and people travel to process work.

### Analyzing the Current Layout and Flow

The physical layout of the process is a major issue in relation to continuous flow, and many are not designed adequately. In relation to manufacturing processes, layout may be an issue, but it's even more true in transactional processes. And in these, location based on keeping functional specialisms, such as Finance, together may mean that people working consecutively in a process may be geographically separated, so that physical documents need to be moved a long way between them. Spaghetti Diagrams can be used here to optimize the flow and layout



In the example above a man goes to the supermarket. He goes straight to the meat counter and then onto the beer counter, then wine counter, before going for anything else. What's important in looking at this Spaghetti Diagram is that every time he crosses his route, he is in some sense being inefficient.

### When is a Spaghetti Diagram Used?

The Spaghetti diagram can be used in the Measure and Analyze Phases to design the as-is flow and in the Improve and Control Phases to design and control the to-be flow.



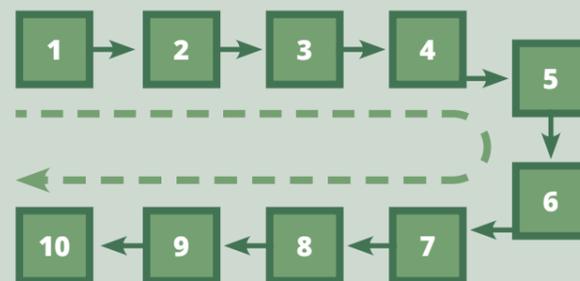
### How to Create a Spaghetti Diagram?

1. Draw an outline of the area you are focusing on
2. Walk the process to understand the current lay-out of the process
3. Start at the beginning of the process. Use directional arrows to show the routes that are traced on the paper. Record the amount of time at each activity.
4. Show the areas where the flow of materials stops
5. Calculate the distances and times to provide baseline performance information
6. Create a separate diagram showing the ideal flow by eliminating as much non-value added tasks as possible

### Improving the Flow Using Cells

Very common in Lean manufacturing is the creation of cells. Equipment and workstations are dedicated to a cell and arranged in a sequence that supports a smooth flow of jobs and materials through the process with minimum transport and delay. The focus is on keeping jobs and material flowing rather than localized workstation and machine efficiencies. Be aware that cells can become insular and that multi-skilling is required to achieve maximum efficiency, so that members of the cell team can assist and compensate for each other, depending on the particular areas where support is most needed in the process.

The most common cellular layout is probably the u-shaped flow, whereby what could be a linear process is bent round so that the process operators have contact with each other in the sense of ownership, and communication across the whole of the process is relatively easy to do.



There are various versions of u-shaped layouts. In a manufacturing environment, the diagram labelled multi-manned where the workforce have their back to each other, working on benches may be used. Similarly, in an office environment, the staff facing version may be used, and the multi-process is where an operator rotates between workstations within the u-shape.

