What is Lean?

Lean as a philosophy *(lean thinking)*

Lean is a management philosophy derived mostly from the Toyota Production System (TPS). TPS is renowned for its focus on reduction of the original Toyota 7 wastes to improve overall customer value.

Lean as a continuous change process *(becoming lean)*

Lean is a sustainable way of working. It is a culture of teamwork and continuous improvement, teaching people to think and see waste.

Lean as a set of tools or methods *(doing lean/toolbox lean)*

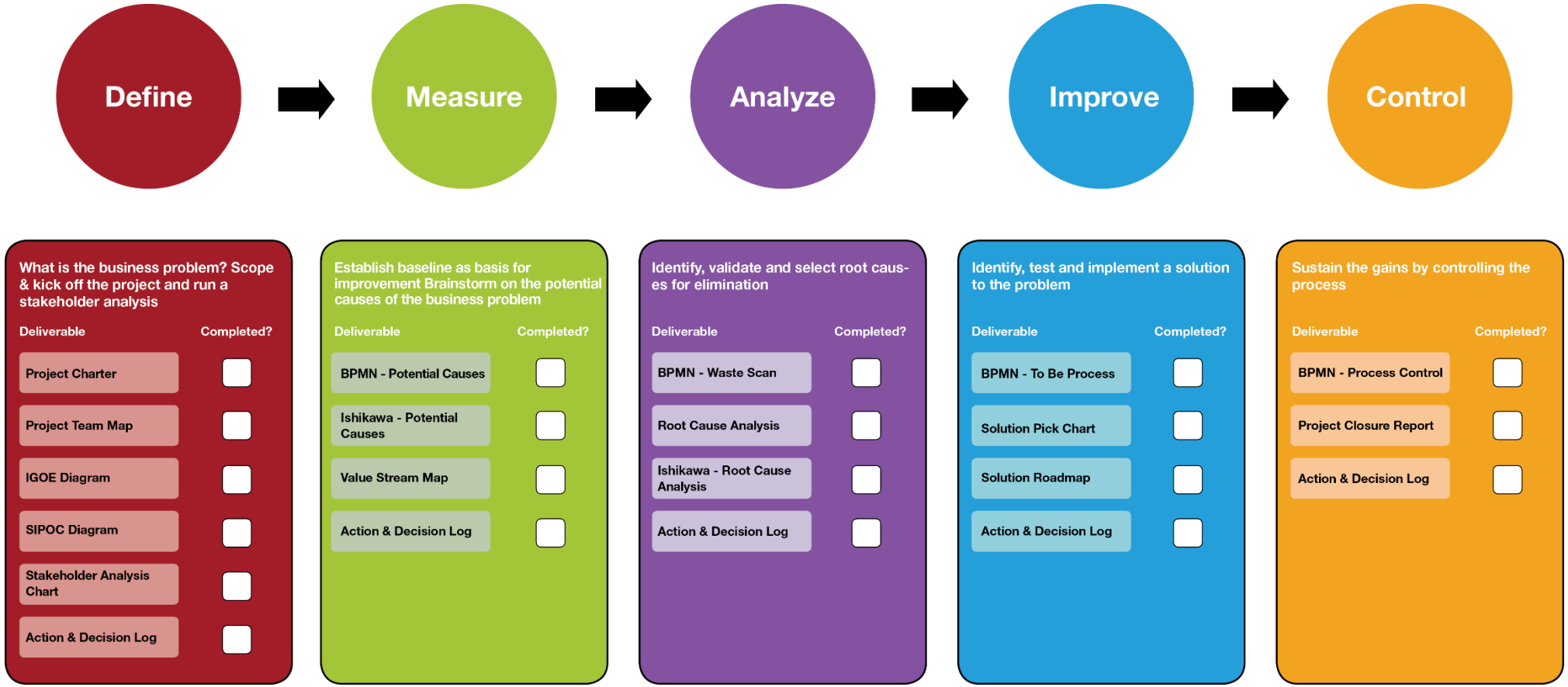
Lean is a set of tools and methods such as Value Stream Map, SIPOC or Ishikawa.

Lean as a fixed state or goal *(being lean)*

Lean can also be regarded as fixed state or goal. The main goals in Lean are: eliminating waste, improving quality, reducing time and reducing Cost

DMAIC Methodology

DMAIC is an improvement methodology used for improving and controlling business processes. The DMAIC improvement cycle is the core tool used to drive Lean and other Business Process Improvement projects. At each phase of the DMAIC a number of deliverables can be created.



8 Types of Waste

A key concept in Lean is waste, which can be defined as anything that doesn't add value to the customer. There are 8 types of Waste:

Transport

Inventory

Motion

Waiting

Overproduction

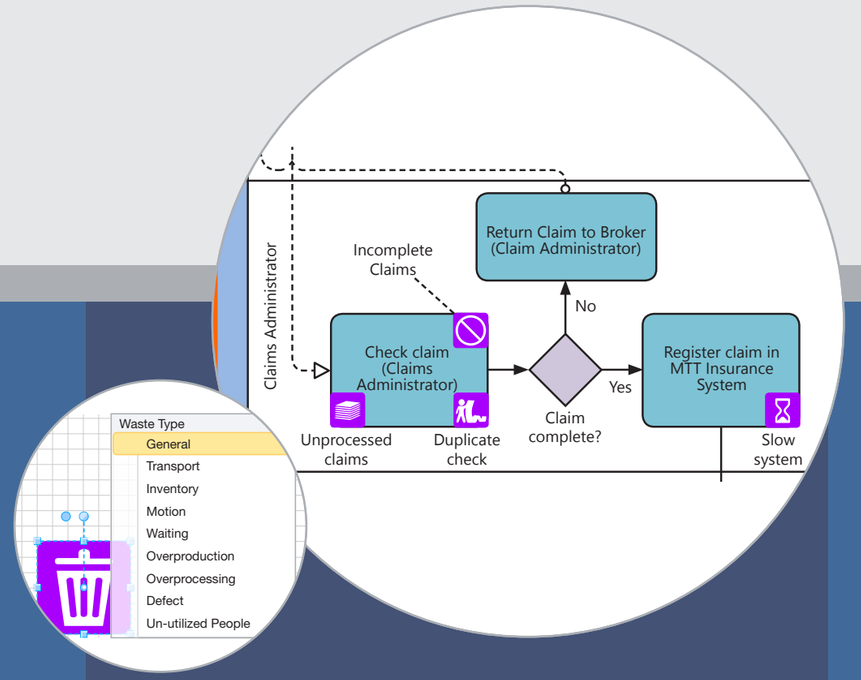
Over-processing

Defect

Un-utilized People

Lean Extensions

A quick reference for the meaning and use of these Lean extensions, including the 8 types of waste, a key concept within the principles of Lean.



#1 Transport
Unnecessary movement of work, for example sequential process steps are not co-located

#2 Inventory
Holding information and material longer than piles of unprocessed work

#3 Motion
Non-value-added movement of people such as unnecessary meetings

#4 Waiting
Waiting causes delays or stoppages such as waiting for instructions

#5 Overproduction
Unneccessary effort producing work in excess or ahead of customer requirements

#6 Over-processing
Unnecessary activity due to complex processes and systems, such as too many approvals required

#7 Defect
The effect involved in inspecting for the fixing defects, such as data entry

#8 Un-utilized People
Un-utilized people covers aspects such as restricting employee's ability to input improvement ideas

General
Anything that doesn't add value to the customer

Cause
Cause or potential cause of a problem in a process

Customer Touchpoint
Physical interaction between customer and organization

BPMN 2.0 Business Process Model And Notation - Complete Element Set

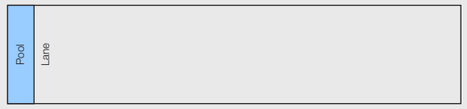
Pools and Lanes

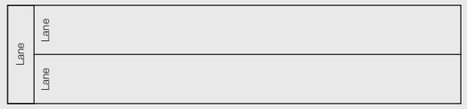
A **Pool** is used to define either a group of *Participants* such as an area within an organization or an external entity that collaborates within a process.

A process model is normally created from the perspective of a single participant – the **White Box Pool**, and contains the detail of that process. **Black Box Pools** are considered external to the scope of the process (although not necessarily outside of the organization), and do not show flow and activities. Black box pools may be collapsed and rotated, but do not have to be.

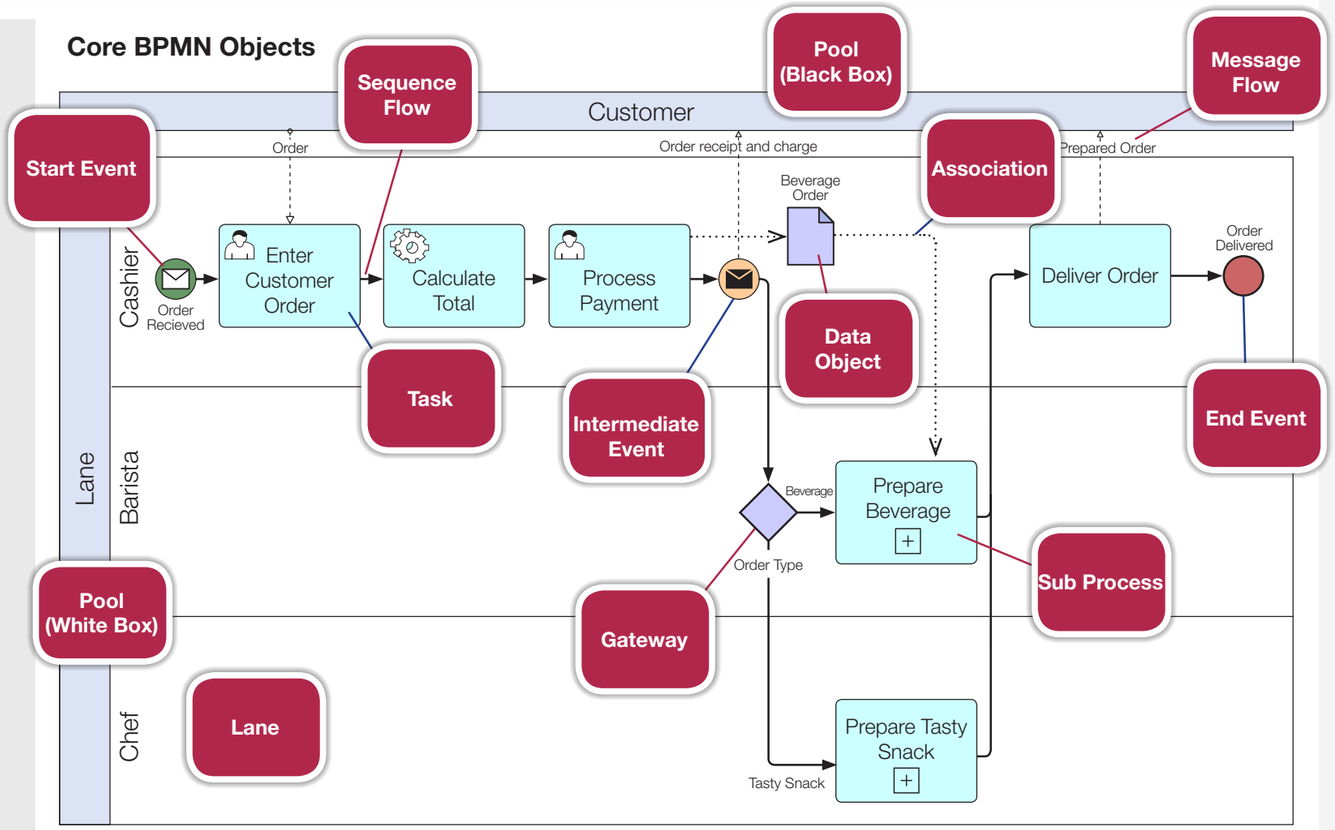
A **Lane** is used to define a specific participant or role within a process.

A lane may be contained within a pool or may itself be broken down into other lanes:





Core BPMN Objects

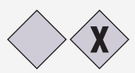


Events

An Event is an indicator that something has happened within a process.

	Top Level	Event Sub Process Interupting	Event Sub Process Non Interupting	Catching	Boundary Interrupting	Boundary Non Interrupting	Throwing	**End Event**
None	●						●	●
Message	✉	✉	✉	✉	✉	✉	✉	✉
Timer	◷	◷	◷	◷	◷	◷		
Escalation		▲	▲		▲	▲	▲	▲
Conditional		≡	≡	≡	≡	≡		
Link				⇨			⇨	
Error		⚡			⚡			⚡
Cancel					✕			✕
Compensation		◀◀			◀◀		◀◀	◀◀
Signal	△	△	△	△	△	△	△	△
Multiple	⬠	⬠	⬠	⬠	⬠	⬠	⬠	⬠
Parallel Multiple	+	+	+	+	+	+		
Terminate								◉

Gateways



A diverging **Exclusive Gateway** is used to create alternative paths within a Process flow. A converging Exclusive Gateway is used to merge alternative paths.

A diverging **Inclusive Gateway** can be used to create alternative but also parallel paths within a Process flow. A converging Inclusive Gateway is used to merge a combination of alternative and parallel paths.

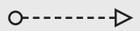
A **Parallel Gateway** is used to synchronize parallel flows and to create parallel flows.

The **Complex Gateway** can be used to model complex synchronization behavior, not captured by other gateways

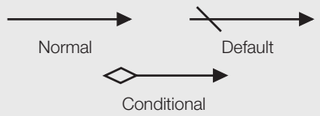
The **Event-Based Gateway** represents a branching point in the Process where the alternative paths that follow the Gateway are based on Events that occur, rather than the evaluation of Expressions using Process data (as with an Exclusive or Inclusive Gateway).

Flows

Message Flow is the flow of information as *Messages* between *Participants*.



Sequence Flow is the flow of the process between events that occur, activities performed by the lanes and decisions that are made (gateways).



Associations are used to attach artifacts (such as data objects) to activities.

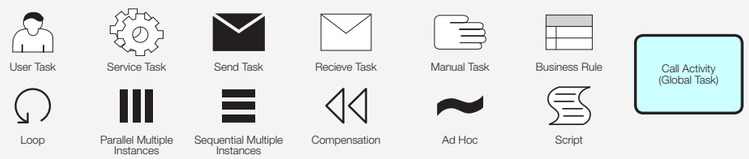
Activities

Within the flow of a process, one or more lanes will perform a number of activities.

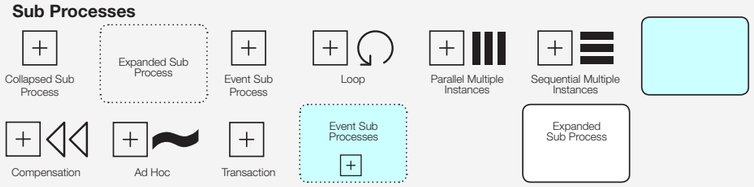
A **Task** is something that a lane (role) does during the process. A task is a granular (atomic) activity that cannot or does not need to be broken down any further.

A **Sub Process** summarizes a group of activities, and can be expanded out into further detail. Sub processes can be shown as collapsed (with the [+] symbol), or expanded.

Tasks



Sub Processes



A process begins with a **Start Event** indicating something has happened, such as a message received or a date that has been reached.

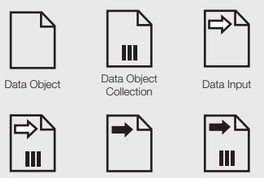
Intermediate Events happen within the flow of the process (between the start and end events).

A process finishes with an **End Event**. Because a process may have several outcomes, there may be multiple end events.

Artifacts

Artifacts allow additional information to be provided on a process model

Data Objects are inputs to and outputs from activities. Data objects could be used to represent documents, data or other objects that are passed between the activities in a process.



A **Data Store** is somewhere that the process can read or write data, that persists beyond the scope of the process.

A **Message** is used to depict the contents of a communication between 2 participants.

A **Group** is a visual way of informally grouping items on a diagram, for example to highlight an area that requires further analysis.

Annotations allow additional information relevant in documenting the process to be shown on the diagram.