Value Stream Mapping

Value Stream Mapping Symbols

Value stream mapping uses a set of symbols to denote the various details.

The type of symbols that are used usually depends on the industry and the type of work.
Value Stream Mapping

The list is by no means complete!

You may design your own symbols to express your details

New symbols should be easy to design

They should be understandable by everyone working or visiting the area
Value Stream Mapping

Process box

Data box

C/T =
C/O =
Uptime =
NAT =

Information flow

Material flow

Push

Withdrawal

COATING

Process or operation box

Covers one area of continuous flow, where materials flow without being stored, queued or delayed.

Used when a part is intentionally changed in any of its characteristics, assembled or disassembled, or arranged for another operation, transportation, inspection, or storage.

Also used to represent a person (or department) doing work, or when information is given or received.
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C/T = 2.3 seconds
C/O = 52 minutes
Uptime = 85%
NAT = 25,200 seconds
Scrap rate = 3.1%

Optionally used to list key information related to processes.

Can be placed under other symbols (e.g. transportation, inventory or key customers or suppliers) to list key information.
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**Drawing**
- Prod. Rate = 2450
- C/T = 30 sec
- C/O = N/A
- Uptime = 98%

**Rinsing**
- Prod. Rate = 2400
- C/T = 376 sec
- C/O = 60 min
- Uptime = 94%

Helps later when creating the timeline and the summary box, and when comparing between the different workstations or processes.

For example, analyzing which workstation has the maximum number of operators or has the maximum change-over time.
Information related to processes depend on the needs and may include:

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
<th>Production rates or EPE</th>
<th>Number of workers per machine</th>
<th>Number of product variations</th>
<th>Overall equipment effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle times (C/T)</td>
<td>Changeover times (C/O)</td>
<td>Net available working times (NAT)</td>
<td>Machine uptime rates</td>
<td>Setup times</td>
<td>Maximum capacities</td>
</tr>
</tbody>
</table>
Value Stream Mapping

- **C/T**
- **C/O**
- **Uptime**
- **NAT**

**Process box**

**Data box**

**Information flow**

**Material flow**

**Push**

**Withdrawal**

**Manual information flow**: Generally used to represent flow of information. Can be accompanied with text or other icons to indicate the type of information, the frequency of information interchange, and the type of media used (telephones, emails, Intranets, LANs, etc.).

**Electronic information flow**: Some lean practitioners simply use the straight arrow for all types of information flow.

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Material flow

C/T =
C/O =
Uptime =
NAT =

Data box

Process box

Information flow

Material flow

Push

Withdrawal

Material flow or shipping

Represents the transfer or movement of materials from one process to the next.

Also represents the movement of raw materials from suppliers to the receiving areas (accompanied with the shipping frequency).

Also represents the movement of finished goods from the shipping areas to the customers (accompanied with the shipping frequency).
Value Stream Mapping

Process box

Data box

Information flow

Material flow

Push

Withdrawal

A push arrow

Pushing the materials from one process to the next.

Represents a material flow that is not controlled by a pull system.
Value Stream Mapping

- **Process box**
- **Data box**

**Information flow**

**Material flow**

**Push**

**Withdrawal**

**Material withdrawal** or physical pull

Used when the material is pulled from the supplying process to the supplied process.
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- **External body**: Represents an external body to the organization, and mainly indicates the key suppliers and customers along the value chain.
- **Transport**: Often accompanied with a data box underneath which covers the characteristics of that supplier or customer.
- **Worker**: Firm name (supplier or customer)
- **Inventory**
- **Safety stock**
- **FIFO sequence**
**Value Stream Mapping**

**External body**

**Transport**

**Worker**

**Inventory**

**Safety stock**

**FIFO sequence**

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**Information related to customers may include:***
- number of customers,
- demand rate (items/day),
- packaging size requirement,
- actual and required lead times,
- error rates,
- customer shift pattern,
- product mix, etc.

Usually there is only one customer shown, but you may have more than one.
Information related to suppliers may include; number of suppliers, demand rate (items/day), packaging size requirement, actual and required lead times, error rates, supplier shift pattern, the different types of materials, etc.

Usually there is only one supplier shown, but you may have more than one.
Value Stream Mapping

External body
Transport
Worker
Inventory
Safety stock
FIFO sequence

Transport or Shipment

Represents how raw materials are brought in and how finished goods are sent out.

Also represents the transport of raw materials, WIP, or products within the facility by an operator.

Date related to transportation may include; distance traveled, transportation time, transportation frequency, number of product types, etc.
Transportation can be of three types:
1- External (e.g. trucking).
2- Internal (e.g. forklifts).
3- Conveying between processes.
Value Stream Mapping

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Usually placed in a process box to represent the number of workers deployed at a particular workstation.
Value Stream Mapping

External body
Transport
Worker
Inventory
Safety stock
FIFO sequence

Inventory

Represents the storage locations for raw materials, work-in-process (WIP), and finished products throughout the value stream.

Date related to inventory may include: inventory type, amount of inventory, queue or delay time, number of product types in the inventory, etc.
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You can write a number below the triangle to indicate the approximate amount of inventory observed, or the maximum capacity.

You may indicate that the inventory is uncontrolled or has no fixed upper limit by leaving the triangle without a number.
Quality inspection

Occurs when a product is examined against pre-defined quality standards to determine whether defective products are being produced.

Delay

Represents unplanned accumulation of materials or products without a prior plan. Also represents a delay in the process, such as waiting for approval.
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Pieces

Represents a safety stock against problems such as unplanned breakdowns, to protect the production system against failure or sudden fluctuations in customer demands.
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First In First Out lane is used to show where parts are stored or transferred to the next process in a FIFO sequence (queue).

You may write either the maximum capacity or the current capacity above or below the FIFO lane.
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Represents a document, form or report that is generated throughout the value stream. More than one report can be represented through the use of multiple symbols behind each other.
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Business System

Represents a centralized system (ERP or MRP).

Note that value stream mapping considers not only the process, but also the management systems and information systems that support the process.

Note that a production control or scheduling system can also be represented using a plain box.
Value Stream Mapping

Visually checking material and information flows to ensure they meet quality standards and quantity requirements.

For example, a supervisor may visually check the material flow to seek for discrepancies, visually inspect a sample product as part of his routine job, or visually check the amount of inventory to decide what to produce next.
Value Stream Mapping

- Work cell
- Document / report
- Business system
- Go see
- Kaizen burst
- Improvement idea

Kaizen or lightening Burst

Used to indicate issues and problems throughout the value stream.

Kaizen bursts help launch appropriate kaizen events for continuous improvement.
Value Stream Mapping

- Work cell
- Document / report
- Business system
- Go see
- Kaizen burst
- Improvement idea

**Improvement idea**

Used to indicate a solution, suggestion, or improvement idea.

The team can highlight improvement opportunities that are critical to achieve the future state of the value stream.
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Signal Kanban
Supermarket
Kanban post
Production Kanban
Withdrawal Kanban
Load leveling

Improvement idea

Used when the on-hand inventory levels in the supermarket between two processes drops to a minimum or the trigger point.
Value Stream Mapping

Supermarket

Represents an inventory supermarket or the end point of a Kanban loop.

For a supermarket to be complete, an information flow should come out of it and bring a Kanban back to one of the preceding processes or transports.
Value Stream Mapping

A location where Kanban signals reside for pickup.

Often used with two-card systems to exchange withdrawal and production Kanban.
Value Stream Mapping

Signal Kanban
Supermarket
Kanban post
Production Kanban
Withdrawal Kanban
Load leveling

Production Kanban

Used to signal the supplying process to trigger production and provide a pre-defined number of parts to the next process.

Usually drawn on top of the information flow going back from a supermarket to a preceding process or transport.
Value Stream Mapping

Signal Kanban  | Supermarket  | Kanban post  | Production Kanban  | Withdrawal Kanban  | Load leveling

A note card or device that instructs the material handler or operator to go to the supermarket and withdraw parts needed at the receiving process.
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Part of the information flow in a Kanban loop. It is a tool to batch Kanbans in order to level the production volume and production mix over a period.