

Training Course on Lean Management & Process Streamlining



Introduction to Lean

Going Lean

- *What* is Lean?
- *Why* go Lean?
- *Who* do it?
- *Where* you want to be?

Going Lean

- What is Lean?
- Why go Lean?
- Who do it?
- Where you want to be?

What is Lean?

Narrow Definition

- Tools
- Cost cutting

Broad Definition

- System thinking
- Entire enterprise, business system

What is Lean?

- Is about waste elimination in the processes (i.e. work-in-process and finished good inventories).
- Is about expanding capacity by reducing costs and shortening cycle times between order and ship date.
- Is about understanding what is important to the customers.
- Is **NOT** about eliminating people.

What is Lean?

Five Lean Principles

- ❖ **Specify** what does and does not create **value** from the **customer perspective**.
- ❖ **Identify** all steps necessary to design, order and produce the product across the whole **value stream** to highlight non value adding waste.
- ❖ **Make** those actions that create **value flow** without interruption, detours, backflows, waiting or scrap.
- ❖ **Only** make what is **pulled** by the customer.
- ❖ **Strive** for **perfection** by continually remove waste.


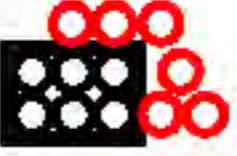






What is Lean?

“A systematic approach to identifying and eliminating non value-added activities through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection.”

What is Lean or Streamlined ?

- The science of responsiveness to the customer
 - How responsive are you to the customer?
 - Eliminate all the barriers to the responsiveness (the 8 wastes)

What is Lean?

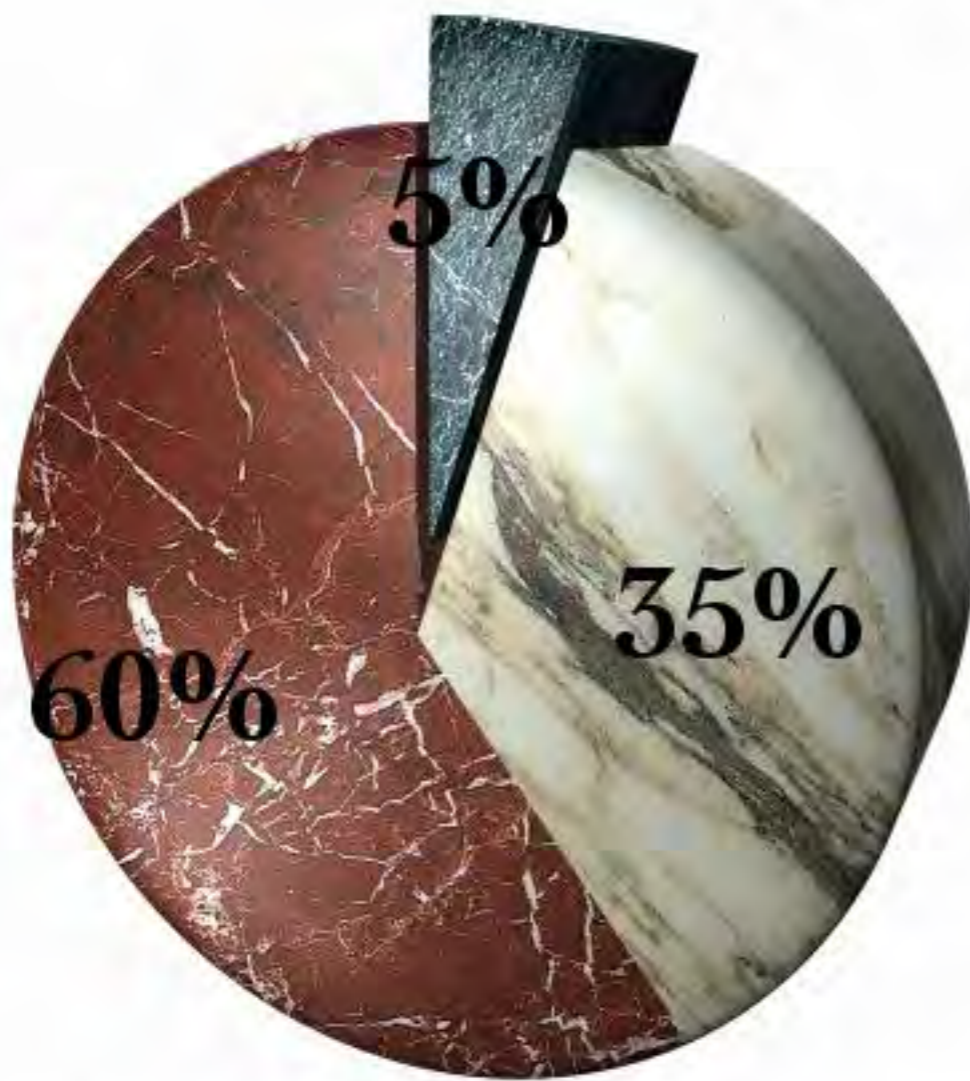
- ☛ Defect 
- ☛ Overproduction 
- ☛ Waiting 
- ☛ Non-utilized people 
- ☛ Transportation 
- ☛ Inventory 
- ☛ Motion 
- ☛ Extra processing 

7+1 Types of Waste (Muda)

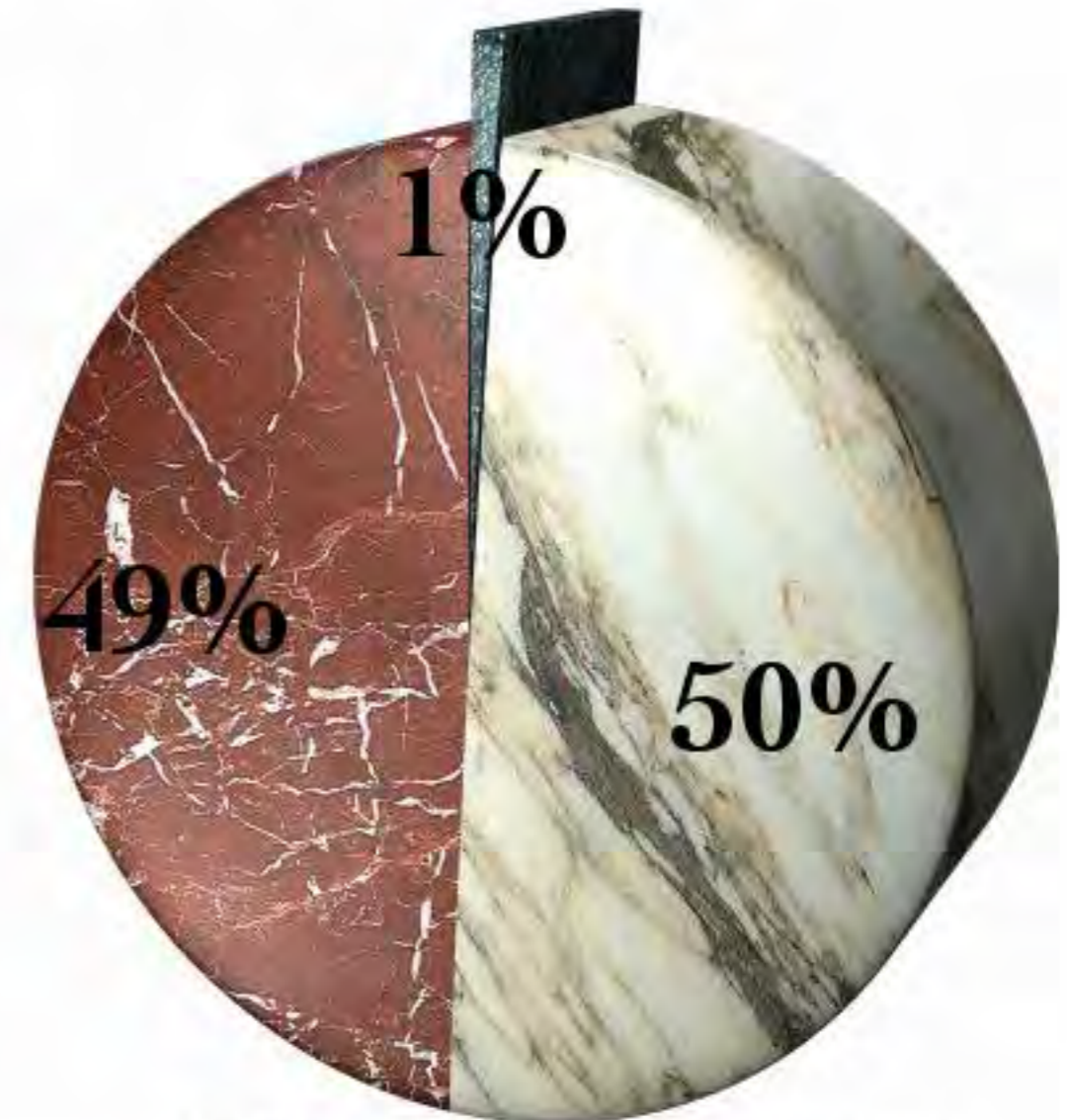
Why go Lean?



Why go Lean?



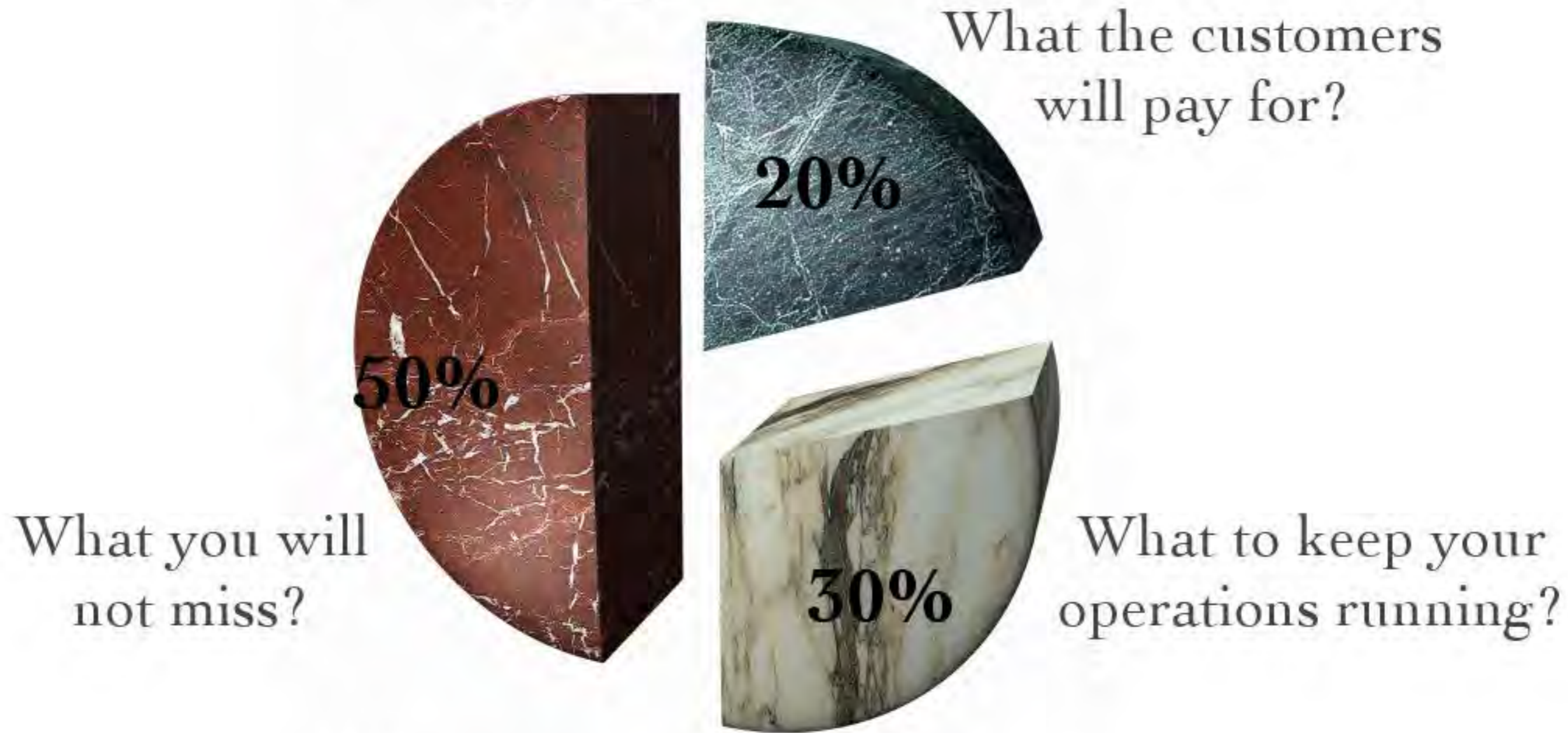
Physical Product Environment
Manufacturing or Logistics



Information Environment
Office, Distribution or Retail

- Value Adding
- Necessary but Non-Value Adding
- Non-Value Adding

Why go Lean?



How yours look like?

Why go Lean?

Every Organization must address,

- **Purpose** - To provide value to customers in order to prosper.
- **Process** - Through smooth flowing value streams for design, make and use.
- **People** - By engaging every employee touching the value streams to sustain and improve the flow.

“To do all these is to be Lean.”

Why go Lean?

Tangible benefits of Lean,

- **Reduces Cost.** Waste elimination.
- **Improves quality.** Reduction and elimination of defects.
- **Reduces delivery time.** Process and lead time reduction.
- **Improves customer satisfaction.** More responsive to customer demand.
- **Improves moral and company culture.** Employee involvement in the process.

Why go Lean?



Who do it?

Senior Managers

Lean Champions

Wider Workforce

What is Lean?

Lean Thinking

Understanding Waste

What is our goal?

Setting the direction

How we do it?

Understanding the big picture

Detailed mapping

Getting suppliers & customers involved

Will it work?

Check the plan fits the direction & ensure buy-in

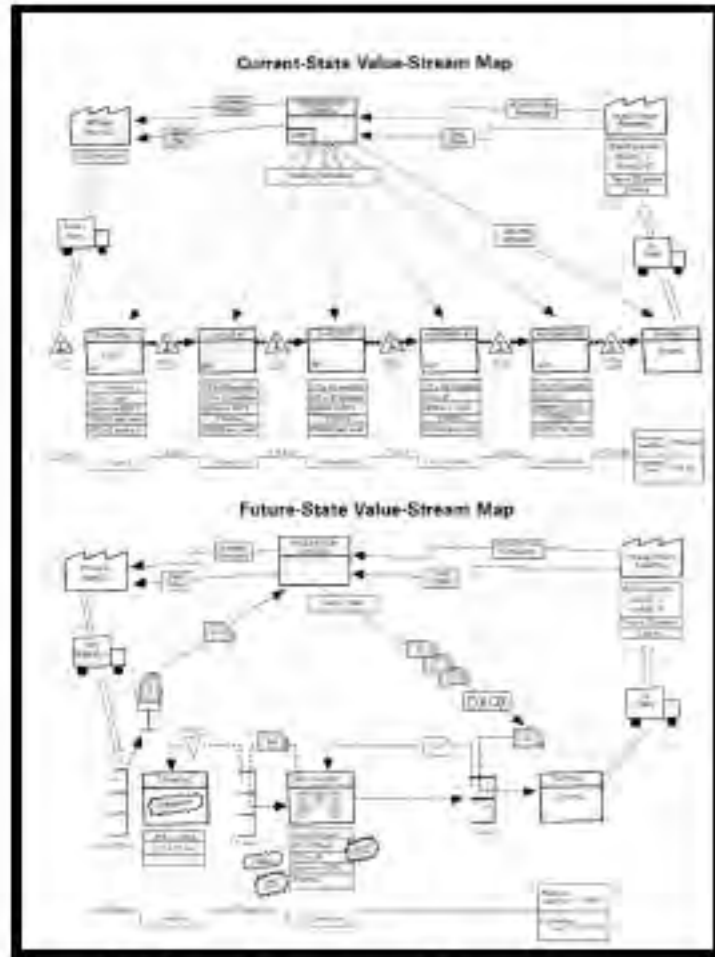
Where we want to be?

- *Half* our current lead time.
- *Half* our total inventory.
- *100%* order fulfillment.
- *Double* our operating profit.

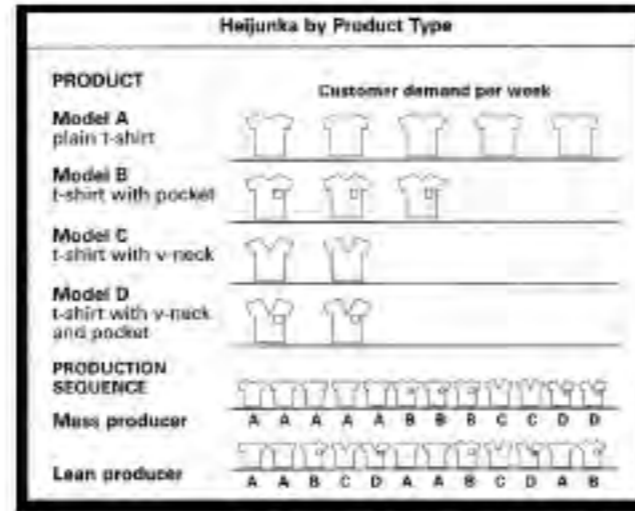
Going Lean

- What is Lean?
- Why go Lean?
- Who do it?
- Where you want to be?
- Will it work?

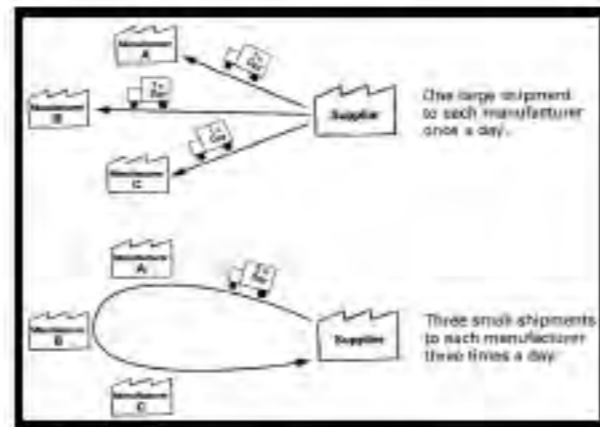
Use these



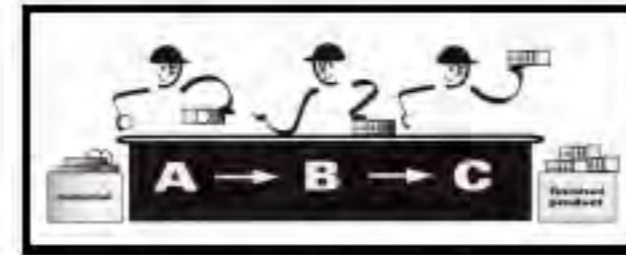
Value Stream Mapping



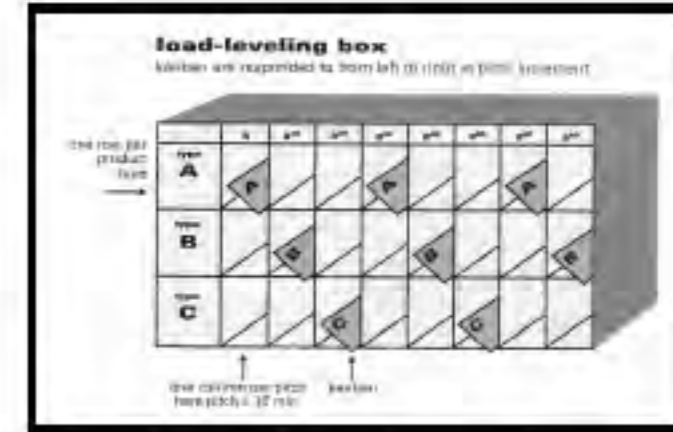
Heijunka



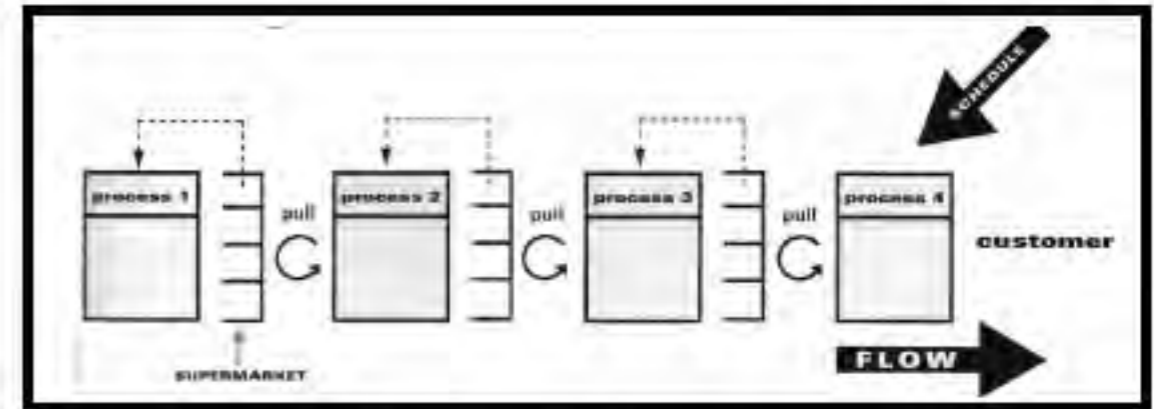
Milk run



Continuous Flow



Load Leveling Box



Kanban/Pull system

7 Waste

Takt time

5 Why

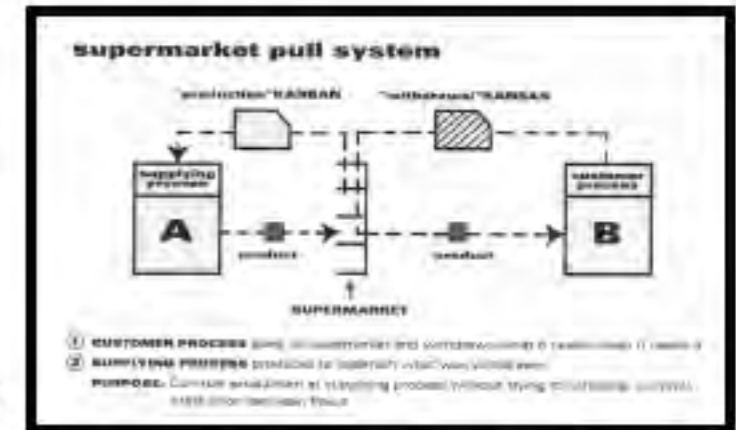
PDCA

JIT

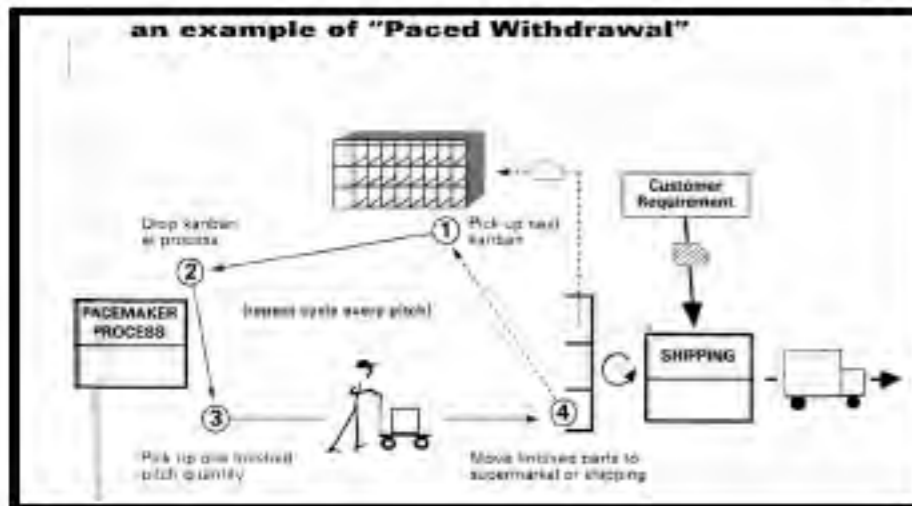
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Pokayoke

DMAIC

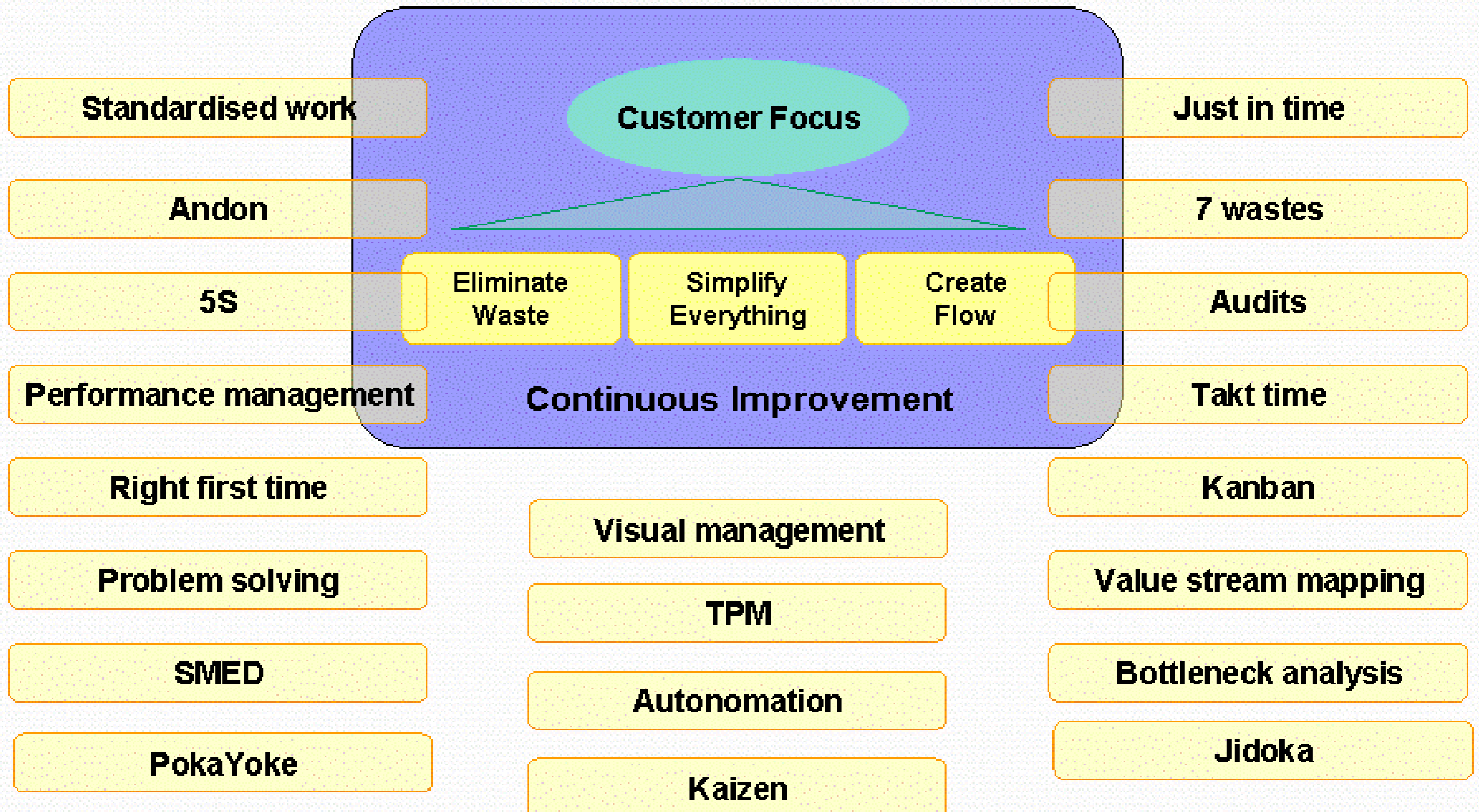


Supermarket pull

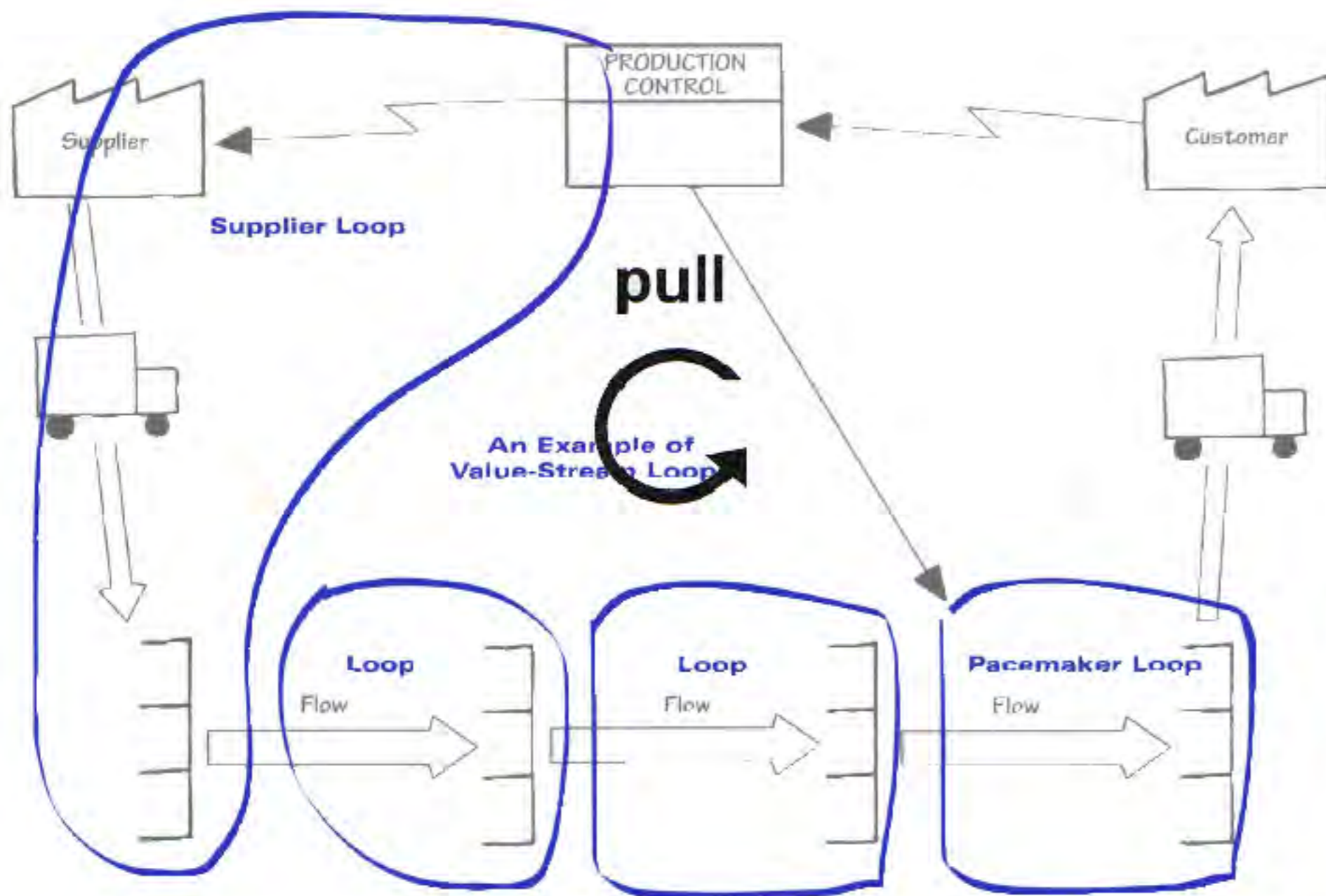


Pacemaker withdrawal

LEAN TOOLS.



Lean Manufacturing System



“Produce what customer want when they want it.”

+

“Remove all waste”



#1 Minimum Inventory

#2 Maximum Efficiency

#3 Minimum Cost

5 steps of Lean Implementation

1. **Specify Value.** Specify what does and does not create value from the customer's perspective.
2. **Map.** Identify all the steps necessary to design, order and produce the product across the whole value stream to highlight non value adding waste
3. **Flow.** Make those actions that create value flow without interruption, detours, backflows, waiting or scrap.
4. **Pull.** Only make what is pulled by the customer.
5. **Perfection.** Strive for perfection by continually removing waste.

How to go Lean?

- Find a change agent.
- Get the lean knowledge.
- Find a reason to do it.
- Map the value streams.
- Eliminate wastes in the value streams.
- Continuous improvement.

Lean Culture

Ask **Why** and not **Who**

- ❖ Problems are recognised as Opportunities.
- ❖ It's OK to make mistakes. But how can we prevent it from happening again?
- ❖ Expose the problems to solve it. NOT Hide them.
- ❖ People are NOT problem - They are problem-solvers
- ❖ Emphasis on finding solutions instead of "Who did it?"

Lean Culture

Does your company culture reward/
recognize firefighters but not
problem preventers?



Lean is NOT new

“The longer an article is in the process of manufacture and the more it is moved about, the greater is its ultimate cost.”

Henry Ford, 1926

Lean is NOT easy

“Nothing is more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new system.”

“For initiator has the enmity of all who would profit by the preservation of the old system.”

Machiavelli, 1513

Lean is **NOT** easy

“It is not a set of isolated techniques.”

“It is a complete business system.”

Lean can be Counterintuitive

“Favor small machines to big ones
despite economies of scale.”

“Stop machines or processes despite
poor utilization.”

“Adopt standardization to achieve
flexibility.”

What makes it hard?

“There are no step-by-step on the how-to.”

“Company culture plays a big part.”

“Approach differs between companies.”

Reality Check

- ❖ Lean culture can't & won't happen overnight.
- ❖ Time, efforts and commitments are required.
- ❖ Results on bottom line is expected from the lean initiatives.
- ❖ There is always the comfort zone of status quo to fall back on.
- ❖ Problems will be exposed and visible.

Reality Check

- ❖ It can be more stressful to respond to problems quickly when they are more visible.
- ❖ It will take a lot more effort and thought to design simple systems than complicated ones.
- ❖ Suppliers will resist change to be more responsive without the safety buffers.
- ❖ People may feel threatened when their performance are visible to all and compared across the board.

Reality Check

- It is always easy to ask “who” than “why” because the former makes the problem others.
- They will always be people who profit from the old system and will give reasons against the change.
- Reducing buffers removes the safety net for just-in-case scenarios.
- Perception of relinquishing the power of decision making from the middle-management.

Why are we doing it?

“It is NOT the Strongest of the species that Survive, NOR the most Intelligent, BUT the one most Responsive to Change.”

Charles Darwin

General Action Plan

- Find a change agent. (**How about you?**)
- Find a teacher whose learning curve you can borrow. (**Follow the beaten path**)
- Seize (or create) a crisis to motivate action across your firm. (**Crisis is a catalyst for change**)
- Map the entire value stream for all your product families. (**Find the waste**)
- Pick something important and get started. (**Realising the benefits of the change**)

Implementation Subtleties

- Remove “anchor-draggers” & add “rowers”.
- Create a lean “implementation office”.
- Develop a growth strategy for additional business.
- Create a policy for reallocation.

Success Factors

- ❖ Prepare and Motivate the people
 - ⦿ Create widespread orientation to continuous improvement.
 - ⦿ Create common understanding of the need to be lean.
- ❖ Employee Involvement
 - ⦿ Push decision making to the “lowest levels”.
 - ⦿ Train and empowered people.
- ❖ Share Information and manage expectation.
- ❖ Identify & Empower Champions
 - ⦿ Remove roadblocks (people and process)

Success Factors

“Leadership and Commitment”

“Question Everything”

“Commitment to Excellence”

Questions?

Lean Operations

Lean Management

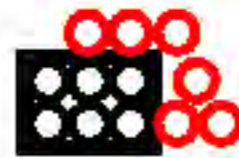
Lean Management

☂ Defect



Mistakes in Documents/ Contracts/order fulfillment

☂ Overproduction



☂ Waiting



Teachers, Students and Parents waiting in Line

☂ Non-utilized people



Non-utilized/ idle staff

☂ Transportation



Unnecessary movement of training materials and aids

☂ Inventory



Over-ordering of materials and supplies/

☂ Motion



Unnecessary movement or motions of people

☂ Extra processing



Unnecessary evaluation, approval

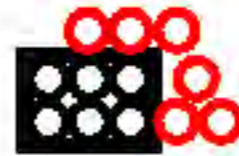
Lean Education Enterprise

☂ Defect



Mistakes in Documents/Grades/
Certificates.

☂ Overproduction



Over-enrollment, unused curriculum
design

☂ Waiting



Teachers, Students and Parents waiting in
Line

☂ Non-utilized people



Non-utilized/ idle staff

☂ Transportation



Unnecessary movement of training
materials and aids

☂ Inventory



Unnecessary books, materials becoming
obsolete.

☂ Motion




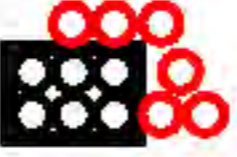






Unnecessary movement or motions of
people

☂ Extra processing



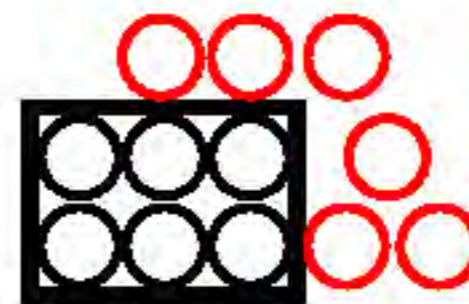
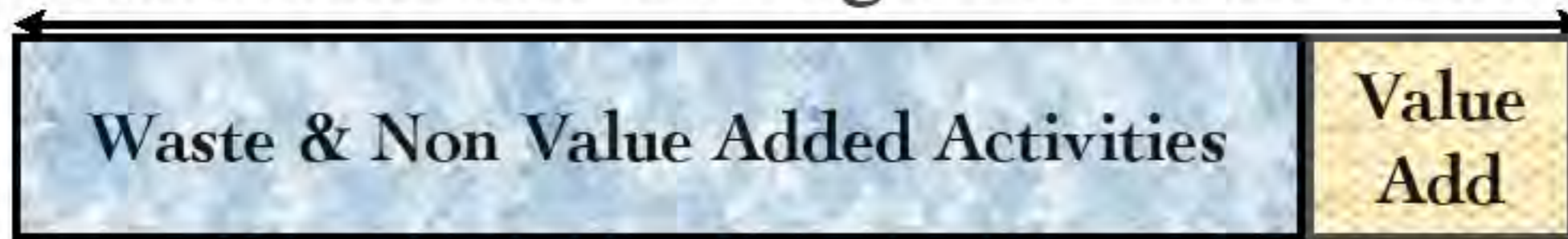
Unnecessary evaluation, approval

Where are the waste?

- ☛ Defect 
- ☛ Overproduction 
- ☛ Waiting 
- ☛ Non-utilized people 
- ☛ Transportation 
- ☛ Inventory 
- ☛ Motion 
- ☛ Extra processing 

Where are the waste?

Total leadtime through the value chain



Where are the waste?

Which is the most significant source of waste?



unnecessary
Inventory



Excessive
Transportation



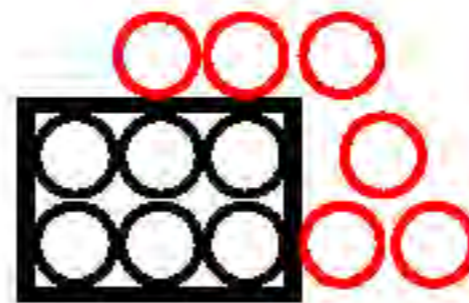
Waiting



Defects



unnecessary
Motion



Overproduction



Creating a Lean Value Stream

“Avoid overproduction!!!”

“Get one process to make only what the next process needs when it needs it.”

“Link all processes from the final customer back to raw material in a smooth flow without detours that generates the shortest lead time, highest quality and lowest cost.”

Creating a Lean Value Stream

#1 Produce to your Takt time

“Synchronise pace of production to match the pace of sales.”

To do so requires concentrated effort to:

- provide fast response (within takt) to problem.
- eliminate causes of unplanned downtime.
- eliminate changeover time in downstream.

Creating a Lean Value Stream

“Drumbeat cycle of the rate of flow of products”

$$\text{TAKT Time} = \frac{\text{Available work time}}{\text{Average demand}}$$

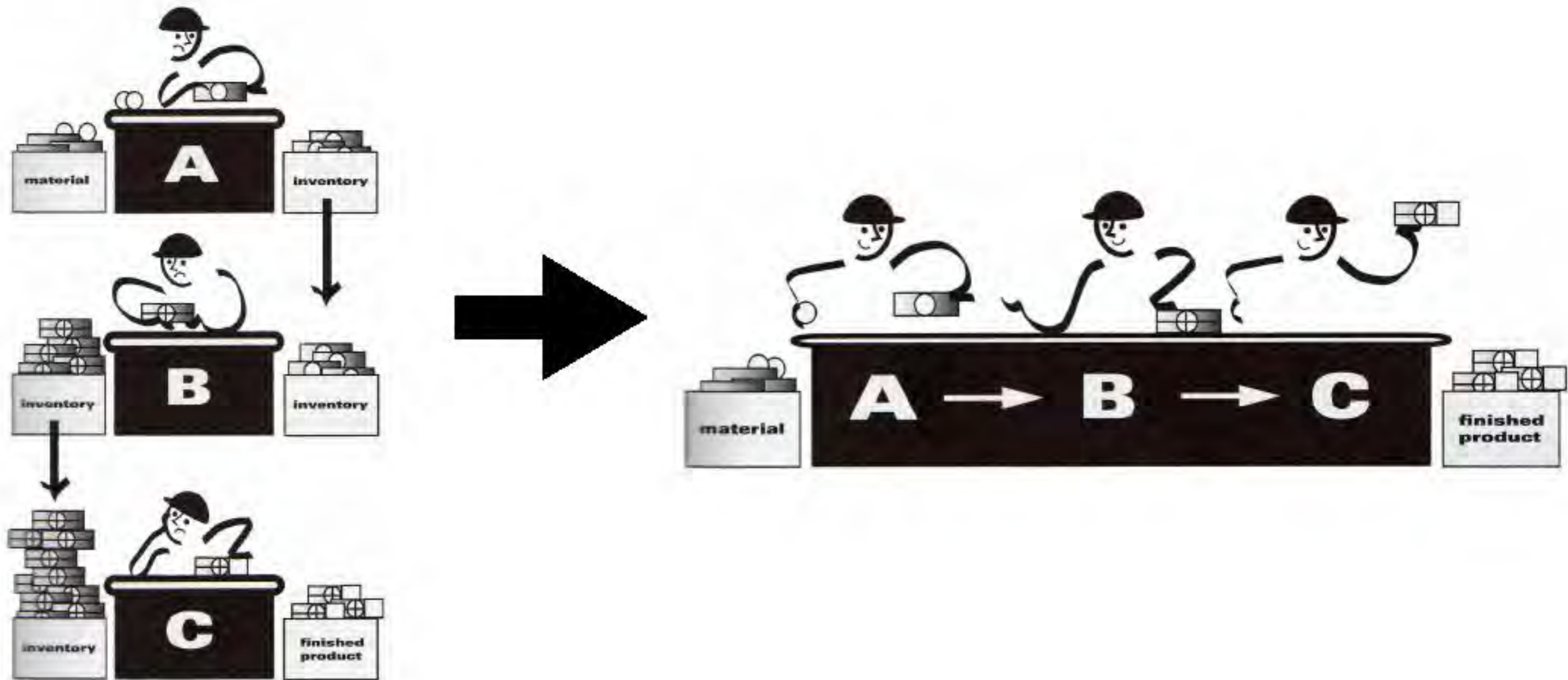
TAKT time is used to synchronise the operations/ processes to reduce leadtime and inventory.

Creating a Lean Value Stream

#2 Develop continuous flow wherever possible

“Producing one piece at a time, with each item passed immediately from one process to step to the next.”

Creating a Lean Value Stream



Creating a Lean Value Stream

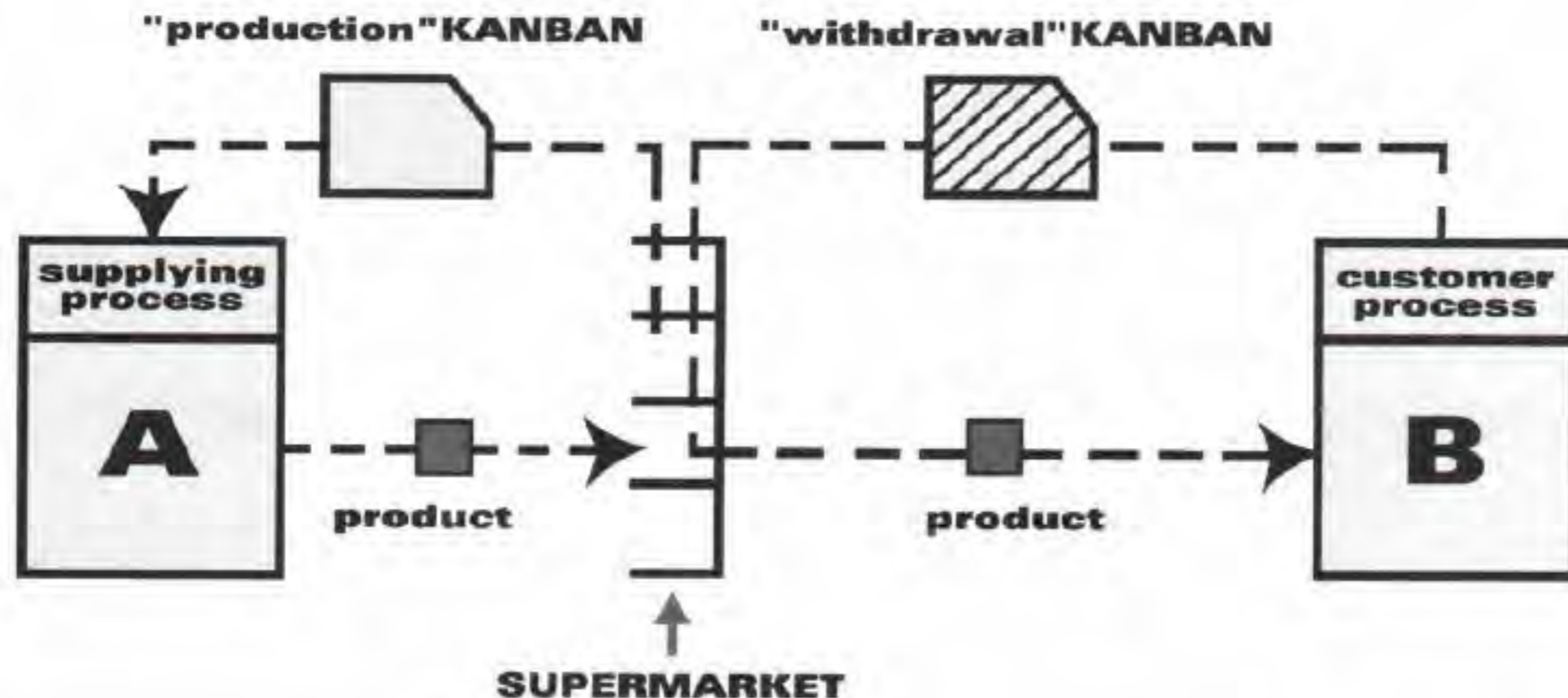
#3 Use supermarkets to control production where continuous flow does not extend upstream

Some of the reasons are:

- Some processes are designed to serve multiple product families.
- Suppliers are far away and shipping one piece at a time is not realistic.
- Some processes have too much lead time or are too unreliable to couple directly with other processes

Creating a Lean Value Stream

supermarket pull system



- ① **CUSTOMER PROCESS** goes to supermarket and withdraws what it needs when it needs it.
 - ② **SUPPLYING PROCESS** produces to replenish what was withdrawn
- PURPOSE:** Controls production at supplying process without trying to schedule. Controls production between flows

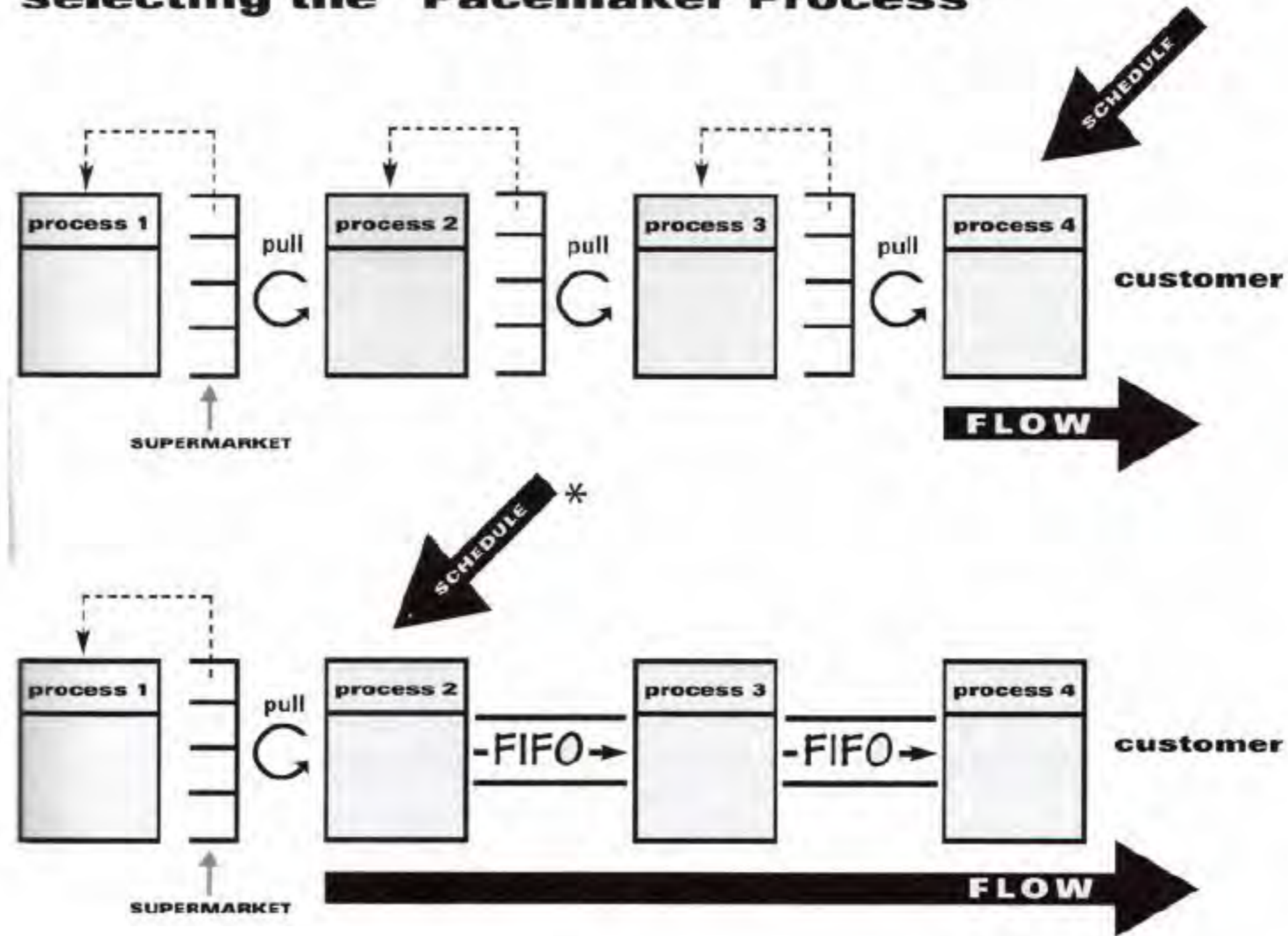
Creating a Lean Value Stream

#4 Try to send the customer schedule to only one production process

“Schedule only one point (**pacemaker process**) in your door-to-door value stream.”

Creating a Lean Value Stream

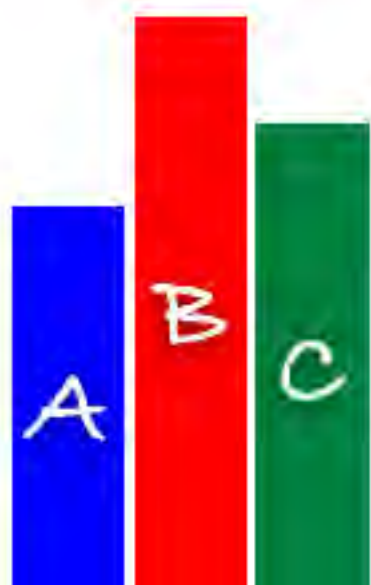
selecting the "Pacemaker Process"



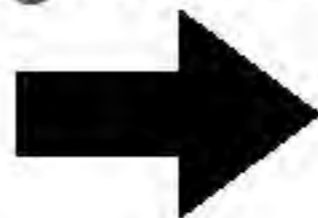
Creating a Lean Value Stream

#5 Distribute the production of different products evenly over time at the pacemaker process

“Level Production Mix”



“Only possible with the elimination/reduction of changeover time.”



Creating a Lean Value Stream

#6 Create an “initial pull” by releasing and withdrawing small, consistent increments of work at the pacemaker process

“Level the Production Volume (Heijunka)”

Creating a Lean Value Stream

Some of the problem associated with uneven volume and large batches of work are:

- No sense of takt time and no “pull” to which the value stream can respond.
- Peaks and valleys resulted in extra burden on machines, people and supermarket.
- Situation difficult to monitor. Are we ahead or behind?
- Large amount of work in stream results in orders shuffling. This increases lead time and the need to expedite.

Creating a Lean Value Stream

$$\text{TAKT Time} = \frac{\text{Available work time}}{\text{Average demand}}$$

$$\text{Pitch} = \text{TAKT Time} \times \text{Packout container quantity}$$

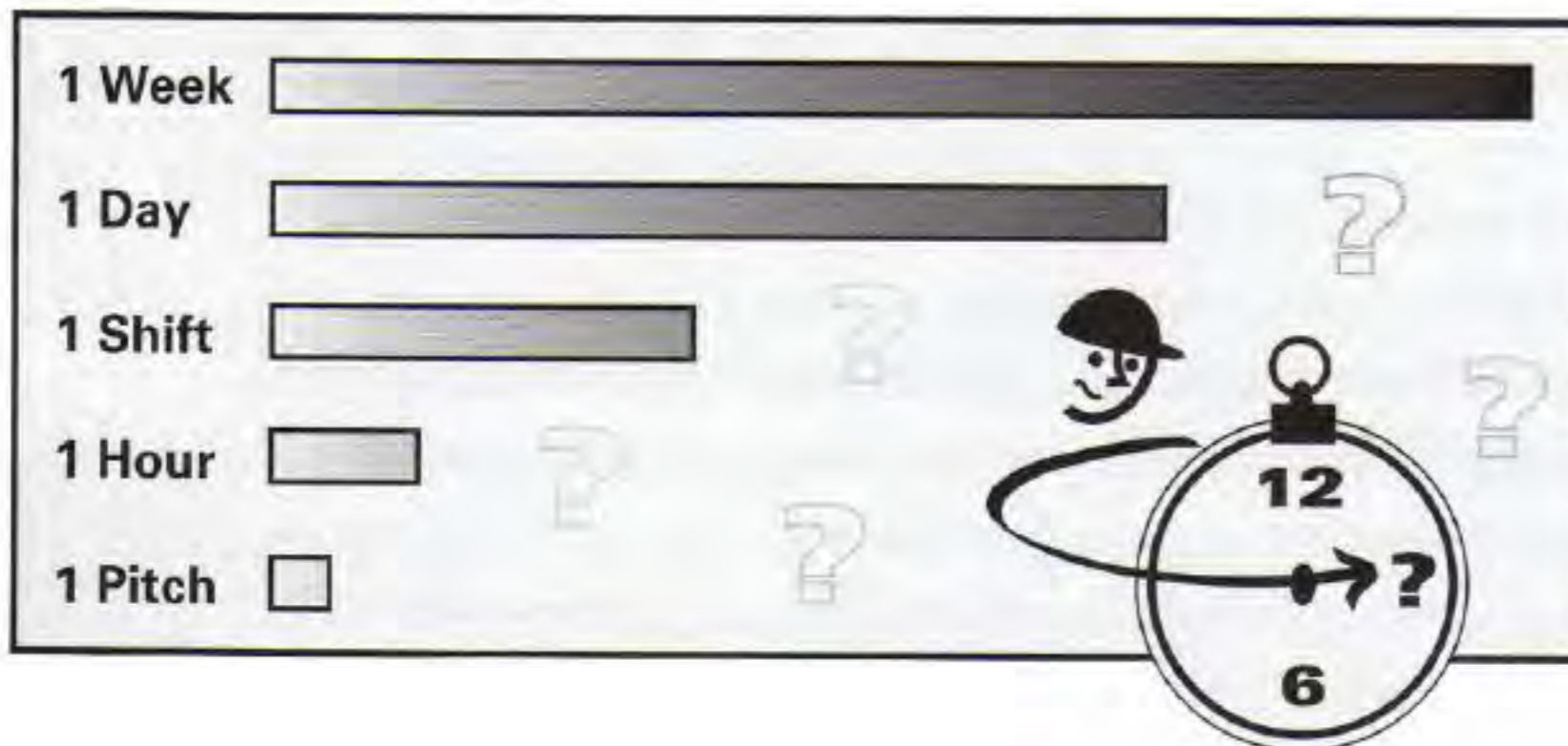
e.g. Takt time = 30 sec and Pack size = 20 pieces,
then your pitch = 10 minutes.

Creating a Lean Value Stream

If you release a week of work at a time, your probably only know your customer demand “once a week”.

What is your management time frame?

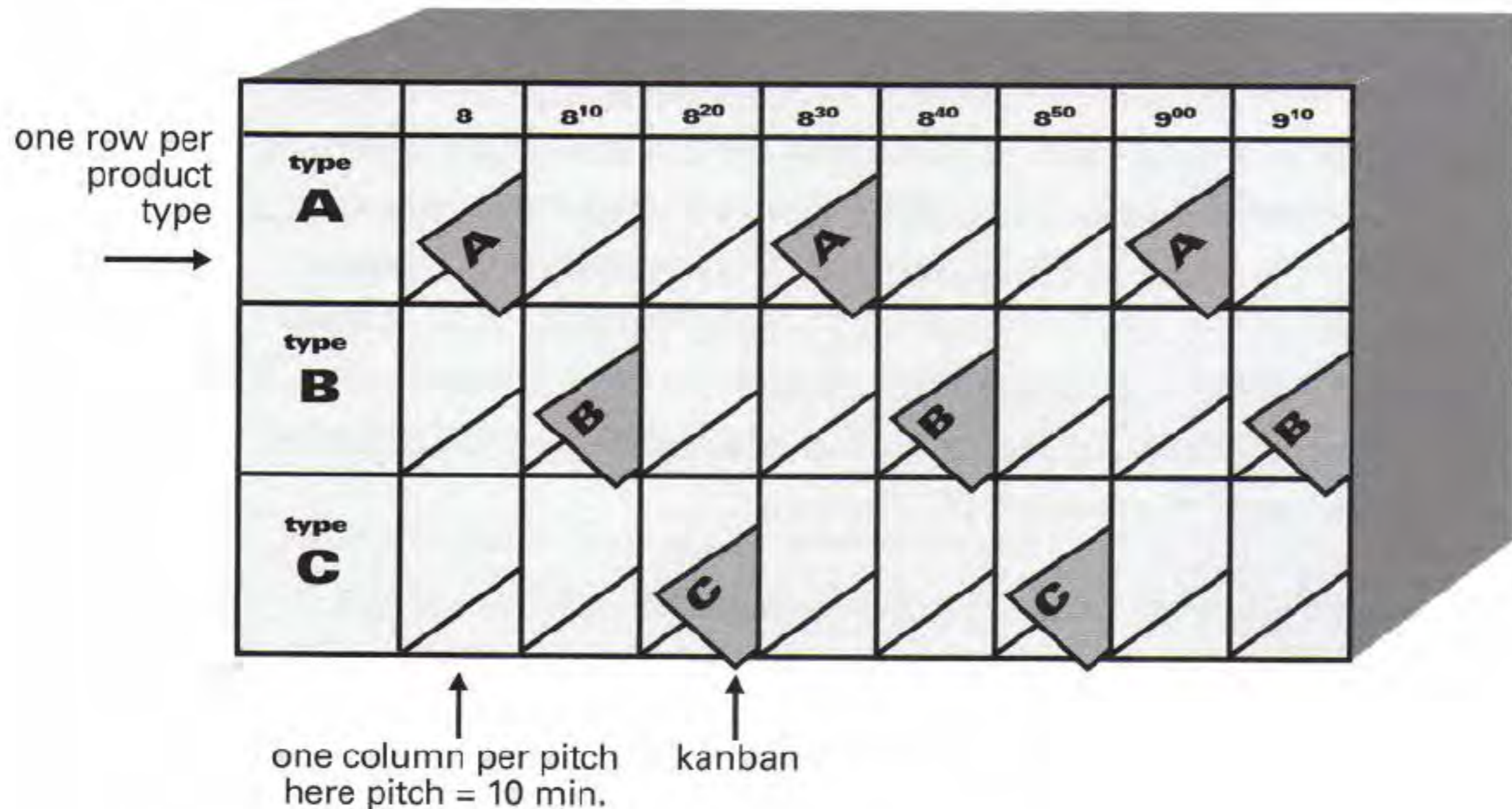
- What increment of work are you releasing?
- How often do you know your performance to customer demand?



Creating a Lean Value Stream

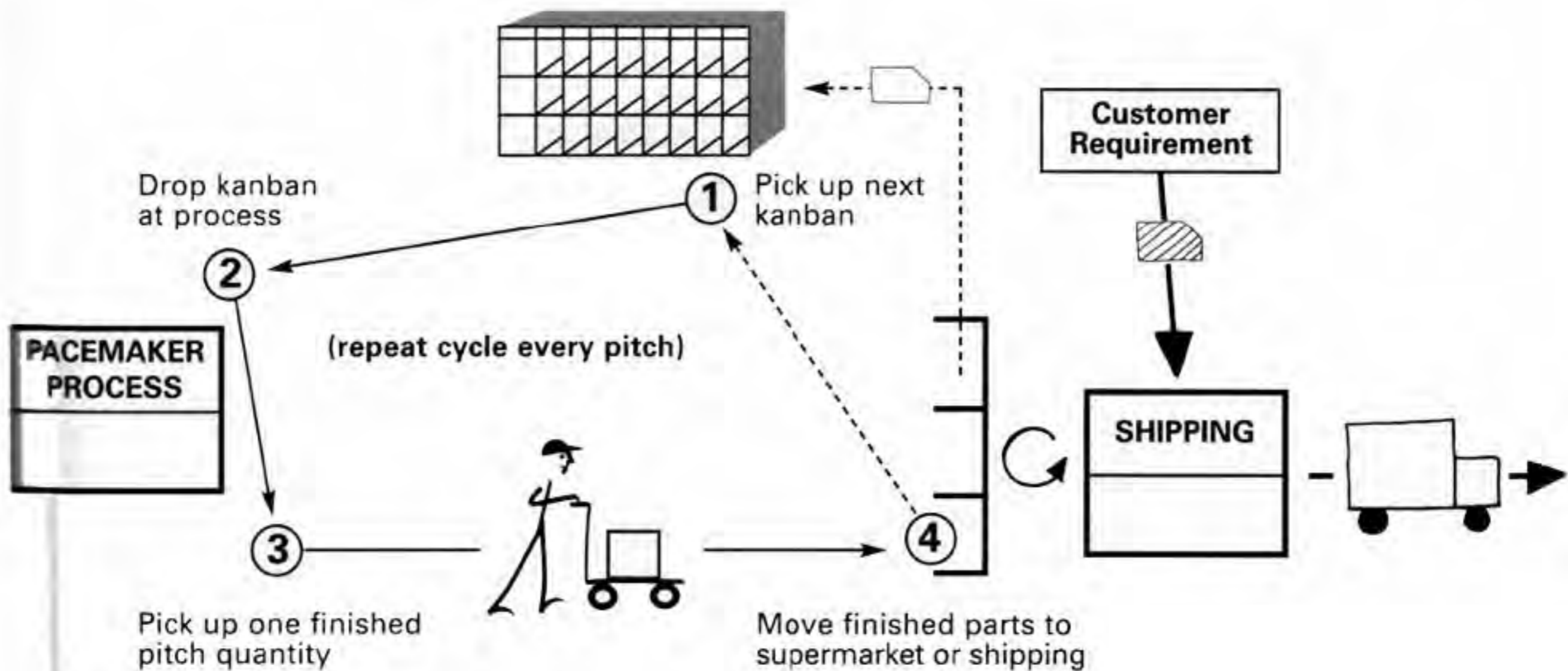
load-leveling box

kanban are responded to from left to right at pitch increment



Creating a Lean Value Stream

an example of "Paced Withdrawal"



Creating a Lean Value Stream

#7 Develop the ability to make “every part every day” (then every shift, then every hour or pallet or pitch) in fabrication processes upstream of the pacemaker process.

By shortening changeover times and running smaller batches in your upstream fabrication processes, those processes will be able to respond to changing downstream needs more quickly. In turn, they will require less inventory to be held in their supermarkets.

Lean Techniques

5S

Seiri



Sort

Seiton



Simplify

Seiso



Shine

Seiketsu



Standardise

Shitsuke



Sustain

5S

- **SORT** - To identify the tools and items needed at each workstation to produce the product and to remove any unnecessary tools and items from the work area.
- **SIMPLIFY** - Set in order. To neatly arrange and identify the tools that are needed.
- **SHINE** - To cleanup. Physically tidy up on ongoing basis. Visual sweeping to always on the lookout for anything out of place and correct it immediately.
- **STANDARDISE** - To perform the first 3S's at regular and frequent intervals. Develop standards for the 3S's.
- **SUSTAIN** - Turn the first 4S's into habits.

Pokayoke (Mistake-Proofing)

“Device that literally prevents defects from being made”

Pokayoke Types

	Control	Warning
Contact	<ul style="list-style-type: none">• Parking height bars• Armrest on seats	<ul style="list-style-type: none">• Staff mirror• Shop entrance bell
Fixed- Value	<ul style="list-style-type: none">• French fry scoop• Pre-dosed medication	<ul style="list-style-type: none">• Trays with indentations
Motion- Step	<ul style="list-style-type: none">• Airline lavatory doors	<ul style="list-style-type: none">• Spellcheckers• Beepers on ATMs

Pokayoke (Mistake-Proofing)



Pokayoke (Mistake-Proofing)



Pokayoke (Mistake-Proofing)



Pokayoke (Mistake-Proofing)



JIT / Zero Inventory

Inventory hides problem



JIT / Zero Inventory

Reducing inventory to
expose problem

Raw
Material

Finished
Product

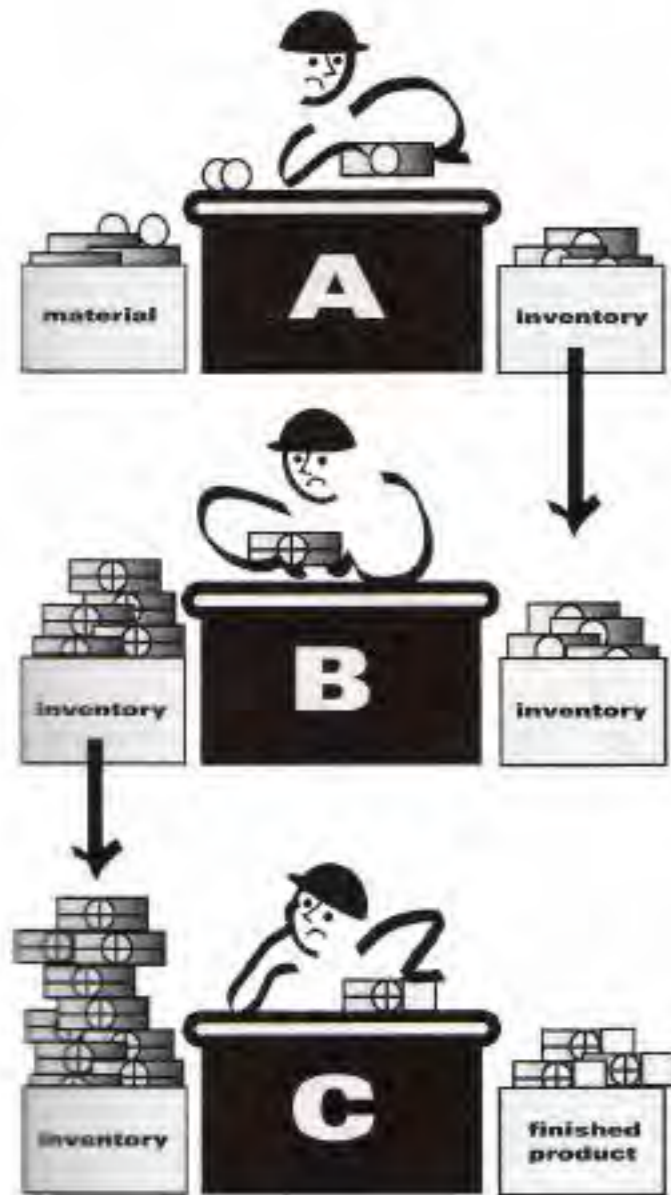


JIT / Zero Inventory

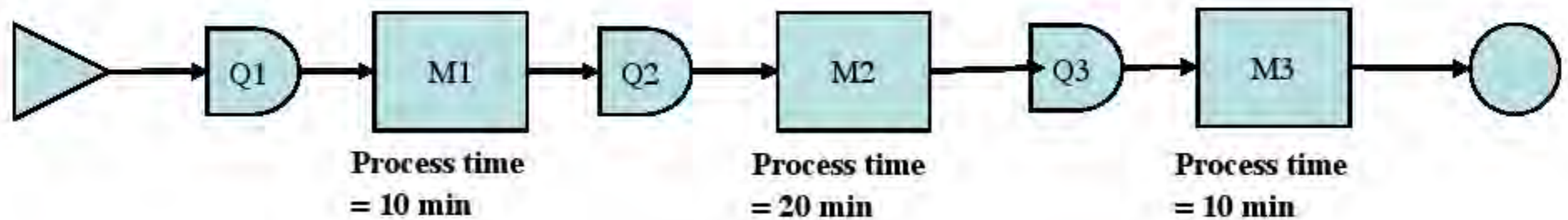
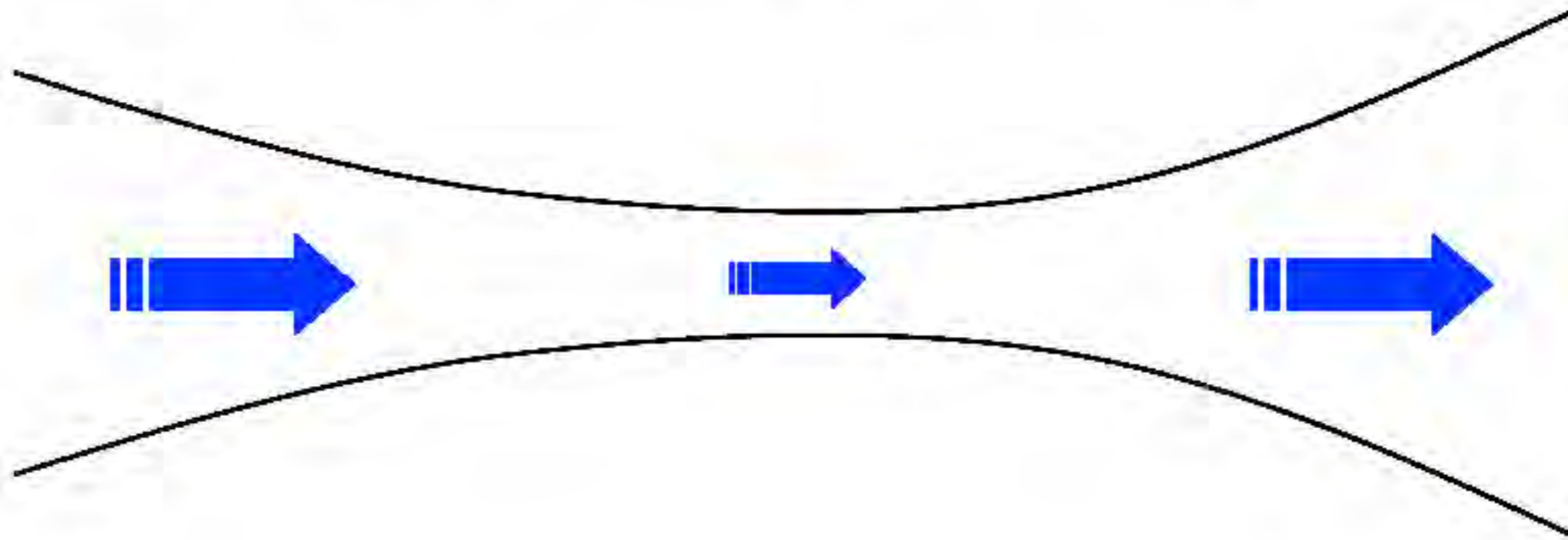
Solve problem and reduce
more inventory



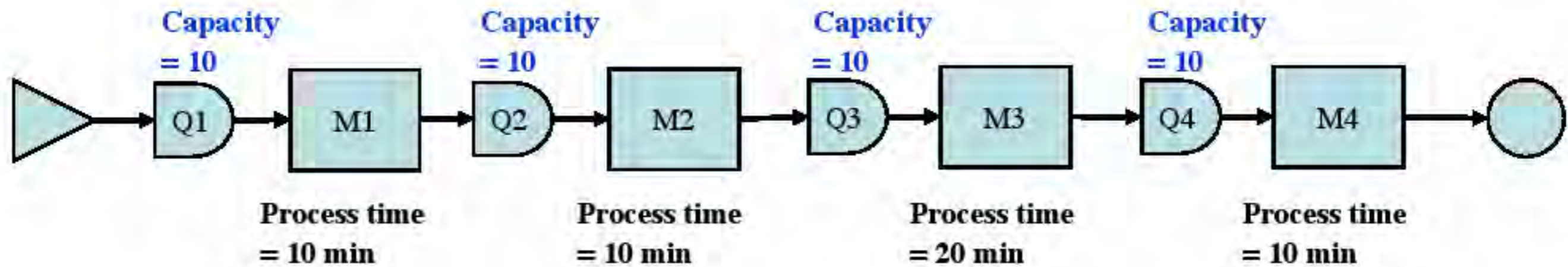
Continuous Flow



Continuous Flow

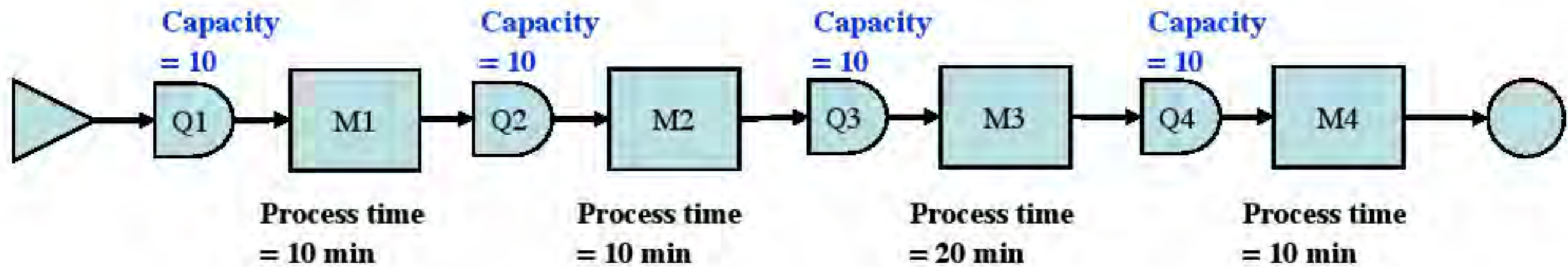


Continuous Flow



What is the throughput for 10 days?

Continuous Flow

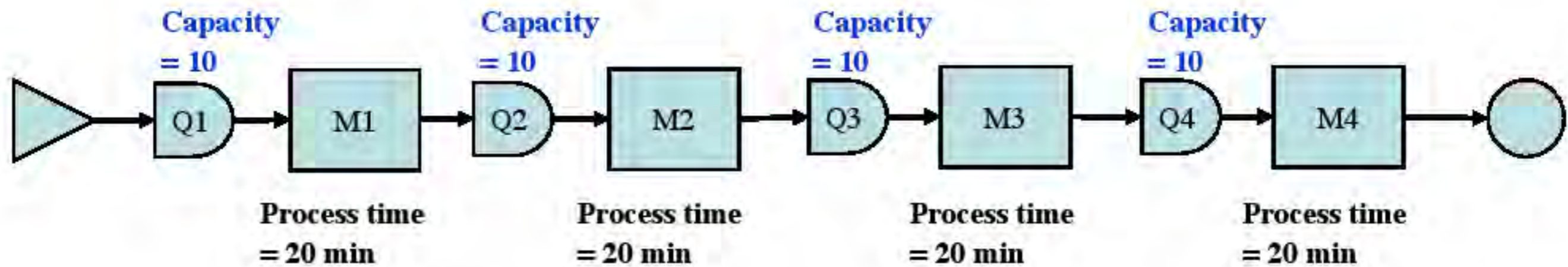


What is the cycletime?

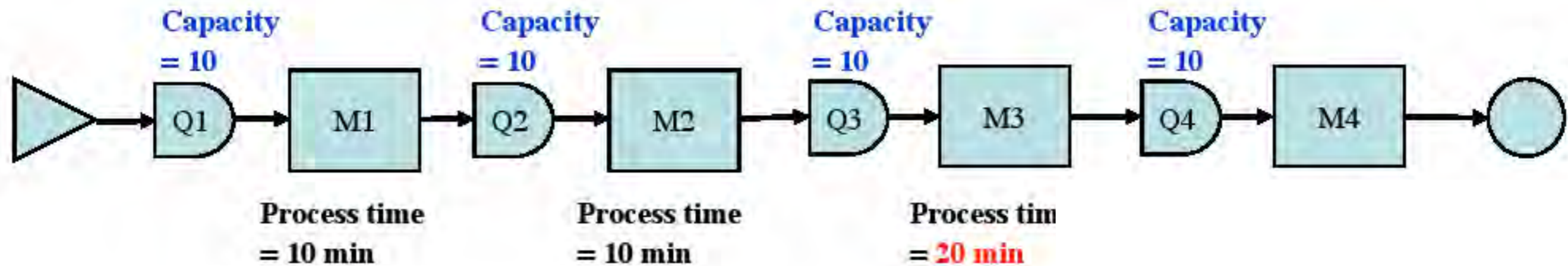
Continuous Flow

- ❖ **Bottleneck resource defines the rate of production**
 - Determine the throughput or capacity of the system
- ❖ **Process time of bottleneck resource propagate upstream**
 - Upstream resource will share the same process time although the actual process times are unchanged
 - Idle time of job spend waiting in the machine account for the excess process time
- ❖ **Queue capacity determine the waiting time of job in the system.**
 - Only queues before the bottleneck resource matter
 - At steady state, all queues before the bottleneck resource will be filled
 - $\text{Waiting time} = \text{Capacity} \times \text{Bottleneck process time}$
 - $\text{Reduce Queue size} = \text{Reduce Waiting time of job in system}$

Continuous Flow



What is the cycletime?



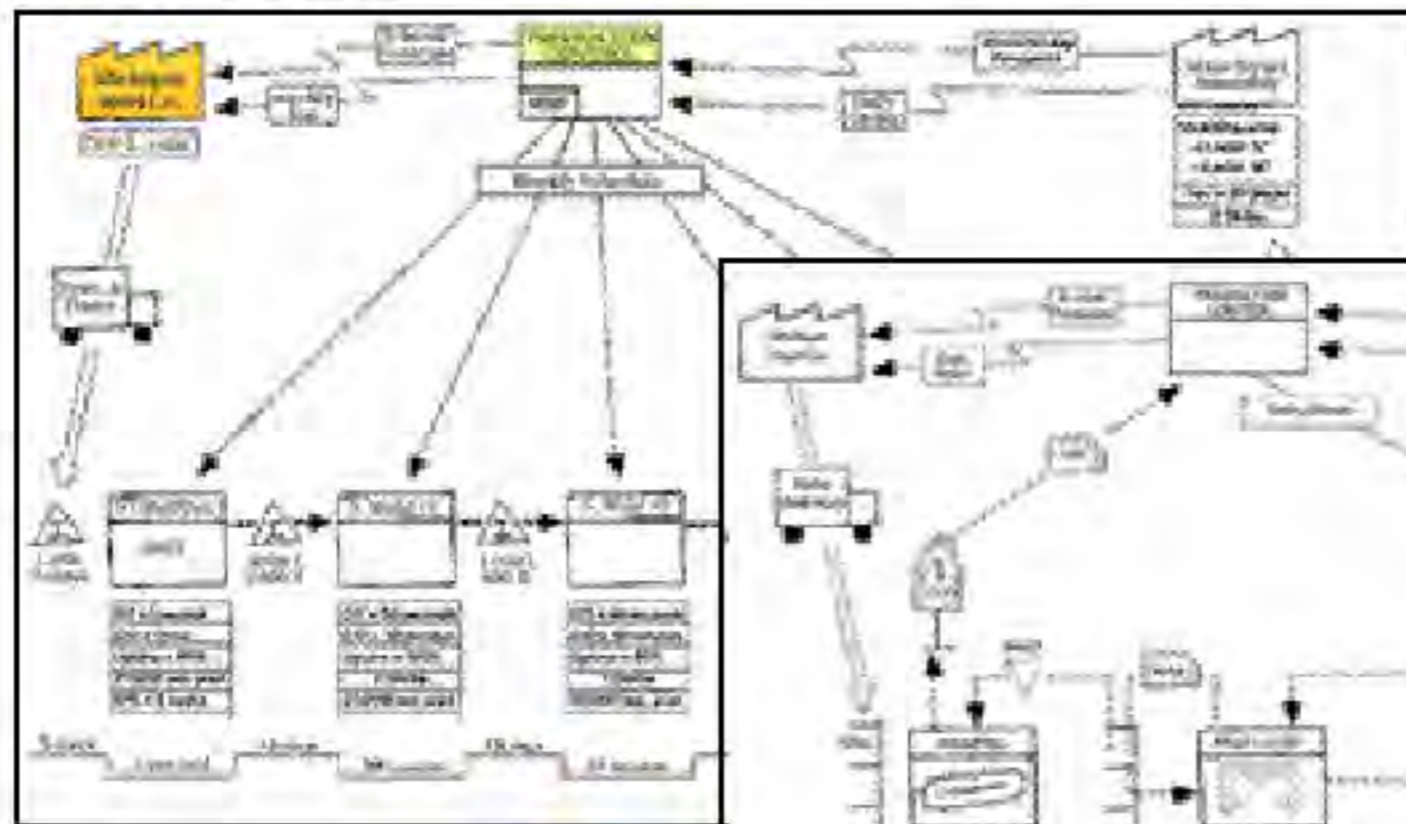
Continuous Flow



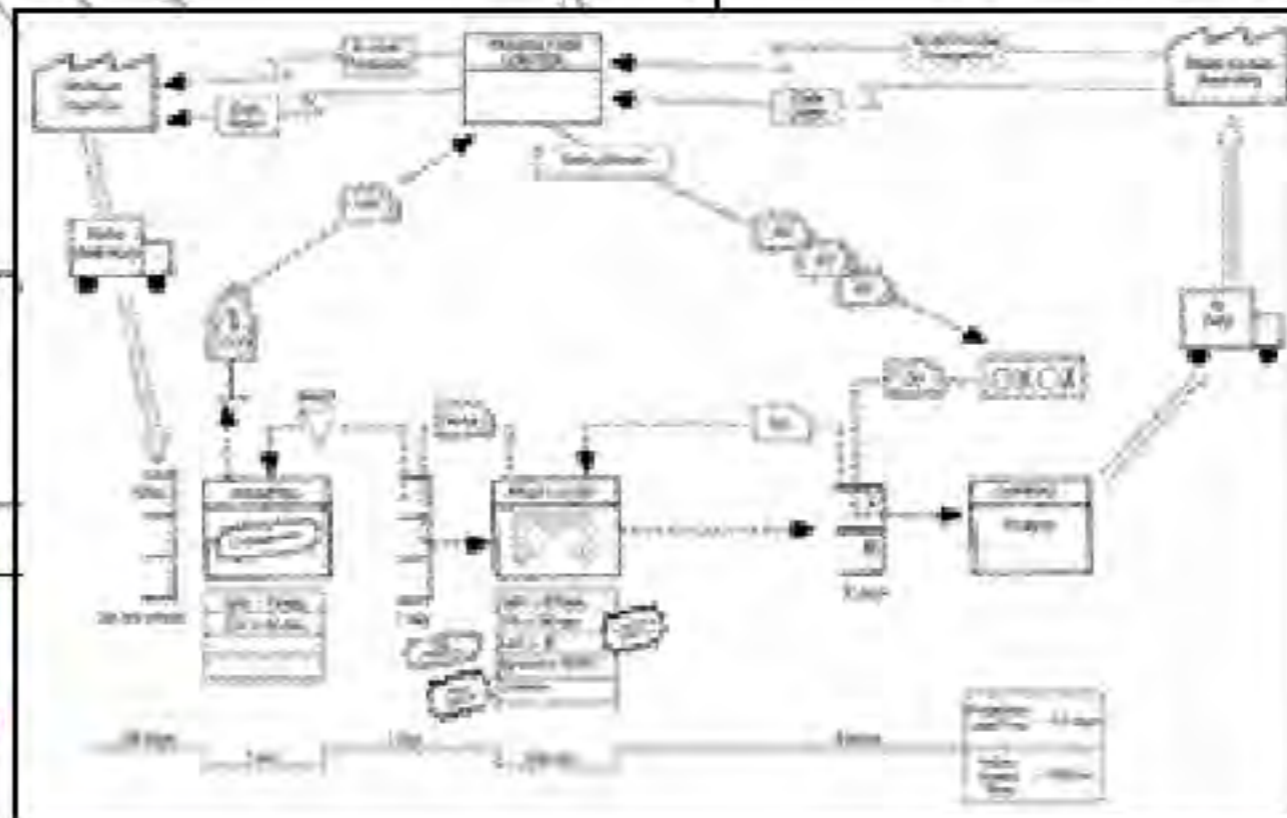
Value Stream Mapping

“Visualisation tool to understand and streamline work processes.”

Current State



Future State



Value Stream Mapping

- ❧ A Value Stream is the flow of all of the activity, value added and otherwise, needed to fulfilled a request.
- ❧ Value Stream Maps are drawings that makes the flow of material and information visible.
- ❧ Current State Maps describe the process as it is today.
- ❧ Future State Maps describe the ideal state based on applying Lean principles.

Value Stream Mapping



Value Stream Mapping

“Level 0”



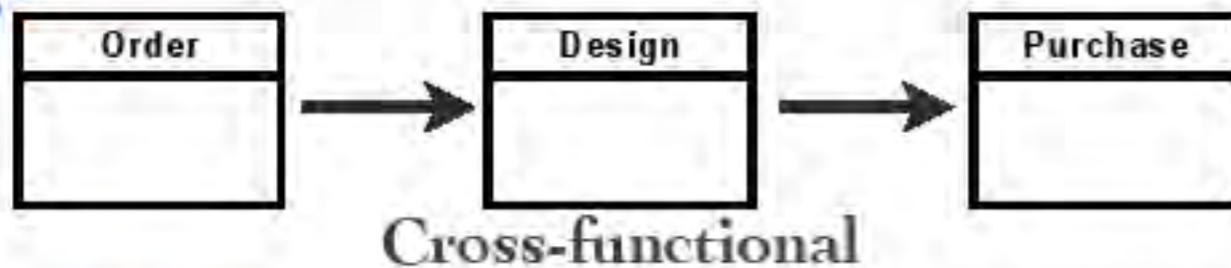
Visualises how different entities in the supply chain coordinate to support a final customer of their product/service.

“Level 1”



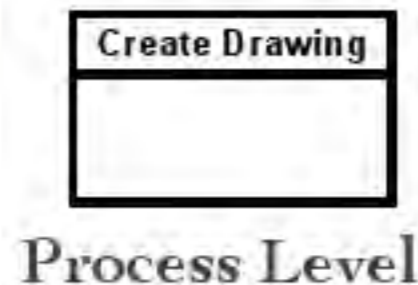
Visualises how one or more sites within a single company coordinate to support a customer outside the organisation.

“Level 2”



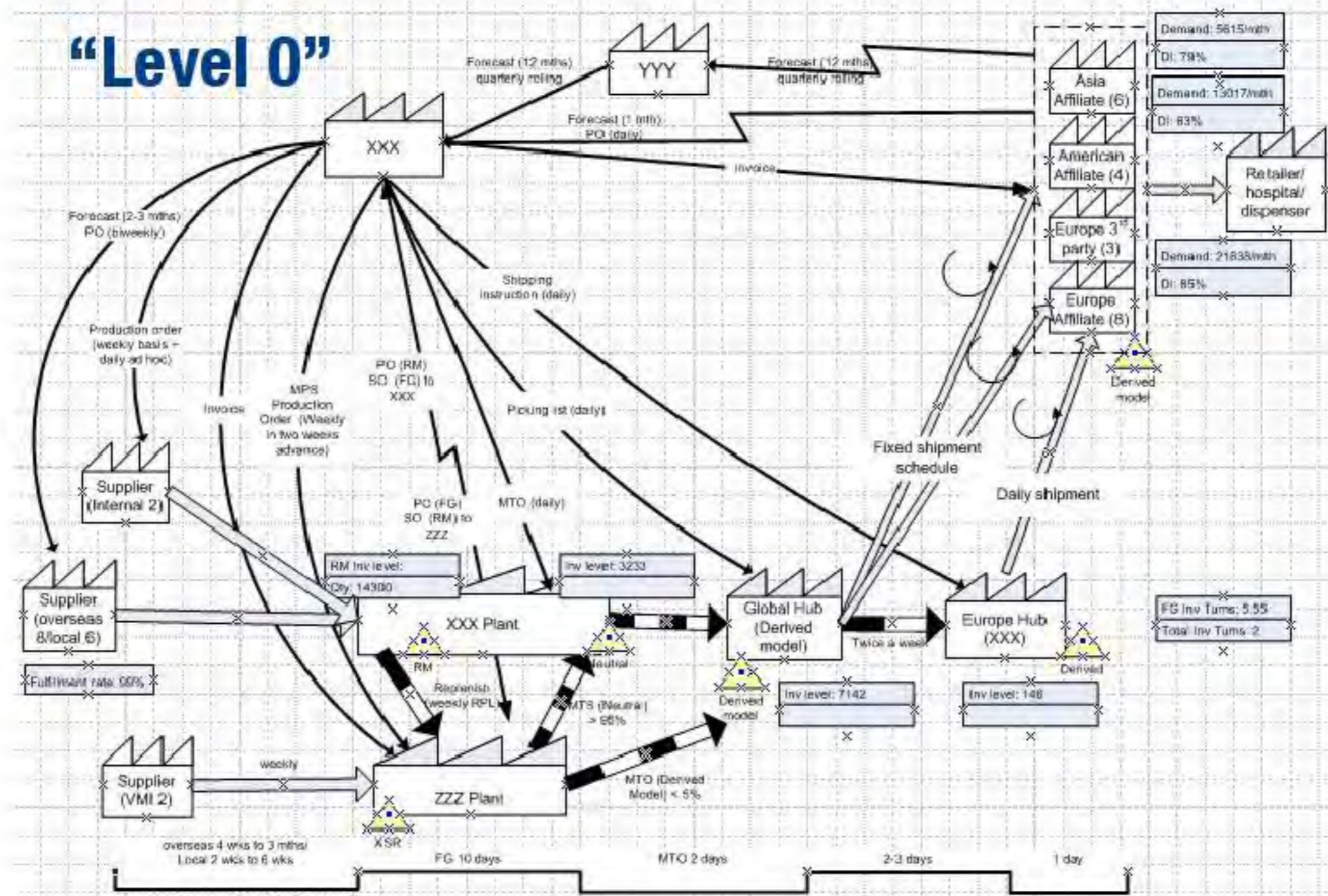
Focus on a value stream redesign within a specific process of a company.

“Level 3”

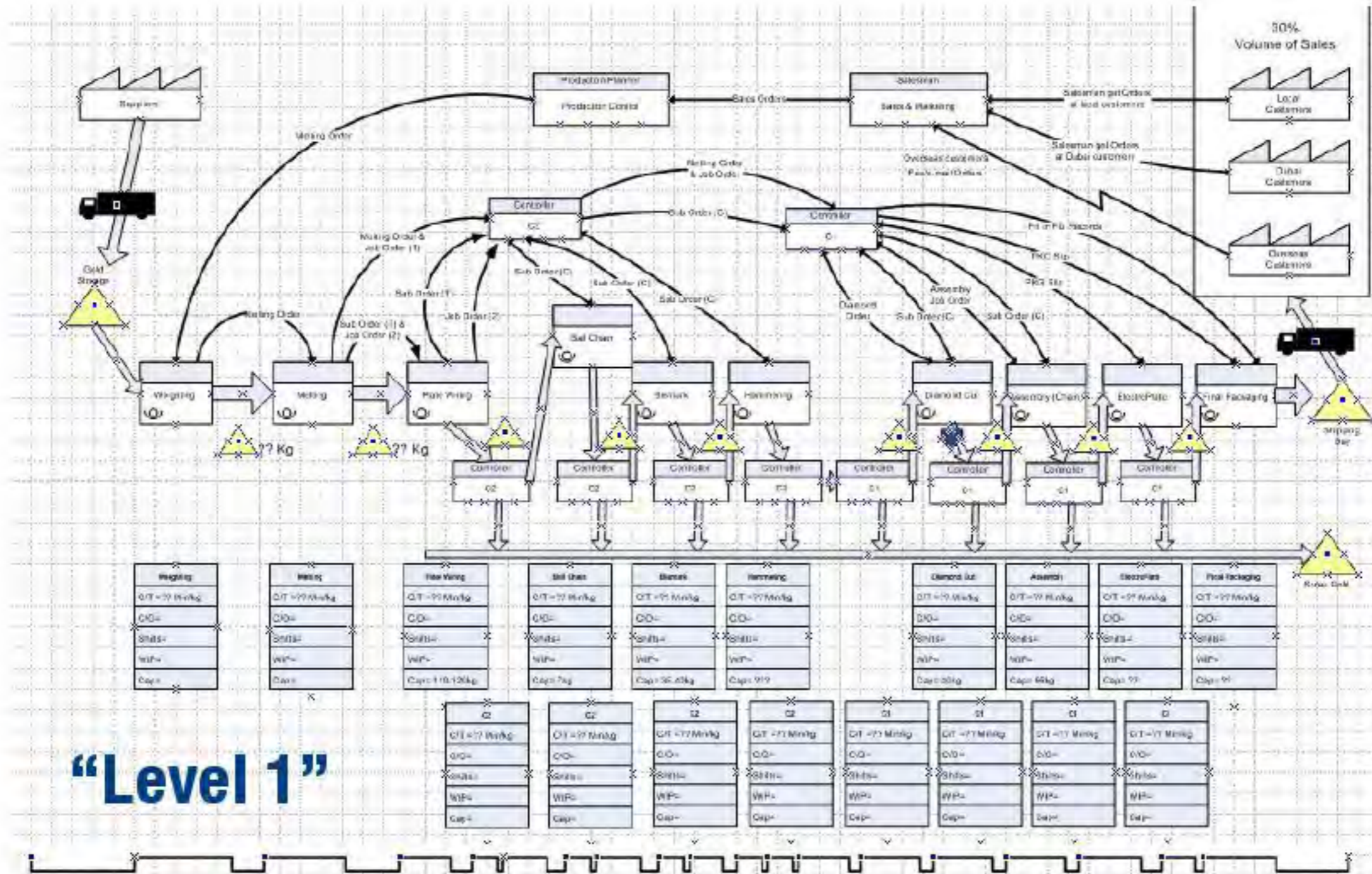


Also known as “Cubicle Level”. Used for a detailed redesign of a specific task within a process.

Value Stream Mapping

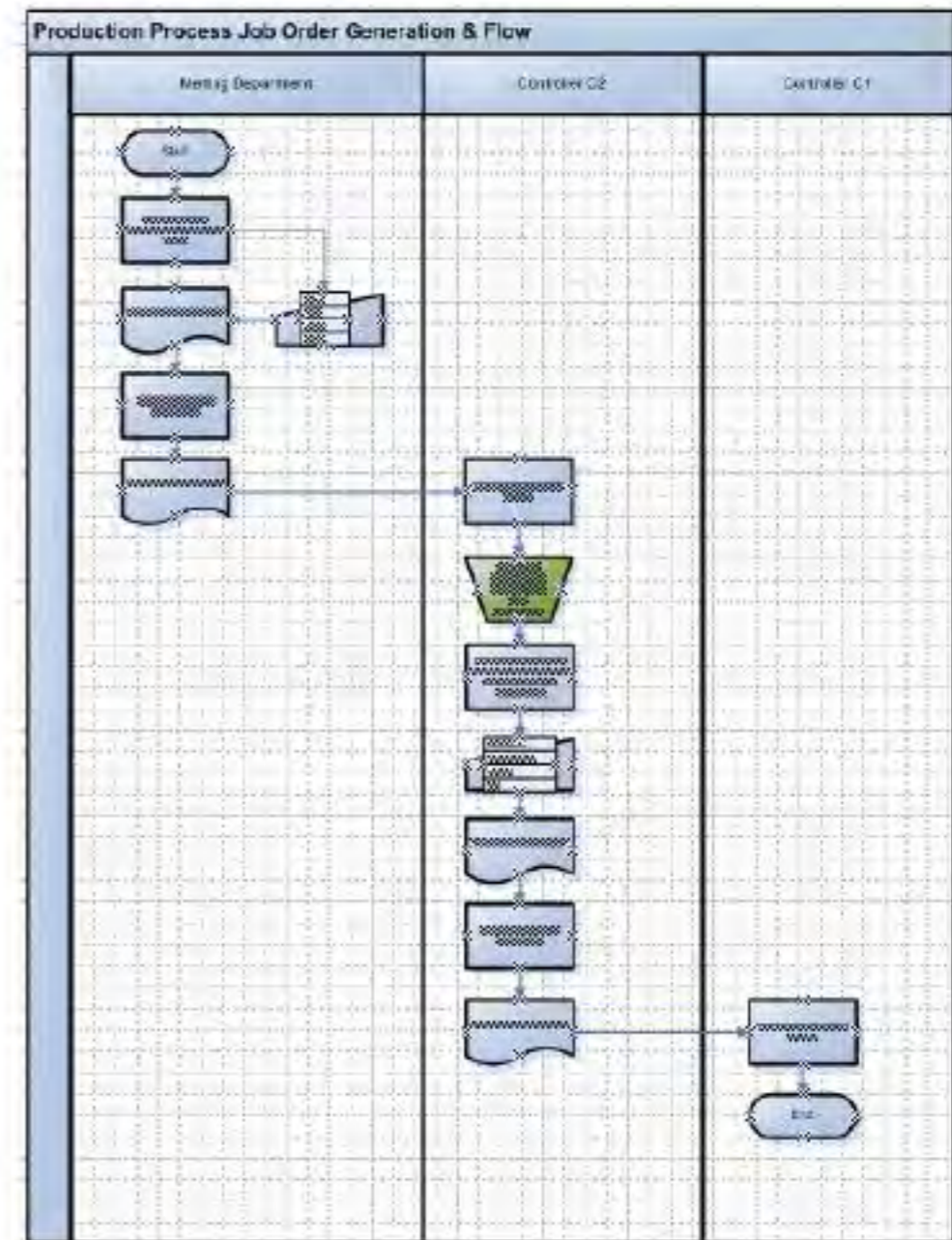
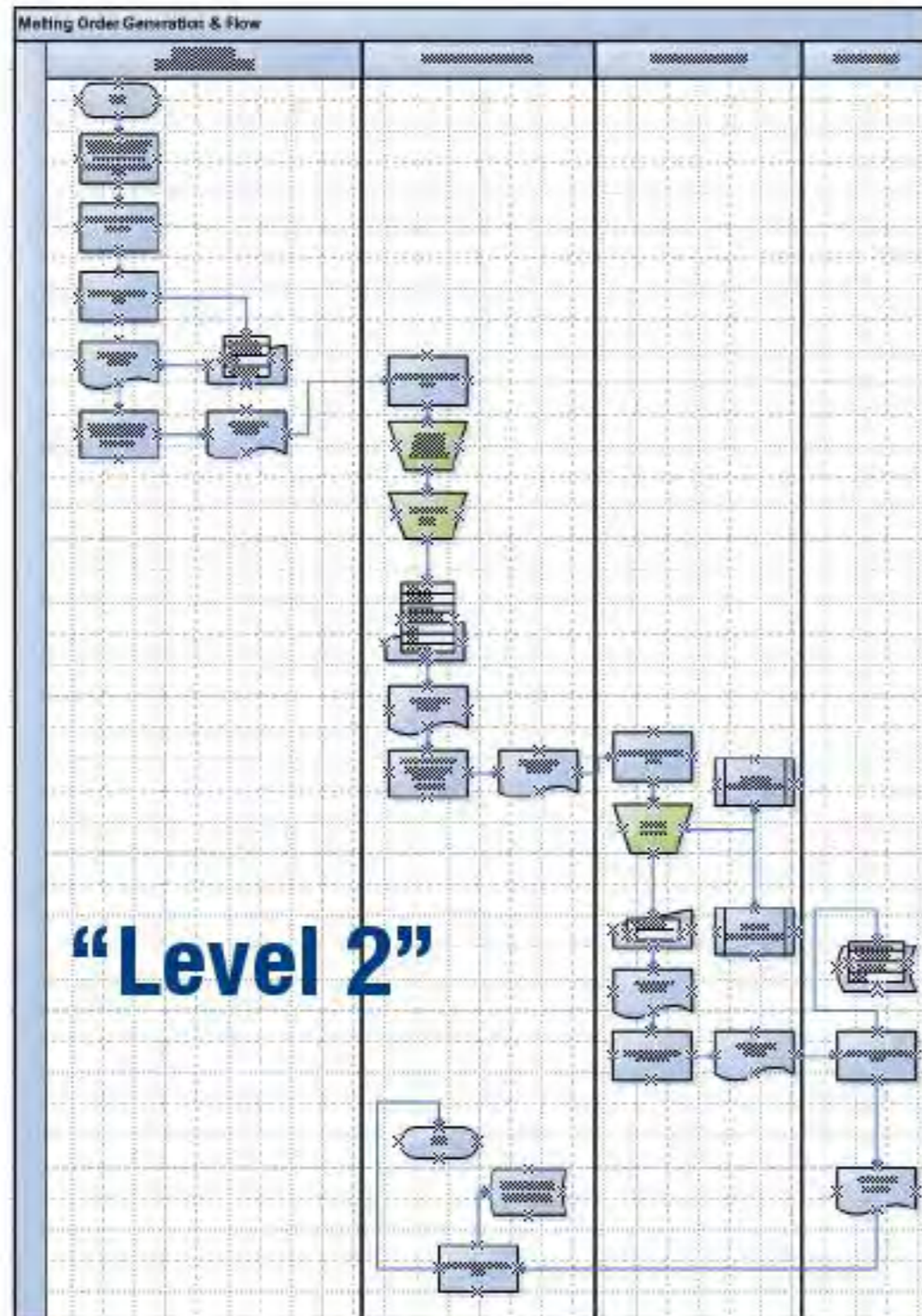


Value Stream Mapping

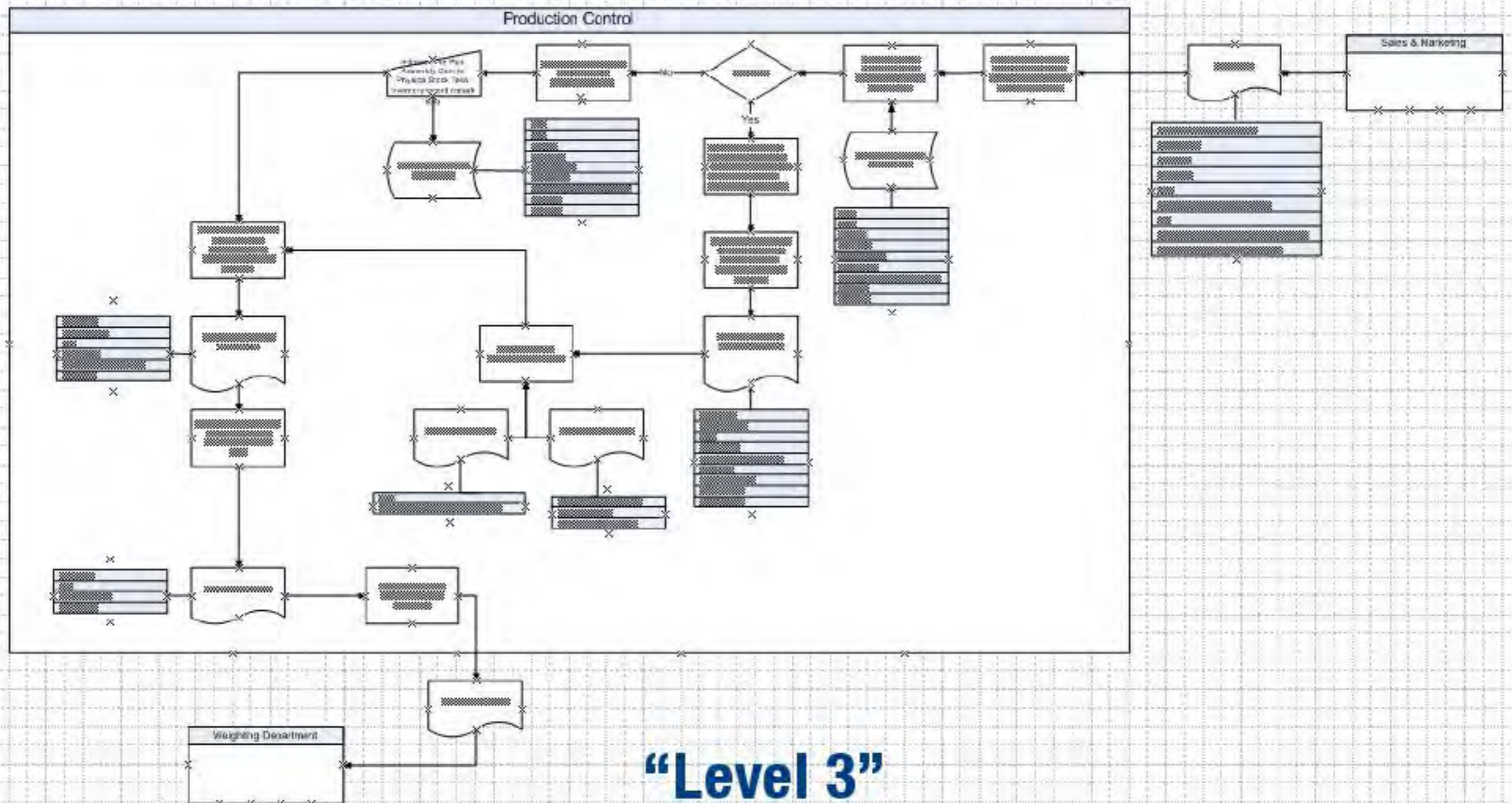


“Level 1”

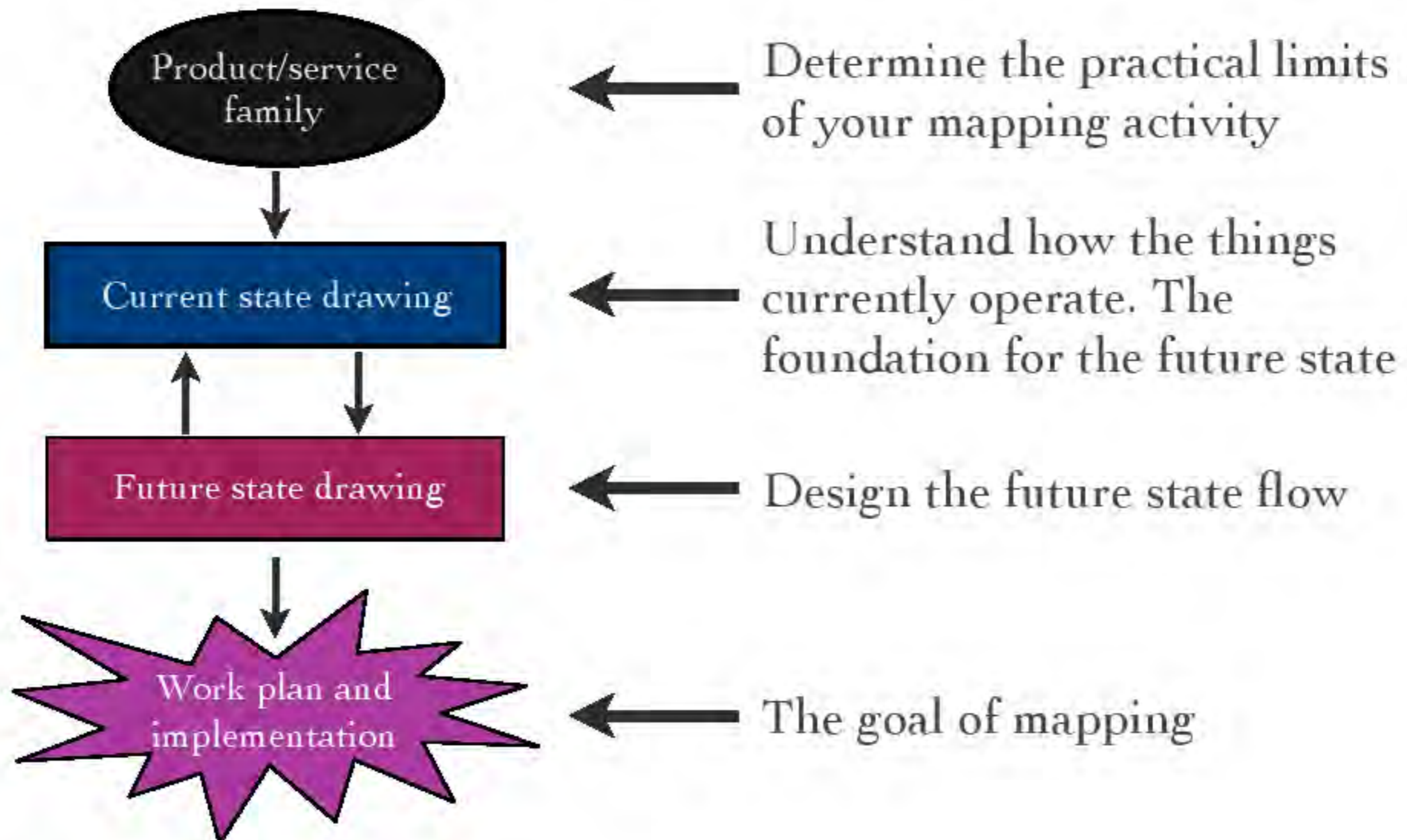
Value Stream Mapping



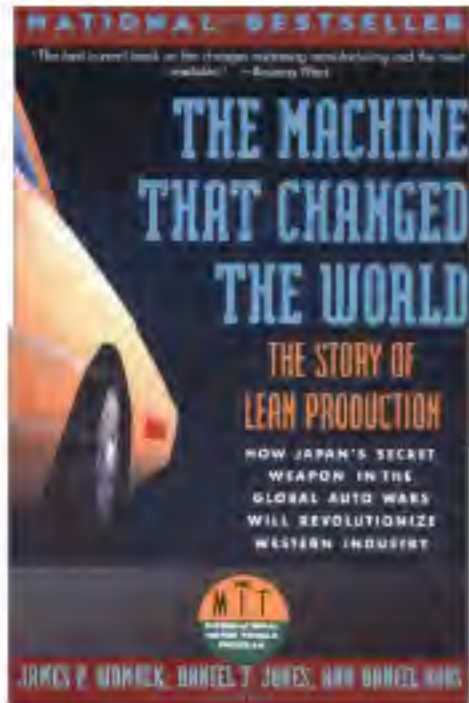
Value Stream Mapping



Value Stream Mapping

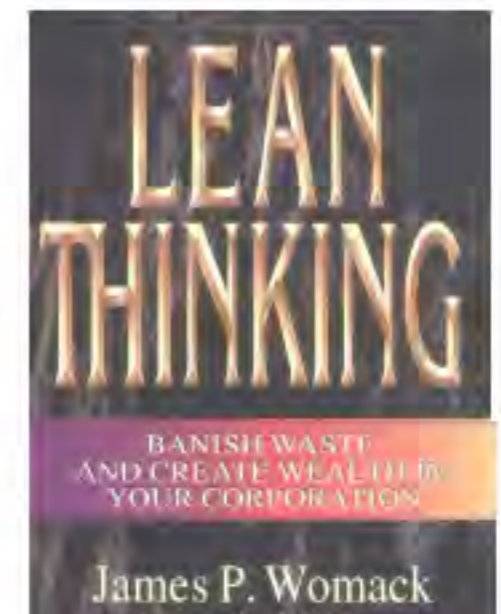


References



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Thank You